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**Constrained Potential:
A Characterisation of Mexican Microenterprises**

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Constrained Potential: A Characterisation of Mexican Microenterprises

Abstract

This paper investigates the existence and nature of constraints prevailing among Mexican microenterprises. It provides inter-temporal insights by relying on firm-level data spanning from 1994 to 2012. A performance index is defined based on firm levels of capital stock and monthly profits, and is used to estimate the empirical probability of a business's success. The predicted values are used to classify every microenterprise into one of three categories: upper, middle, or lower segment. Overall, the study provides evidence of constrained productivity and capital misallocation. Specifically, middle-segment firms exhibit entrepreneurial features and their average marginal returns are 15 percent. Because this segment faces mainly external constraints, cost-effective interventions are plausible. Regarding the lower-segment firms, it is estimated that their average monthly marginal returns are 30 per cent, compared to 1 per cent for the upper segment. It is also shown that, over time, the share that middle-segment firms represent relative to all microenterprises increased from 16 to 22 percent. Lastly, the sources of variation in monthly profits among segments are explored using the Oaxaca-Blinder decomposition method.

Keywords: microenterprises, returns to capital, constrained productivity, Mexico, decomposition method, empirical probability

JEL Classification: C25, D22, D24, N86, O12, O17.

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1 Introduction¹

Microenterprises provide approximately 47 per cent of employment and represent 97 per cent of the existent economic units in Mexico.² Despite their predominance, their contribution to GDP is limited.³ Furthermore, they do not export; tend to be informal; and are concentrated in the lowest tiers of profits, capital stock, wage expenditure, and innovation activities. For

1 I would like to acknowledge the helpful comments of Jann Lay and Julio C. Leal-Ordóñez. I am grateful for the support and hospitality I received to develop this paper as a guest researcher at the Directorate General of Economic Research of the Mexican Central Bank in the summer of 2016. I also thank the INEGI's Department of Microdata in Mexico City for their assistance. An earlier version of this paper was presented at the Bolivian Conference on Development Economics and the Mexican Colloquium on Mathematical Economics and Econometrics. The final responsibility for the content is mine.

2 The statistics were self-computed at the microdata office of the National Institute of Statistics and Geography (INEGI) in Mexico City and followed security protocols to ensure the confidentiality of respondents. The reported shares are representative at the national level because they correspond to the merging of the economic census and the National Survey of Microenterprises (ENAMIN) adjusted by the expansion factor. This procedure is only possible with 2009 data because that was the only year in which both data sources were collected simultaneously.

3 According to the 2014 economic census, microenterprises contribute 9.8 per cent of GDP, small firms 9.5 per cent, medium-sized firms 16.6 per cent, and large ones 64.1 per cent.

more than two decades, numerous reforms oriented towards liberalisation and structural improvements have been implemented. However, the average levels of capital stock and profits among microenterprises have barely changed. To explain these microenterprises' apparent stagnation and Mexican economic development, it is necessary to understand the features of these firms and the constraints they face.

The analysis relies on a micro-level firm survey and pools data on the 1990s on the one hand and on the current decade on the other. Each data block is split into three groups of microenterprises according to the estimated probability of success. Since all groups are empirically determined and comprise homogeneous firms, they are denominated segments.⁴ This procedure results in several outcomes. First, a detailed characterisation of every firm segment is obtained. The strong heterogeneity of microenterprises can thus be better understood and their needs directly assessed. Second, the nature of the constraints these firms face can be discussed, together with policy implications. Third, an inter-temporal comprehension of microenterprise profiles and constraints is feasible by comparing time periods.

Three firm segments are determined empirically: upper, middle, and lower. By construction, the upper segment comprises 10 per cent of the sample – namely, the highest-performing firms, as measured by their levels of capital stock and monthly profits. The results show that the average marginal return to capital of this segment is close to the market interest rate. Middle-segment firms are similar to upper-segment firms in terms of observable characteristics and behaviours; however, they are not as successful. The estimated monthly marginal returns to capital are high on average; furthermore, the share of this group of firms increased between 1994 and 2012. Lastly, despite the low socio-economic profile of the lower-segment firms, the average marginal return to capital of these microenterprises is very high. Altogether, these findings suggest the existence of constrained productivity and capital misallocation, as well as the plausibility of cost-effective interventions.

The paper further explores the sources of variation using the Oaxaca-Blinder decomposition method. To explain the differences in monthly profits, the study first compares the upper segment with the middle segment and then with the lower segment. The results show that the coefficient effects explain most of the variation between the upper and middle segments. Despite their observable similarities, microenterprises from the middle segment need to build further competencies. By contrast, the comparison between the upper and lower segments shows that the endowments effect is almost twice as large as the coefficients effect. Therefore, the severe lack of capital experienced by lower-segment microenterprises is what constrains their growth the most.

Overall, the study provides further evidence of the constrained potential exhibited by microenterprises and highlights the necessity of policies that take into account the differentiated needs of firm segments. Interventions tailored to distinguish between internal and external constraints are more likely to be successful in fostering firm growth.

⁴ See Nichter and Goldmark (2009) for a more detailed definition of observational segments.

The remainder of this paper is structured as follows. Section 2 introduces the analytical framework and the literature review, and Section 3 goes on to outline the data structure and provide the main descriptive statistics. Section 4 explains the empirical methodology used to identify three distinct firm segments, while Section 5 describes each group of firms. Section 6 estimates the monthly marginal returns to capital of all the firm segments. Section 6 explores the sources of profit variation using a decomposition method. The last two sections discuss the results and conclude the paper.

2 Scientific Framework

Microenterprises are the most common firm category in the Mexican economic landscape and represent a significant source of employment. This contrasts with the log-normal-like distribution of the private sector observed in developed countries.⁵ That developing countries have relatively few small and middle-sized firms is a stylised fact that has been described in the literature as the “missing middle” (Ayyagari, Beck, and Demirguc-Kunt 2007; Tybout 2000). Recently it has been argued that developing countries also have a “missing large,” because large firms are also relatively scarce (Hsieh and Olken 2014).

Microenterprise performance is lower relative to bigger firms for virtually any indicator, and this gap appears to have widened since liberalisation.⁶ Padilla-Pérez and Villarreal (2014) show that the slowness of the structural change process and of productivity growth can be partly explained by the labour flows into small-scale informal firms.

The performance disparity is also related to how small-scale informal firms have been conceptualised in economic analyses. About half a century ago, a dichotomous framework was introduced (Hart 1972; Harris and Todaro 1970; Lewis 1954), according to which these firms were residual economic units whose prevalence in the market was explained by the lack of employment opportunities. However, as the research advanced, it was found that small-scale informal firms are highly heterogeneous (Mead and Morrisson 1996) and that productive and survival activities coexist (Cunningham and Maloney 1998; Liedholm and Mead 1998). Not everyone employed in these firms was implicitly queuing for a job in larger formal ones. In fact, there is evidence of well-performing wage workers who choose micro-entrepreneurship (Fajnzylber, Maloney, and Rojas 2006). Also, there are strong linkages between the formal and informal sectors (Boehme and Thiele 2014).

5 Microenterprises only account for 15 per cent of employment in the US and 31 per cent in the EU. In terms of the number of firms, they represent 70 and 92 per cent, respectively. Furthermore, Mexican microenterprises are small relative to the definition of their category because only approximately 1.4 per cent of them have a total workforce of more than five persons. Note: For the United States, the information corresponds to 2008 and was obtained from the U.S. Small Business Administration (SBA). For Europe, the average for the period 2008–2013 of the Bank Lending Survey (BLS), which is published by the European Central Bank, was considered. The statistics that were provided include one-person firms (self-employment).

6 See the economic census reports from INEGI and the 2014 McKinsey report on Mexican growth and prosperity.

Recent studies have, furthermore, found empirical evidence of the existence of constrained productivity using survey data (Siba 2015; Falco et al. 2011; Grimm, Krueger, and Lay 2011; McKenzie and Woodruff 2006) and experimental data (Fafchamps et al. 2011; De Mel, McKenzie, and Woodruff 2008; D. McKenzie and Woodruff 2008). The current state is that some authors insist on a dichotomous point of view (Puyana and Romero 2012) while others believe that microenterprises may become key promoters of development if the constraints they face are mitigated (Li and Rama 2015).

The weight that microenterprises have as economic units and as sources of employment, together with their interrelation with informality, makes them relevant from a scientific perspective. However, their high degree of heterogeneity makes it difficult to study them. Classifying microenterprises or generalising the results of analyses may therefore become a questionable endeavour. For instance, classifications might vary substantially depending on the researcher's thematic interest or disciplinary background, or they might be context specific. Moreover, the analysis may be too simplistic when choosing an indicator to determine the similarity of economic units or it may become prone to the "curse of dimensionality" if the number of benchmark indicators increases. To date, only a few studies have refined their analysis of heterogeneity by relying on either factor-cluster analysis (Cunningham and Maloney 1998) or the empirical probability of firm success (Grimm, Knorringa, and Lay 2012). My paper follows closely on the latter study in that, by relying on a clearer classification procedure, it provides more accurate and valid insights.

Lastly, the literature on the constraints hindering firm growth is also worth mentioning briefly. In 2006, McKenzie and Woodruff disproved the existence of a poverty trap by testing the underlying theoretical model (Banerjee and Duflo 2005; Banerjee 2001; Banerjee and Newman 1993). They found that an interaction between capital market imperfections and high minimum-scale investments is not sufficient to explain the low growth and low capital reinvestment of Mexican microenterprises. This empirical evidence supporting the idea of constrained productivity among small-scale firms sparked interest in conducting similar tests in different parts of the world, such as Africa, Peru, and Ethiopia (Grimm, Krueger, and Lay 2011; Göbel, Grimm, and Lay 2012; Siba 2015). A currently accepted conclusion driving further research efforts is that the exhibited constrained productivity may be mainly explained by economic, institutional, or social constraints (Grimm, van der Hoeven, and Lay 2011). Accordingly, my paper focuses on exploring the nature of the constraints that different groups of sufficiently similar microenterprises (segments) face.

3 Data Composition, Inter-Temporal Stagnation, and Firm Heterogeneity

The National Survey of Microenterprises (ENAMIN) is a three-stage survey that stems from the National Survey on Employment (ENEU-ENOE).⁷ Its sampling design is probabilistic, strati-

7 In 2005 the Urban Labor Survey (ENEU) was replaced by the National Survey on Employment (ENOE), which also samples rural areas.

fied, and conglomerated. During the first stage, the employment survey collects information about individual socio-economic characteristics and employment. In the following stages, the ENAMIN stems from the subsample of individuals that own a microenterprise. The sampling design enables the collection of extremely detailed information about microenterprises. In that sense, there is no *ex ante* restriction by firm size, and the sampling of these economic units is independent from managerial behaviour (e.g. informality) and operational mode (e.g. use of premises).

The data set is representative on a large scale and, unlike the economic census, takes into consideration (i) informal firms⁸ and (ii) firms that lack premises. This paper makes use of almost all the existent ENAMIN surveys, which are usually collected biannually. It pools the cross-sectional surveys⁹ from 1994, 1996, and 1998 on the one hand, and those from 2008, 2010, and 2012 on the other.

The first time block, ranging from 1994 to 1998, corresponds to the period immediately following the introduction of liberalisation reforms, the ratification of the North American Free Trade Agreement (NAFTA), and the devaluation of the Mexican peso (MXN), while the second time block, ranging from 2008 to 2012, comprises the newest available data. Each survey is highly homogeneous relative to those of the corresponding time period. The sampling design makes it possible to generalise the results to the population under study. However, the 1994–1998 surveys are representative for urban areas, and the 2008–2012 ones are representative at the national level. Also, the first time block captures firms employing up to five workers and the second one broadens its definition to up to 10 workers. Therefore, both data time blocks become comparable once geographical features and firm size are taken into consideration.

The master data sets comprise 29,528 observations from the 1994–1998 surveys and 36,528 observations from the 2008–2012 surveys. The nominal responses correspond to 2016 MXN and are reported in USD. They were first deflated and then adjusted by currency to avoid exchange rate volatility.¹⁰ Only microenterprises that had at most five workers and operated in cities that have had more than 100,000 inhabitants since the 1990s have been kept. In what follows, some clarifications about the composition of the data sets are mentioned. First, despite the exclusion of firms with a total workforce of more than six persons (including the entrepreneur) from the second time block, the majority of the observations have been kept because those firms only represented 0.9 per cent of urban microenterprises. Second,

8 According to INEGI's classification, firms that belong to the informal sector rely strongly on the household's income to operate without constituting themselves as a corporation and without undertaking a standard accounting system. This leads to a situation where the economic unit can be hardly audited and where its existence cannot be strictly separated from that of the household.

9 Each year's sample was also considered separately to ensure that they all do behave similarly. The descriptive statistics and econometric models yielded similar results, thus confirming that combining the data across years to increase the sample and compare time periods is feasible.

10 The nominal responses are first converted into 2016 MXN using the GDP deflator and are then converted into USD. The MXN-USD exchange rate used is 18.102, which, like the deflator, corresponds to February 2016.

38 cities were considered for the analysis.¹¹ This city readjustment allowed for 51.3 per cent of the urban 2008–2012 sample to remain part of the data set. Lastly, the analysis considers entrepreneurs that are either men or women aged at least 15 years.

Table 1 shows that there have been positive transitions during the past two decades from gender, educational, and business experience perspectives. First, more women have joined the labour force as micro-entrepreneurs. Between 1994 and 1998, approximately one-third of microenterprise owners were female; this share increased to approximately one-half during the period 2008–2012. Second, the level of education rose substantially for both firm owners and workers. Specifically, the share of micro-entrepreneurs without primary education decreased from 30 to 4 per cent, while the percentage of people holding at least a bachelor's degree doubled. Third, firms remained in the market for longer periods of time and the owners gained experience. For instance, the average age of firms rose from seven to 11 years. Interestingly, the partitioning of firms by age shows that the share of firms older than 10 years increased the most. In line with this observation, workers and entrepreneurs are, on average, older and more experienced. Overall, these three changes reflect general macroeconomic trends in Mexico.

Table 1. Descriptive Statistics Depicting Positive and Negative Trends in Microenterprise Indicators across Time

Positive transitions	Mean		sd	
	2008–2012	1994–1998	2008–2012	1994–1998
Microenterprises owned by women	45%	32%	50	47
Education				
Less than primary school	4%	30%		
Primary school	32%	32%		
Secondary school	27%	20%		
High school	16%	10%		
At least undergraduate education	20%	9%		
Mean firm age	11 yrs.	7 yrs.	10	9
Mean years of experience	29 yrs.	27 yrs.	15	15
Apparent stagnation				
	Mean		sd	
	2008–2012	1994–1998	2008–2012	1994–1998
One-person microenterprises	68%	65%	47	48
Mean working hours per week	60 hrs.	66 hrs.	52	51
	Monthly profits			
mean	USD 352	USD 422	544	3316
median	USD 220	USD 216		
	Capital stock			
mean	USD 4,458	USD 4,287	19,084	14,297
median	USD 739	USD 619		

11 Almost all urban areas are considered. Specifically, the cities kept in the sample are Acapulco, Aguascalientes, Campeche, Cd. de Mexico, Cd. Juárez, Celaya, Chihuahua, Coatzacoalcos, Colima, Cuernavaca, Culiacán, Durango, Guadalajara, Hermosillo, Irapuato, León, Manzanillo, Matamoros, Mérida, Monclova, Monterrey, Morelia, Nuevo Laredo, Oaxaca, Orizaba, Puebla, Saltillo, San Luis Potosí, Tampico, Tepic, Tijuana, Tlaxcala, Toluca, Torreón, Tuxtla Gutiérrez, Veracruz, Villahermosa, and Zacatecas.

Despite the qualitative advances, Table 1 also shows that the performance of microenterprises appears to have stagnated during the period under study. Neither capital stock nor monthly profits changed substantially across decades. Furthermore, the share of one-person firms (self-employment) increased, and the average number of weekly hours worked decreased. On the one hand, microenterprises' average capital stock increased from USD 4,284 to USD 4,458, and on the other hand, their mean monthly profits decreased from USD 422 to USD 352. Even when the skewness of both capital stock and profits has faded slightly over time, these indicators show that the performance of microenterprises was below expectations, despite the introduction of structural reforms that liberalised the economy and aimed to improve the conditions of the private sector.

Studies have pointed out that a major reason why Mexico has not grown substantially during the past three decades is low average productivity growth (Cepeda and Ramos 2015; Hanson 2010; Chiquiar and Ramos-Francia 2009). However, it has also been observed that the average economic performance of microenterprises contrasts with that of large firms. For example, the economic census shows that firms that are larger than microenterprises have increased their contribution to GDP and to exports. Table 2 shows the distribution of capital stock and provides further insights about the heterogeneity of microenterprises. The capital stock of firms below the median increased, while that of firms above the median decreased. It is thus the relatively poorer firms that have accumulated the most capital over time. This is in line with the empirical observation that Mexican microenterprises exhibit high marginal returns at low levels of capital (McKenzie and Woodruff 2006; McKenzie and Woodruff 2008). It should also be noted that, despite the slight increase in capital over time, profits decreased across all levels of capital.

Table 2. Firm Characteristics by Capital Percentile

		p10	p25	p50	p75	p90
<i>General characteristics</i>						
Capital stock	2008–2012	24	68	375	1,606	35,295
	1994–1998	21	63	350	1,628	27,426
Monthly profits	2008–2012	142	180	264	397	904
	1994–1998	210	208	279	556	960
Labour (weekly hours)	2008–2012	36	41	55	70	112
	1994–1998	39	44	55	73	113
Firm size (total staff)	2008–2012	1.2	1.3	1.5	1.7	2.4
	1994–1998	1.1	1.2	1.4	1.7	2.4
Entrepreneur is a woman	2008–2012	0.52	0.44	0.34	0.25	0.22
	1994–1998	0.38	0.33	0.35	0.25	0.16
Age of entrepreneur	2008–2012	47	46	45	44	46
	1994–1998	44	44	42	42	44
Age of microenterprise	2008–2012	10	10	10	11	14
	1994–1998	7	8	8	7	9

		p10	p25	p50	p75	p90
Share of one -person firms	2008–2012	0.86	0.80	0.69	0.58	0.34
	1994–1998	0.90	0.84	0.72	0.57	0.31
Firm has premises	2008–2012	0.05	0.09	0.27	0.47	0.74
	1994–1998	0.03	0.05	0.17	0.43	0.71
<i>Industry (share)</i>						
Construction	2008–2012	0.11	0.16	0.12	0.06	0.02
	1994–1998	0.08	0.13	0.08	0.04	0.02
Manufacturing	2008–2012	0.15	0.15	0.15	0.15	0.18
	1994–1998	0.13	0.12	0.20	0.16	0.21
Miscellaneous services	2008–2012	0.18	0.17	0.20	0.18	0.13
	1994–1998	0.43	0.39	0.27	0.23	0.15
Personal services	2008–2012	0.02	0.01	0.02	0.03	0.06
	1994–1998	0.01	0.01	0.01	0.01	0.01
Professional services	2008–2012	0.00	0.01	0.03	0.05	0.05
	1994–1998	0.02	0.02	0.04	0.07	0.09
Repair services	2008–2012	0.06	0.04	0.01	0.02	0.01
	1994–1998	0.00	0.00	0.00	0.00	0.00
Restaurants and hotels	2008–2012	0.18	0.18	0.16	0.09	0.04
	1994–1998	0.08	0.10	0.16	0.10	0.04
Retail and wholesale trade	2008–2012	0.28	0.27	0.29	0.36	0.35
	1994–1998	0.25	0.22	0.22	0.33	0.3
Transportation services	2008–2012	0.02	0.01	0.01	0.06	0.15
	1994–1998	0.01	0.01	0.01	0.06	0.19

The share of microenterprises involved in trade activities increased over time across the capital stock spectrum. In contrast, the share of microenterprises within the service sector (personal, professional, and miscellaneous) consistently declined. Lastly, the number of average hours worked weekly decreased over time despite the larger average size of firms below the 25th percentile. This observation is mainly explained by the higher share of one-person firms at higher capital levels observed across the two decades.

4 Determining Firm Segments

The previous section showed that despite the observed improvements in socio-economic features during the past two decades, microenterprises have remained relatively stagnant in terms of capital and profits. In this paper, I investigate (i) whether microenterprises face constraints that impede their growth, (ii) the nature of those constraints, and (iii) how they have changed during the past two decades. To do so, I rely on the methodology developed by Grimm, Knorringa, and Lay (2012).

The underlying idea of the empirical analysis is to identify firm segments in order to test the three questions mentioned above. Segments are defined as relatively homogeneous

groups of observations sharing similar characteristics that differentiate them from other groups (Nichter and Goldmark, 2009). Intuitively, the characteristics of this study's segments are as follows: (i) the "upper segment" is composed of the top performers, (ii) the "middle segment" includes microenterprises with a high empirical probability of becoming top performers given their observable characteristics, and (iii) the "lower segment" is made up of firms with survivalist features.

Determining to which segment each economic unit belongs is done by following these steps: First, a subgroup of enterprises is defined as the upper segment based on their capital stock and monthly profits. Second, among a list of socio-economic features, some owner and firm characteristics are distinguished based on their correlation with the two performance measures considered. Third, these variables are used as controls to predict the empirical probability of being a successful firm according to the performance criteria set out in the first step. Fourth, each microenterprise is classified into one of the three firm segments according to its predicted probability of success. Finally, the differences between the characteristics and behaviour of all three segments are discussed.

Accordingly, the upper segment (or set A) is defined as the top 10 per cent of the most successful microenterprises. To classify each one of the observations in the data sets, I use the index I_i^{up} . This index takes the value "1" when the economic unit complies with two performance criteria: size (capital stock) and profitability (monthly profits). Otherwise, I_i^{up} takes the value "0". Specifically, the firm is considered part of the upper segment when it belongs to the upper 15th percentile of capital stock and, additionally, exhibits high levels of profits. This is equivalent to the firms in the upper 66th percentile of profits which have at least USD 6,400 in capital stock. The two classification criteria thus allow us to take into consideration past and current performance.

$$I_i^{up} = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases} \quad (1)$$

It should be noted that employment is not considered an indicator of top performance – first, because firm size shows little variation across the distribution of capital; second, because it might change over the course of a year; and third, because microenterprises rely heavily on unpaid family labour. The performance indicators employed are measured as follows: capital stock corresponds to the replacement cost of the work equipment owned, the premises, and the inventories. The average monthly profits correspond to those reported by the entrepreneur in answer to the following question: "How much do you normally obtain as earnings after deducting expenses?" This measure of profits is used by taking into consideration that it comprises a lower measurement error relative to the computation of income minus costs (De Mel, McKenzie, and Woodruff 2009).

4.1 Binary Response Model

The empirical classification of microenterprises results from a binary response model (probit) where I_i^{up} is regressed on the list of control variables for vector X_i (see Table 3). The corresponding estimation is repeated two times. In this section I present the first specification or base model, where only standard socio-economic variables are included as regressors. The variables employed thus correspond to inherent features that were largely already determined when the firm started to operate: gender, education, marital status, age of the owner, and age of the firm. The squared values of the two latter variables are also considered. The econometric model further controls for year and industry fixed effects.

Table 3. Description of the Variables Employed in the Econometric Analysis

Variable	Description
Average wage	Refers to the average hourly wage in a given state and industry for the corresponding year. This data is obtained from the labour survey (ENEU and ENOE).
Capital stock	Measured as the replacement cost of tools, utensils, machinery, furniture, equipment, land, and vehicles that are property of the entrepreneur and employed for business purposes, plus the market price of all firm inventory. In the case of the 1994–1998 data, the category “other type of capital” is not considered to make it comparable with the period 2008–2012.
Firm age	Number of years since the owner began the activity or became head of the business.
Firm size	Refers to the number of persons comprising the workforce, including both the entrepreneur and the workers. In the sample, this figure ranges from one to six to enable comparability across decades.
Industry	The SCIAN classification is grouped into nine industries: construction, manufacturing, miscellaneous services, personal services, professional services, repair services, restaurants and hotels, retail and wholesale trade, transportation services. Reference category: manufacturing.
Labour	Owner’s labour defined as the number of hours usually allocated per week to serve clients, stock up the merchandise for sale, buy materials, make repairs, and carry out business transactions. The labour of employees is defined similarly. The data allows us to distinguish between unpaid and paid labour.
Marital status	Dummy variable. Reference category: unmarried people.
Monthly profits	Monthly earnings of the self-employed which are directly reported in response to the question: “How much do you normally obtain as earnings after deducting expenses?”
Motivation to start the business	Three categorical variables grouping the main motives behind microentrepreneurs’ decisions to start operations: (i) family tradition or obtaining a higher income; (ii) complementing family income, not finding a job, or being laid off. The reference category encompasses all the other motivations captured in the survey – for example, finding a good business opportunity, having more flexible hours, etc.
Owner’s age	Continuous variable. The minimum value is 15 years old.
Owner’s gender	Dummy variable. Reference category: men.
Years	Categorical variable for 1994, 1996, 1998, 2008, 2010, and 2012. Reference category: 1994 in the 1994–1998 regressions, and 2008 in the 2008–2012 regressions.

Equation 2 is the probit specification where the response probability $\Pr(I_i^{up} = 1)$ is modelled in terms of the vector of control variables X , the vector of coefficients β , and a random error term ω . The function Φ corresponds to the standard normal cumulative distribution function and it takes on values strictly between zero and one for all real numbers z : $0 < \Phi(z) < 1$. Therefore, the estimated probabilities of firm success also take values between zero and one:

$$0 < \widehat{\Pr}(I_i^{up}) < 1.$$

$$\Pr(I_i^{up} = 1) = \Phi(\beta_0 + X_i'\beta_1 + \omega_i) \quad (2)$$

Columns one and four of Table 4 present the maximum likelihood estimations of Equation 2 for each decade.¹² The estimates for “age of the entrepreneur” and “age of the firm” show that time has a significant effect that is positive at decreasing rates. The entrepreneur’s education has positive and significant effects on the empirical probability of high performance. This is especially true for those firms where the owner has attained at least a bachelor’s degree. The effect of being married is positive and significant, although it has decreased over time. Lastly, the effect of being a woman is highly significant and negative.

Table 4. Binary Response Model (Probit)

Control variable	I_i^{up} 2008-2012			I_i^{up} 1994-1998		
	(1)	(2)	(3)	(4)	(5)	(6)
Age of entrepreneur	0.024** (0.008)	0.029** (0.011)	0.002** (0.001)	0.042*** (0.005)	0.036*** (0.006)	0.003*** (0.000)
Age squared of entrepreneur	-3.0e-4*** (8.7e-5)	-3.4e-4** (1.1e-4)	-2.9e-5*** (7.5e-6)	-4.3e-4*** (5.5e-5)	-3.6e-4*** (6.3e-5)	-2.7e-5*** (2.8e-6)
Female entrepreneur	-0.604*** (0.053)	-0.543*** (0.065)	-0.042*** (0.006)	-0.424*** (0.056)	-0.327*** (0.078)	-0.021*** (0.005)
Married	0.214*** (0.044)	0.157*** (0.043)	0.013** (0.004)	0.325*** (0.042)	0.237*** (0.059)	0.016*** (0.004)
Primary school	0.241 (0.151)	0.073 (0.169)	0.006 (0.015)	0.255*** (0.045)	0.175** (0.060)	0.014** (0.005)
Secondary school	0.498** (0.162)	0.266 (0.191)	0.025 (0.021)	0.637*** (0.055)	0.429*** (0.065)	0.041*** (0.009)
High school	0.845*** (0.169)	0.504** (0.195)	0.056 (0.030)	0.948*** (0.066)	0.596*** (0.069)	0.069*** (0.013)
At least undergraduate studies	1.311*** (0.159)	0.832*** (0.180)	0.110** (0.037)	1.252*** (0.087)	0.798*** (0.089)	0.106*** (0.020)
Age of firm	0.039*** (0.005)	0.028*** (0.007)	0.002*** (0.001)	0.026*** (0.004)	0.021*** (0.004)	0.002*** (0.000)
Age of firm squared	-6.8e-4*** (1.6e-4)	-6.0e-4** (1.9e-4)	-5.1e-5** (2.0e-5)	-5.3e-4*** (1.2e-4)	-5.0e-4*** (1.1e-4)	-3.5e-5*** (9.2e-6)

12 The remainder columns correspond to the extended probit, which is explained in the following section.

Control variable	I_i^{up} 2008-2012			I_i^{up} 1994-1998		
	(1)	(2)	(3)	(4)	(5)	(6)
Family tradition or increase income		0.147** (0.049)	0.013** (0.005)		0.294*** (0.038)	0.023*** (0.003)
Book keeping		0.478*** (0.052)	0.045*** (0.003)		0.600*** (0.100)	0.050*** (0.009)
Firm has premises		0.470*** (0.048)	0.045*** (0.008)		0.512*** (0.042)	0.046*** (0.007)
One person firm		-0.054 (0.036)	-0.004 (0.003)		-0.207** (0.065)	-0.016** (0.005)
Share of paid workers		0.667*** (0.046)	0.057*** (0.005)		0.505*** (0.038)	0.037*** (0.003)
Contact with government		0.116* (0.050)	0.011* (0.005)		0.157*** (0.042)	0.013*** (0.004)
Contact with trade associations		0.115* (0.055)	0.011* (0.005)		0.227*** (0.032)	0.019*** (0.004)
Constant	-2.644*** (0.237)	-3.225*** (0.311)		-2.538*** (0.157)	-3.228*** (0.177)	
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,772	14,655	14,655	18,478	18,386	18,386
Pseudo R-squared	0.1730	0.2953	0.2947	0.1838	0.3423	0.3423

*** p < 0.001, ** p < 0.01, * p < 0.05

I then consider the estimators (β_0 and β_1) to predict the probability of being a top performer for every observation in the sample. Therefore, $\Pr(I_i^{up} = 1)$ refers to the empirical probability of belonging to the upper segment given the observable characteristics of the firm.

$$\widehat{\Pr}(I_i^{up} = 1) = \Phi(\widehat{\beta}_0 + X_i' \widehat{\beta}_1) \tag{3}$$

The shares of the two other segments are determined by choosing a cut-off point for $\widehat{\Pr}(I_i^{up} = 1)$. Microenterprises classified as middle-segment firms are those whose average predicted probability of success equals that of firms in the upper segment:

$$E[\widehat{\Pr}(I_i^{up}) | I_i^{up} = 1] = E[\widehat{\Pr}(I_i^{up}) | I_i^{up} = 0] \tag{4}$$

Although there are other possible criteria to define the threshold, this one provides a clear cut-off where the upper and middle segments should be equally likely to be successful. This implies that the distribution of the observable variables X is the same in both groups.

The empirical strategy leads to the determination of three firm segments: upper, middle, and lower. The upper segment is composed of those firms which are indeed top performers ($I_i^{up} = 1$). The middle segment includes microenterprises with a high empirical probability of being top performers given their observable characteristics, which, nonetheless, are not yet as successful. The lower segment comprises the remainder of the firms. Accordingly, Table 5 shows some features of each firm segment.

Table 5. Classification of Each Segment Share across Decades

Decade	Segments		$\bar{Pr}(I_i^{up})$	Share	Capital	Profits	Labour	Size
2008–2012	Upper	mean	0.22	10	25,422	1,076	112	2.4
		sd	0.14	-	46,932	1,093	74	1.4
	Middle	mean	0.22	31	3,251	392	65	1.6
		sd	0.10	-	14,536	375	49	1.0
	Lower	mean	0.04	59	1,315	261	58	1.5
		sd	0.04	-	4,226	286	47	0.9
1994–1998	Upper	mean	0.24	10	23,136	1,136	114	2.4
		sd	0.16	-	33,402	3,567	68	1.4
	Middle	mean	0.24	25	3,430	439	68	1.5
		sd	0.11	-	7,900	1,485	46	0.9
	Lower	mean	0.04	65	1,262	326	59	1.5
		sd	0.03	-	3,405	4,282	42	0.8

Overall, the empirical classification matches expectations in qualitative terms. For instance, Table 5 further shows that the upper segment has high levels of capital stock and outstanding profiles in terms of socio-economic characteristics and behaviour. Some examples are educational attainment, profits, and bookkeeping. The lower segment, in contrast, has low levels of capital and its socio-economic and behavioural profile is low. Finally, the middle segment shares features with the other two firm groups. It resembles the upper segment in terms of observable characteristics and is, simultaneously, similar to the lower segment in terms of capital.

The analysis shows that the share of middle-segment firms increased over the period under study. This suggests that microenterprises that face mainly external constraints have become more numerous.

4.2 Refined Classification

The above partition reveals the existence of features that are highly correlated with the probability of being a successful firm. These include (i) starting the business due to family tradition or to have higher earnings, (ii) undertaking bookkeeping, (iii) having premises, (iv) having contact with governmental institutions or (v) trade associations, (vi) providing employment, and (vii) having a high proportion of workers who receive a wage. All these variables are included in the vector of control variables X_i to estimate a second version of Equation 2.

The second probit estimation is refined by including characteristics and behaviours that proxy unobserved characteristics such as ability. This procedure aims to model non-observable terms¹³ that could be systematically included in the error term ω_i . Overall, the iteration of the probit estimation enables more detailed profiling of each firm segment.

13 It is assumed that the behavioural measures enter the model in an additive way. The characterisation could have a certain degree of endogeneity if the proxies employed depended on a third variable.

Columns two and five of Table 4 present the estimates of the extended version of the binary response model. It can be observed that the signs of the estimates are the same for both the simple and the refined econometric specifications (columns one, two, four, and five). Also, the sign of each of the variables considered is as expected.

Columns three and six report the marginal effects of each control variable. This shows that the contribution of age of the owner and age of the firm to being a successful business is negligible (approximately two percentage points). The effect of education becomes economically significant only if the entrepreneur attended at least high school. If the owner has at least a bachelor's degree, the probability of having a successful business increases by 11 percentage points. Similarly, (1) starting the business due to family tradition or to increase income and (2) having contact with the government or (3) with trade associations increase the probability of success by approximately one percentage point.

The negative effect of being a female entrepreneur is significant and has increased slightly over time. For example, during the period 2008–2012 the sole fact of being a woman diminished the probability of success by four percentage points, compared to two during the period 1994–1998. The behavioural variables show that the three features that contribute the most to good firm performance are bookkeeping, operating with premises, and paying a wage to workers. Each factor contributes approximately five percentage points to the probability of firm success. Lastly, firms that do not hire workers are less likely to be successful.

Table 6 presents the resulting share of each firm segment once the cut-off point for the predicted probability of success is determined. If we compare it to Table 5 we can observe that the modification of the econometric model leads to a more refined classification of segments. Furthermore, the observation about the share of the middle segment increasing over time holds. This is a relevant inference because it shows that the number of firms whose main constraints are external rather than internal in nature has increased over time.

Table 6. Classification of Each Segment Share across Decades

Segments	2008–2012	1994–1998
Upper	10	10
Middle	22	16
Lower	67	74

Figure 1 shows the distribution of the predicted probability of success for every firm segment. As a complement, Figure 2 displays the distribution of capital stock for all three firm segments.

Figure 1. Distribution of the Predicted Probability of Success for Every Firm Segment

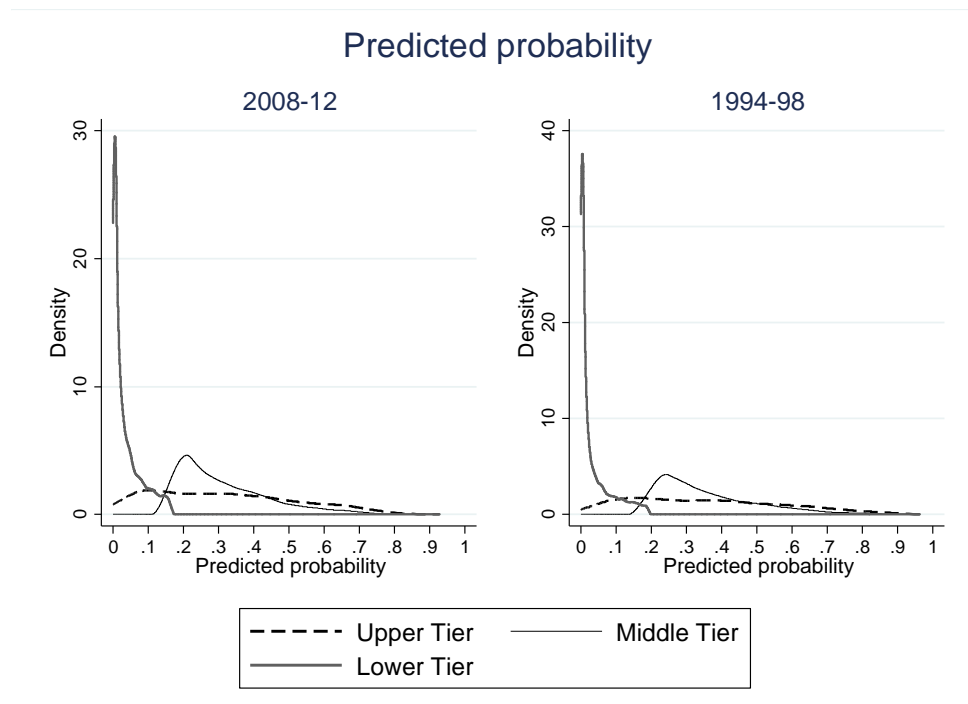
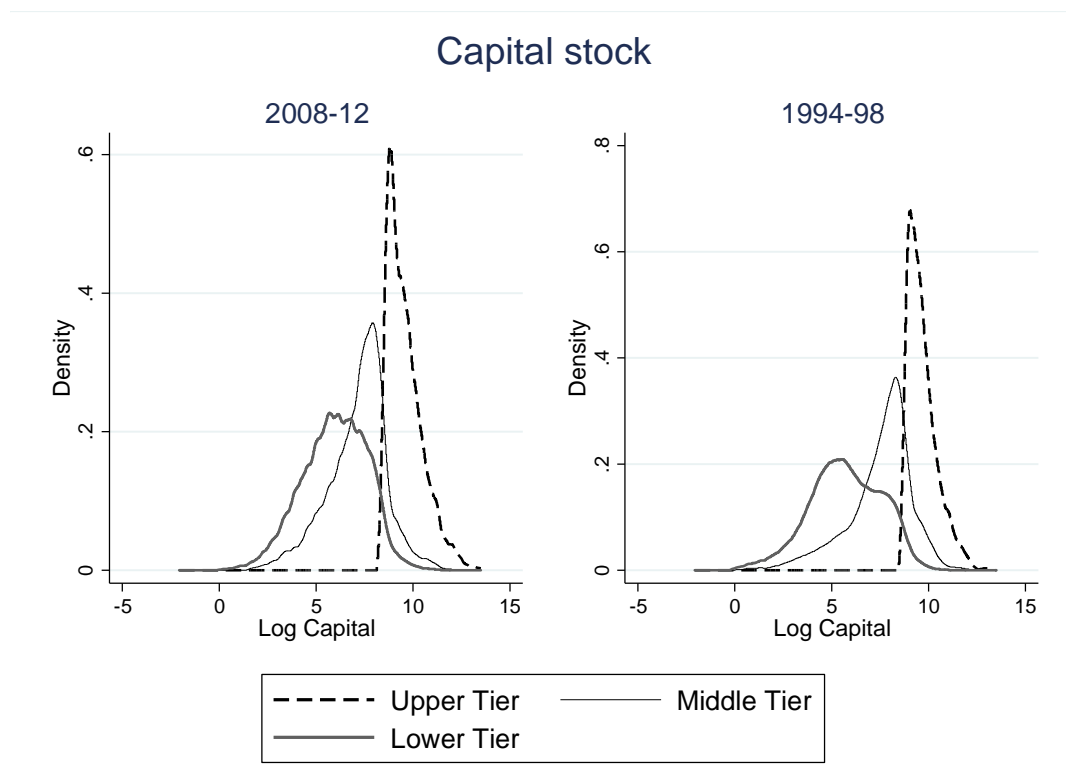


Figure 2. Distribution of Capital Stock of all Three Firm Segments



The distribution of capital shows that, despite similarities in observable characteristics between the upper and middle segments, the latter segment has lower levels of capital stock. Also, of all the segments, the firms within the lower segment have increased their levels of capital the most over time.

5 Characterisation of Microenterprises by Segment

Tables 7 and 8 provide a detailed characterisation of each firm segment during the two time blocks under examination. The descriptive statistics do follow the expected intuitive pattern. First, the upper segment outperforms the other two groups from a financial and behavioural perspective. Second, the lower segment exhibits the exactly opposing trend. Third, the middle segment is similar to the upper one in terms of business characteristics and behaviour; however, it resembles the lower segment in terms of capital and profits. It should be noted that this is an ex post characterisation because the observed features were not used as criteria in the initial classification. They are the result of a methodological specification that allows for empirical classification and avoids rigid or arbitrary definitions.

Table 7. Characteristics of Each Firm Segment during the Period 2008–2012

Concept	Upper	Middle	Lower	Pr(T > t)	Pr(T > t)
Average values	(US)	(MS)	(LS)	(US) vs	(MS) vs
	2008–2012	2008–2012	2008–2012	(MS)	(LS)
Main performance indicators					
Predicted probability $\widehat{\Pr}(I_i^{up})$	0.31	0.31	0.03	0.983	0.000
Capital stock	25,422	3,894	1,390	0.000	0.000
Monthly profits	1,076	418	272	0.000	0.000
Labour (weekly hours)	112	79	55	0.000	0.000
Firm size (total workforce)	2.4	1.9	1.4	0.000	0.000
Characteristics of entrepreneurs					
Woman	0.16	0.30	0.44	0.000	0.000
Head of household	0.78	0.67	0.59	0.000	0.000
Married	0.73	0.67	0.56	0.000	0.000
Age	44	45	45	0.292	0.222
Experience	28	29	29	0.532	0.031
Used to a be wage worker	0.68	0.62	0.56	0.000	0.000
Education of entrepreneur					
Less than primary school	0.01	0.01	0.05	0.295	0.000
Primary school	0.12	0.13	0.38	0.436	0.000
Secondary school	0.18	0.18	0.30	0.947	0.000
High school	0.23	0.24	0.16	0.373	0.000
At least undergraduate education	0.46	0.43	0.11	0.153	0.000
Firm characteristics					
Age	13	12	10	0.000	0.000
Share of paid workers	0.77	0.68	0.39	0.000	0.000
Offers contract to workers	0.12	0.04	0.01	0.000	0.000
Undertakes bookkeeping	0.81	0.70	0.28	0.000	0.000
Used credit to start business	0.11	0.08	0.07	0.002	0.039
Reports not having needed financing	0.04	0.07	0.11	0.000	0.000
Expects to continue operations next year	0.98	0.97	0.96	0.007	0.119
Labour composition					
Share of one-person firms	0.34	0.47	0.71	0.000	0.000
Family firm	0.38	0.52	0.79	0.000	0.000
Mixed firm	0.23	0.11	0.05	0.000	0.000
Non-family firm	0.38	0.38	0.17	0.696	0.000

Concept	Upper	Middle	Lower	Pr(T > t)	Pr(T > t)
Average values	(US)	(MS)	(LS)	(US) vs	(MS) vs
	2008–2012	2008–2012	2008–2012	(MS)	(LS)
Main motive to become entrepreneur					
Family tradition	0.11	0.10	0.05	0.369	0.000
Complement family income	0.09	0.17	0.27	0.000	0.000
Obtain a higher income	0.26	0.22	0.19	0.009	0.000
Could not find a job or was laid off	0.05	0.07	0.08	0.009	0.012
Flexible hours	0.01	0.02	0.02	0.011	0.166
Other	0.35	0.33	0.32	0.131	0.127
Relationship with institutions					
Healthcare registration (IMSS)	0.32	0.16	0.07	0.000	0.000
Registration with the Ministry of Economy	0.07	0.05	0.01	0.000	0.000
Registration with municipality	0.47	0.41	0.18	0.000	0.000
Registration with any trade association	0.28	0.21	0.08	0.000	0.000
Premises					
Firm has premises	0.70	0.60	0.26	0.000	0.000
Premises are owned by the entrepreneur	0.53	0.46	0.55	0.000	0.000
Operates in public thoroughfare	0.02	0.03	0.07	0.134	0.000
Operates at an open-air market (tianguis)	0.05	0.07	0.09	0.320	0.004
Operates in a vehicle	0.41	0.27	0.08	0.000	0.000
Operates at the client's home	0.22	0.23	0.29	0.709	0.000
Operates in the owner's home	0.10	0.21	0.27	0.000	0.000
Operates as a mobile firm	0.01	0.03	0.05	0.102	0.000
Main reported problem					
Low sales	0.22	0.26	0.28	0.001	0.017
High competition	0.21	0.19	0.18	0.057	0.515
Low profits	0.01	0.01	0.01	0.133	0.449
Lack of credit or resources	0.04	0.03	0.03	0.113	0.751
Conflict with workers	0.00	0.00	0.00	0.139	0.000
Debts from clients	0.04	0.03	0.02	0.161	0.068
Problems with the authorities	0.00	0.01	0.01	0.836	0.708
Other	0.33	0.31	0.24	0.366	0.000
No problem	0.15	0.16	0.22	0.580	0.000
Industry					
Construction	0.04	0.04	0.12	0.528	0.000
Manufacturing	0.18	0.16	0.15	0.756	0.219
Miscellaneous services	0.13	0.17	0.18	0.000	0.446
Personal services	0.07	0.05	0.02	0.011	0.000
Professional services	0.05	0.05	0.03	0.323	0.000
Repair services	0.01	0.02	0.03	0.654	0.000
Restaurants and hotels	0.05	0.08	0.15	0.001	0.000
Retail and wholesale trade	0.34	0.33	0.31	0.392	0.035
Transportation services	0.12	0.10	0.02	0.030	0.000

Table 8. Characteristics of Each Firm Segment during the Period 1994–1998

Concept	Upper (US) 1994–1998	Middle (MS) 1994–1998	Lower (LS) 1994–1998	Pr(T > t) (US) vs (MS)	Pr(T > t) (MS) vs (LS)
<i>Main performance indicators</i>					
Predicted probability $\widehat{\Pr}(I_i^{up})$	0.36	0.36	0.03	0.987	0.000
Capital stock	23,136	4,897	1,283	0.000	0.000
Monthly profits	1,136	538	323	0.000	0.006
Labour (weekly hours)	114	88	56	0.000	0.000
Firm size (total workforce)	2.4	2.0	1.4	0.000	0.000
<i>Characteristics of entrepreneurs</i>					
Woman	0.12	0.16	0.32	0.000	0.000
Head of household	0.84	0.74	0.67	0.000	0.000
Married	0.86	0.83	0.66	0.008	0.000
Age	43	43	43	0.983	0.062
Experience	26	27	28	0.657	0.000
Used to be a wage worker	0.68	0.71	0.63	0.061	0.000
<i>Education of entrepreneur</i>					
Less than primary school	0.19	0.19	0.36	0.910	0.001
Primary school	0.20	0.21	0.36	0.653	0.000
Secondary school	0.22	0.22	0.18	0.837	0.000
High school	0.20	0.19	0.06	0.225	0.000
At least undergraduate education	0.19	0.20	0.05	0.665	0.000
<i>Firm characteristics</i>					
Age	8	8	8	0.359	0.000
Share of paid workers	0.73	0.64	0.32	0.000	0.000
Offers contract to workers	0.11	0.07	0.01	0.000	0.000
Undertakes bookkeeping	0.86	0.78	0.28	0.000	0.000
Used credit to start a business	0.12	0.08	0.04	0.000	0.000
Reports not needing financing	0.07	0.09	0.17	0.135	0.000
Expects to continue operations next year	0.96	0.93	0.91	0.000	0.000
<i>Labour composition</i>					
Share of one-person firms	0.32	0.41	0.74	0.000	0.000
Family firm	0.35	0.48	0.77	0.000	0.000
Non-family firm	0.18	0.09	0.05	0.000	0.000
Mixed firm	0.47	0.42	0.18	0.006	0.000
<i>Main motive to become entrepreneur</i>					
Family tradition	0.10	0.08	0.05	0.062	0.000
Complement family income	0.16	0.19	0.34	0.002	0.000
Obtain a higher income	0.53	0.50	0.31	0.030	0.000
Could not find a job or was laid off	0.07	0.09	0.17	0.001	0.000
Flexible hours	0.03	0.03	0.04	0.108	0.048
Other	0.12	0.10	0.09	0.021	0.086

Concept	Upper	Middle	Lower	Pr(T > t)	Pr(T > t)
Average values	(US)	(MS)	(LS)	(US) vs	(US) vs
	1994–1998	1994–1998	1994–1998	(MS)	(LS)
<i>Relationship with institutions</i>					
Healthcare registration (IMSS)	0.34	0.20	0.02	0.000	0.000
Registration with the Ministry of Economy	0.03	0.03	0.01	0.153	0.000
Registration with municipality	0.32	0.31	0.11	0.788	0.000
Registration with any trade association	0.37	0.32	0.11	0.000	0.000
<i>Premises</i>					
Firm has premises	0.67	0.62	0.20	0.002	0.000
Premises are owned by the entrepreneur	0.65	0.35	0.50	0.000	0.000
Operates in public thoroughfare	0.02	0.05	0.09	0.000	0.000
Operates at an open-air market (tianguis)	0.04	0.06	0.06	0.150	0.883
Operates in a vehicle	0.59	0.49	0.08	0.000	0.000
Operates at the client's home	0.23	0.20	0.41	0.159	0.000
Operates in the owner's home	0.09	0.13	0.27	0.009	0.000
Operates as a mobile firm	0.02	0.05	0.07	0.002	0.008
<i>Main reported problem</i>					
Low sales	0.24	0.33	0.36	0.000	0.006
High competition	0.23	0.23	0.18	0.668	0.000
Low profits	0.11	0.11	0.13	0.863	0.002
Lack of credit or resources	0.08	0.07	0.06	0.109	0.230
Conflict with workers	0.01	0.00	0.00	0.165	0.000
Debts of clients	0.09	0.06	0.04	0.001	0.000
Problems with the authorities	0.03	0.02	0.02	0.126	0.002
Other	0.05	0.04	0.03	0.006	0.423
No problem	0.16	0.14	0.18	0.013	0.000
<i>Industry</i>					
Construction	0.02	0.02	0.09	0.679	0.000
Manufacturing	0.20	0.19	0.16	0.254	0.000
Miscellaneous services	0.16	0.17	0.31	0.153	0.000
Personal services	0.01	0.01	0.01	0.964	0.523
Professional services	0.11	0.10	0.03	0.381	0.000
Repair services	0.00	0.00	0.00	0.391	0.023
Restaurants and hotels	0.03	0.05	0.12	0.008	0.000
Retail and wholesale trade	0.29	0.30	0.27	0.500	0.003
Transportation services	0.19	0.17	0.02	0.072	0.000

The tables also provide inter-temporal insights by showing how and by how much the performance of each segment has changed. Despite liberalisation measures and constant reforms, microenterprises have not been able to develop as expected. Additionally, both tables report a t-test for each variable. This allows us to compare whether the differences across segments are significant.

In what follows, I first present the commonalities among all three segments. I then describe the specificities of each firm segment. Lastly, I discuss the relevant contrasts across the groups.

Since the 1990s and across all segments, the average profile of the owner has been a married, middle-aged man who is the head of household. He has almost three decades of experience and used to be a wage worker. To start his business he did not use credit and reports not having needed external financing.

The comparative tables also show that there are certain behavioural commonalities. For example, all firm segments tend to rely on their family to run the business. As they increase their income and capital stock, they start hiring outside the family. Nonetheless, microenterprises tend to stay small and most are not bigger than three people. Despite the positive correlation between firm size and the probability of success, firms in the upper segment are, on average, only one worker bigger than those in the lower segment. This observed threshold may be related to operational costs and the potential penalties of being detected by the tax authorities (Leal-Ordóñez 2014).

Microenterprises seldom rely on credit and normally use their own savings or non-interest financing from their support network. However, the reason they give for this behaviour is that they do not need financing. Furthermore, when asked about the main problem they face, only 4 per cent of microenterprises mentioned credit. Instead, all segments reported “low sales” as their main problem, followed by “facing high competition.” This pattern has been observed since the 1990s.

There is a positive correlation between the probability of success and a microenterprise’s affiliation with institutions. However, it is rare that microenterprises interact with either government institutions or trade associations. Lastly, there is a positive correlation between the use of premises and the probability of success. However, there is a commonality across all firm segments when only firms that lack premises are taken into consideration: home-based businesses. Across all segments, firms that do not have premises operate directly within their home or by visiting their clients’ homes.

The industrial composition shows that microenterprises are heavily concentrated in retail and wholesale trade. Approximately one-third of firms in all three segments undertake trade activities. Furthermore, the share of firms employed in this industry has increased over time in every segment. The movement towards trade and not towards services opposes development expectations. This tendency contrasts with the national censuses, which report more firms in the manufacturing and service sectors. Overall, larger firms and firms with premises are entering into activities that are more human-capital intensive and generate higher value added. Microenterprises are doing the opposite.

It should also be noted that there are only four industries that follow a distinguishable pattern. For instance, the upper and middle segments encompass most of the firms engaged in “personal services” and “transportation.” In contrast, the “construction” and “restaurants and hotels” industries are dominated by the lower segment. Nonetheless, it is interesting to

notice that all industries include microenterprises from all three segments. Furthermore, the distribution of firms by industry is rather similar across all segments. This is also true when only recent entrants¹⁴ are considered, thus confirming that entry barriers across industries do not play a significant role (McKenzie and Woodruff 2006). In principle, microenterprises have the potential to become successful in virtually any sector.

The tables also provide detailed inter-temporal insights. First, the gender and educational transitions have occurred unevenly. On the one hand, more women have entered the labour market as micro-entrepreneurs over time; however, their entrance rate has been highest in the middle segment.¹⁵ This provides evidence of gender-related constraints. On the other hand, across all firm segments, illiteracy has dropped and the share of entrepreneurs with a bachelor's degree has increased. As expected, there is a positive correlation between years of schooling and probability of success. However, monthly profits have not increased at the same rate as schooling.

Second, contrary to the expectations raised by liberalisation measures, profits have decreased over time across all three segments. Capital stock has followed the same negative trend, except within the lower segment, where it has exhibited a modest increase. It is noticeable that the middle segment experienced the strongest shrinkage in terms of capital stock, monthly profits, and weekly hours worked. Simultaneously, it is the only segment that has increased its average firm size across the decades.

These empirical observations complement Table 6 by showing, on the one hand, that the share of middle-segment firms increased by six percentage points over time and, on the other hand, that the hardships they faced grew. Despite the improvements in the socio-economic and behavioural features of middle-segment microenterprises, their economic performance decreased. Therefore, the empirical observations match the concept of "middle segment": firms whose observable characteristics and behaviours are similar to those of successful firms and which are, most likely, subject to external constraints rather than internal limitations.

There are other inter-temporal insights that deserve mention. Microenterprises remained in business for longer across all segments. However, over time, they pulled further away from governmental and trade institutions. Also, the usage and ownership of premises decreased. Lastly, the share of paid and family workers increased. In other words, despite allocating more resources for wages, microenterprises became more reluctant to include non-family members in their business activities.

14 This is defined as microenterprises that have been operating for two years or less.

15 Women do not predominate in any segment. However, they are remarkably scarce in the upper segment. For every 25 entrepreneurs, there are four women in the upper segment, eight in the middle segment, and 11 in the lower segment. Furthermore, even though women most commonly belong to the lower segment (44 per cent), they almost doubled their participation in the middle segment over the period under study (women represented 16 per cent of the middle segment during the 1994–1998 period and their share had increased to 30 per cent by 2008–2012).

I will now turn to the particularities of each segment. During the period under study, the upper-segment firms had approximately 6.5 times more capital than the middle segment and generated 2.5 times as much profit. These firms remained in the market for the longest amount of time (13 years) and practised bookkeeping. Also, the owners of upper-segment microenterprises had a bachelor's degree and started their business to increase their income. These firms tended to operate on an ongoing basis by relying on premises (70 per cent) or on a vehicle (12 per cent). They were mostly employment providers and usually paid their workers. However, their employees generally did not receive a contract (only 12 per cent did).

The middle-segment firms remained in the market for an average of 12 years and relied on both premises and vehicles. These firms were very similar to the upper segment in terms of socio-economic and behavioural characteristics. Other resemblances were educational attainment and the habit of bookkeeping. The motivations for starting businesses were mixed. The majority of business owners reported the motivations that have the highest correlation with the probability of success: obtaining more income and family tradition. Nonetheless, a significant share (17 per cent) started operating out of necessity – to complement the family income. Also, despite being mostly employment providers, firms in the middle segment were less likely to subscribe workers to the national health system and to offer them a contract. Furthermore, these microenterprises only had 2.8 times more capital than the lower-segment firms and generated 1.5 times more profits each month. This suggests severe capital constraints.

Finally, the lower segment was mostly composed of entrepreneurs who had employed only themselves for approximately 10 years. These firms were concentrated in the lowest tiers of capital and profit distribution. Other relevant features were that the owners had only attended primary school, did not undertake bookkeeping, and lacked premises. Also, they started their businesses to complement family income. In accordance with these survivalist characteristics, if lower-segment firms happened to have workers, they were mostly family members who did not have a contract or receive a regular wage.

6 Marginal Returns to Capital

This section explores the capital constraints that each firm segment faces. Based on McKenzie and Woodruff (2006), the monthly profits of microenterprise i (π_i) are modelled as a function of the production factors capital (K_i) and labour (L_i), and unobserved factors at the individual level (Z_i):

$$\pi_i = f(K_i(Z_i), L_i, Z_i) \quad (5)$$

The econometric specification is thus estimated as follows: the log of capital $\ln K_i$ and a vector with the log of three labour categories (L_i) are introduced together with a vector of exogenous variables (X_i). Industry and year fixed effects (D_i) are also considered. An example of

factors considered on Z_i is entrepreneurial ability, which determines profits and capital stock simultaneously. The earnings function is modelled with a log-linear transformation where α_i corresponds to the intercept and ε_i to the error term. The marginal returns to capital are estimated for each time period based on the corresponding pooled cross-sectional data.

$$\ln \pi_i(K_i, L_i, Z_i, X_i, D_i) = \alpha_0 + \alpha_K \ln K_i + L'_i \alpha_L + Z'_i \alpha_Z + X'_i \alpha_X + D'_i \alpha_D + \varepsilon_i \quad (6)$$

Profits, capital, and labour are introduced in log terms. The labour vector includes the weekly hours that the entrepreneur and both paid and unpaid workers normally dedicate to operating the microenterprise. The vector X_i captures firm and entrepreneur characteristics that may affect earnings, such as age, gender, and marital status of the entrepreneur, as well as the age of the firm. The square terms of both age variables are considered to explore the rate of the corresponding effects. Also, five schooling categories are used, with education lower than primary school serving as a reference. The vector also includes the log of the average wage in a given year, the industry, and the state to capture the opportunity costs of (i) belonging to the wage sector and (ii) making profitable investments given short-term shocks that vary across geographical locations. Lastly, dummy variables take into account year and industry effects.

The correlation between capital investment and the unobserved ability of the entrepreneur may lead to the under- or overestimation of marginal returns to capital. For instance, ability may lead to an upward bias of estimated $\widehat{\alpha}_K$ because (i) entrepreneurs with better skills might generate more capital and profits or (ii) because reversed causality between capital and profits may prevail. On the contrary, a downward bias can also emerge (i) because under capital market imperfections, very-high-ability individuals would be more willing to start a business, even at very low levels of capital, and (ii) due to the classical measurement error for profits and capital. To address concerns related to ability, the model specification first takes schooling and age into consideration and then introduces two ability proxies.

The vector Z_i measures the ability of the i th individual first, with a dummy for bookkeeping because higher-ability individuals are more likely to develop an accounting system that provides them with an objective overview of their firm's performance. Second, four dummies capture the entrepreneur's motivation for starting the business: (i) due to family tradition or to have higher earnings, or (ii) to complement family income or because they cannot find a job. All other motives serve as a reference. The idea behind this categorisation is that more capable individuals will be eager to enter self-employment and more likely to put a profitable idea into action.

It should be noted that Equation 6 assumes that unobserved ability can be modelled in an additive manner. Therefore, the inclusion of ability measures leads to unbiased estimations provided that these proxies are uncorrelated with optimal capital stock. If the assumption holds, then the unobserved ability would increase profits without increasing marginal returns to capital. The cross-sectional nature of the data makes it difficult to deal with ability biases and the proxies considered are imperfect. However, they are available for the whole sample and are good predictors of firm performance.

The log-log model is estimated for the complete sample first without ability proxies and then with them. The estimations are pursued for each time period. The regression analysis disregards influential outliers from each subsample by ascertaining them with the DFITS statistic. In that sense, the cut-off threshold is $|DFITS|_i = 2\sqrt{k/N}$, where k stands for the degrees of freedom plus one and N represents the number of observations (Belsley et al. 1980).

Table 9 shows the estimated parameters. Their sign is aligned with expectations and is consistent across decades. I determine that both input factors (K and L) have a positive economic effect on earnings. Nonetheless, labour elasticity is higher relative to that of capital. The owner's labour has the largest economic effect on profits relative to that accrued from workers. Across decades, the profit elasticity of capital is seen to have increased. In contrast, the profit elasticity of entrepreneurs' labour decreased. The positive effects of relying on paid work are larger relative to unpaid work and are seen to have increased across decades and capital levels.

Table 9. Parametric Estimation of Log-Log model

Control variable	log monthly profits		log monthly profits	
	2008–2012		1994–1998	
	(1)	(2)	(3)	(4)
Log of capital	0.182*** (0.004)	0.164*** (0.003)	0.143*** (0.003)	0.128*** (0.004)
Log of entrepreneur's total labour hours	0.150*** (0.010)	0.138*** (0.010)	0.367*** (0.012)	0.354*** (0.016)
Log of paid workers' total labour hours	0.040*** (0.002)	0.026* (0.009)	0.042*** (0.002)	0.018 (0.008)
Log of unpaid workers' total labour hours	0.008** (0.002)	0.020*** (0.003)	0.006* (0.002)	0.029* (0.010)
Age of entrepreneur	0.016*** (0.002)	0.015*** (0.001)	0.014*** (0.001)	0.015*** (0.002)
Age squared of entrepreneur	-2.7e-4*** (2.7e-5)	-2.4e-4*** (1.7e-5)	-2.5e-4*** (1.2e-5)	-2.5e-4*** (1.5e-5)
Female entrepreneur	-0.478*** (0.020)	-0.474*** (0.023)	-0.455*** (0.016)	-0.401*** (0.018)
Married	-0.006 (0.011)	0.002 (0.008)	0.031 (0.016)	0.033 (0.019)
Primary school	-0.010 (0.024)	-0.018 (0.030)	0.075*** (0.011)	0.067*** (0.011)
Secondary school	0.054* (0.017)	0.043 (0.023)	0.137*** (0.016)	0.116*** (0.017)
High school	0.113** (0.025)	0.088* (0.031)	0.272*** (0.028)	0.252*** (0.022)
At least undergraduate studies	0.291*** (0.034)	0.257*** (0.030)	0.510*** (0.032)	0.493*** (0.030)

Control variable	log monthly profits 2008–2012		log monthly profits 1994–1998	
	(1)	(2)	(3)	(4)
Age of firm	0.018*** (0.002)	0.016*** (0.002)	0.017*** (0.002)	0.015*** (0.002)
Age of firm squared	-2.9e-4*** (4.5e-5)	-2.9e-4*** (4.7e-5)	-0.000** (0.000)	-2.5e-4** (6.1e-5)
Log of average hourly wage per industry and state	0.317*** (0.047)	0.311*** (0.046)	0.253* (0.077)	0.239* (0.069)
Family tradition or increase income		0.087*** (0.016)		0.211*** (0.010)
Bookkeeping		0.167*** (0.015)		0.146** (0.031)
Firm has premises		0.022 (0.017)		-0.096*** (0.016)
One-person firm		0.111** (0.027)		0.174* (0.070)
Share of paid workers		0.198 (0.099)		0.339* (0.130)
Contact with government		-0.006 (0.013)		-0.006 (0.013)
Contact with trade associations		0.074** (0.021)		0.074*** (0.020)
Constant	3.055*** (0.098)	3.066*** (0.130)	2.376*** (0.251)	2.216*** (0.237)
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Observations	13,762	13,809	16,858	16,748
Robust R-squared	0.525	0.533	0.571	0.587

*** p < 0.001, ** p < 0.01, * p < 0.05

Notes: (1) Influential outliers are ascertained with the DFITS-statistic. (2) Robust standard errors are corrected for clustering. (3) Nominal values are reported in 2016 MXP converted into USD. (4) Reference categories are: sector (manufacturing), motivation (all other categories), education (less than primary school), men, and years (1994 and 2008).

The estimates for age of the entrepreneur and age of the firm support the existence of a learning effect that is positive at a decreasing rate. This coincides with the observation that in the period 2000–2012 firms remained in business, on average, three years longer than in the period 1994–1998. Regarding other socio-economic characteristics, the negative effect of gender on profits remained highly significant across the two decades. Despite the entrance of more women into the labour market, it became more difficult for them to be successful entrepreneurs. *Ceteris paribus*, the sole fact of being a woman decreased profits by 47 per cent.

Education has a positive and non-linear effect on profits. During the period 1994–1998, completing primary school had a positive and significant impact on monthly profits. In the

period 2000–2012, micro-entrepreneurs required at least a high school degree to significantly increase their earnings. Overall, returns to education decreased across the two decades regardless of the level of schooling. Despite the increase in educational attainment that the economy has experienced, the accumulation of human capital is generating lower returns in terms of earnings. Even highly educated individuals face increasing difficulty in making their business prosper.

The hourly average wage paid in every industry and federal state was positive and increased across the two decades. In other words, the opportunity cost of being a microentrepreneur instead of a wage worker increased over time. This observation is coherent with reports from the National Institute of Statistics and Geography (INEGI) showing that small-scale firms' overall contribution to GDP decreased while larger firm-size categories' performance improved across the decades under study. Regarding the variables used as ability proxies, the effect of use of premises and relationship with the government are unclear. All other signs coincide with expectations. For example, the effects of (i) undertaking a book-keeping method and (ii) having entered the business due to family tradition or to increase income are positive, highly significant, and large in economic terms. Despite the imperfection of the dummies used as ability proxies, their association with higher earnings does support the idea that they provide some measure of ability.

In what follows, I compute the monthly marginal returns to capital and analyse their behaviour to explore whether each segment exhibits capital constraints. It should be borne in mind that logging the dependent and control variables implies assuming a constant capital elasticity of profits.

The marginal returns to capital are the product of the output elasticity of capital ($\widehat{\alpha_K}$) and capital profitability ($\frac{\pi_i}{K_i}$):

$$\frac{\delta(\ln\pi)}{\delta K} = \frac{\delta(\alpha_K \ln K)}{\delta \alpha_K} \quad (7)$$

$$\frac{\delta \pi}{\pi} = \alpha_K \frac{\delta K}{K} \quad (8)$$

$$MRK = \frac{\delta \pi}{\delta K} = \alpha_K \frac{\pi}{K} \quad (9)$$

They are computed at the average profitability ($\frac{\bar{\pi}}{\bar{K}}$) because the estimated elasticity is an average effect. Table 10 reports the monthly marginal returns to capital for every segment and across decades.

Table 10. Average Monthly Marginal Returns to Capital by Segment and Decade (percentage)

Segments	Mean		Median		sd	
	2008–2012	1994–1998	2008–2012	1994–1998	2008–2012	1994–1998
Upper	1	1	1	1	0.02	0.03
Middle	14	15	4	2	0.93	0.84
Lower	30	43	7	7	1.09	4.15

The estimations show that microenterprises in the middle and lower segments seem to be constrained because (i) the *MRK* that they exhibit are higher relative to the capital cost r that prevails in the market, and because (ii) they have too little capital given their production function. These conditions imply that such firms have not yet saturated their production potential. If production is inefficient for a substantial share of microenterprises, then the economy as a whole is producing inefficiently. In other words, we observe that microenterprises produce little relative to larger firm categories; however, this might be because they have capital constraints. Furthermore, the identification of different levels of monthly marginal returns to capital shows that there is a large share of capital-constrained firms and thus that capital is misallocated in the Mexican economy.

The high monthly marginal returns of the middle segment are in line with the classification procedure. Given their observable profile, these entrepreneurs show clear potential to become successful. In other words, it is likely that these firms are mainly constrained by their business environment – for example, due to external constraints such as the lack of access to capital, insurance, and productive infrastructure. In contrast, the high monthly marginal returns to capital exhibited by the lower segment are rather unexpected because these microenterprises face both serious external constraints and internal limitations. In other words, they might also need policy interventions that improve their education and skills. These interventions with long-term objectives are likely to be more costly relative to those needed by the middle segment.

7 Sources of Variation: Oaxaca-Blinder Decomposition Method

This section breaks down the differences in monthly profits among firm segments to analyse the origins of such variations. Based on the Oaxaca-Blinder method (Oaxaca 1973; Blinder 1973), it explores whether the differences across the profits of each firm segment arise due to the factors impacting each grouping or due to the effectiveness with which they use those factors. In other words, the endowments and coefficient effects are estimated.

Specifically, given two firm segments S_1 and S_2 , an outcome variable $\ln\pi$, and a set of predictors C , I explore how much of the mean outcome difference (R) is accounted for by group differences in the predictors. The differences in log profits are thus expressed in terms of expected values.

$$R = E[\ln\pi_{S_1}] - E[\ln\pi_{S_2}] \quad (10)$$

From Equation 6 it is known that profits are modelled in terms of variables K, L, Z, X , and D and a random error term ε . The control variables can be renamed and grouped in matrix C for simplification, and α contains the slope parameters and the intercept.

$$\ln \pi(C) = C' \alpha + \varepsilon \quad (11)$$

The linear model from Equation 11 can thus be expressed by segment for the purpose of comparing their means: $\ln \pi_{S_l} = C_{S_l}' \alpha_{S_l} + \varepsilon_{S_l}$ where $l \in \{1,2\}$ and it is assumed that $E[\varepsilon_{S_l}] = 0$. Therefore, the mean outcome difference (R) can be noted as follows:

$$E[\ln \pi_{S_1}] - E[\ln \pi_{S_2}] = E[C_{S_1}' \alpha_{S_1} + \varepsilon_{S_1}] - E[C_{S_2}' \alpha_{S_2} + \varepsilon_{S_2}] \quad (12)$$

$$E[\ln \pi_{S_1}] - E[\ln \pi_{S_2}] = E[C_{S_1}' \alpha_{S_1} + E[\varepsilon_{S_1}]] - E[C_{S_2}' \alpha_{S_2} - E[\varepsilon_{S_2}]] \quad (13)$$

$$E[\ln \pi_{S_1}] - E[\ln \pi_{S_2}] = E[C_{S_1}' \alpha_{S_1}] - E[C_{S_2}' \alpha_{S_2}] \quad (14)$$

By rearranging and adding terms Equation 15 is obtained. It shows the contribution of group differences in predictors to the overall outcome difference:

$$E[\ln \pi_{S_1}] - E[\ln \pi_{S_2}] = \{E[C_{S_1}] - E[C_{S_2}]\}' \{\alpha_{S_2}\} + \{E[C_{S_2}]\}' \{\alpha_{S_1} - \alpha_{S_2}\} - \{E[C_{S_1}] - E[C_{S_2}]\}' \{\alpha_{S_1} - \alpha_{S_2}\} \quad (15)$$

The above decomposition allows for the determination of three summands, each of which captures different effects. Specifically, the first summand or “endowment effect” $E = \{E[C_{S_1}] - E[C_{S_2}]\}' \{\alpha_{S_2}\}$ measures the expected change in the mean outcome of firm segment S_2 if it were to have the predictor levels of segment S_1 . The second summand $C = \{E[C_{S_2}]\}' \{\alpha_{S_1} - \alpha_{S_2}\}$ captures the “coefficient effect,” which measures the expected change in segment S_2 mean outcome if S_2 were to have the coefficients of segment S_1 . Lastly, the “interaction effects” $I = \{E[C_{S_1}] - E[C_{S_2}]\}' \{\alpha_{S_1} - \alpha_{S_2}\}$ account for the fact that differences in endowments and coefficients may exist simultaneously.

The mean outcome difference may thus be rewritten as $R = E + C + I$ to observe each effect in a simplified version or it may be reconverted into its extended form to include all regressors in detail:

$$E[\ln \pi_{S_1}] - E[\ln \pi_{S_2}] = \{E[\ln \pi_{S_1}(K, L, Z, X, D)] - E[\ln \pi_{S_2}(K, L, Z, X, D)]\}' \{\alpha_{S_2}\} + \{E[\ln \pi_{S_2}(K, L, Z, X, D)]\}' \{\alpha_{S_1} - \alpha_{S_2}\} - \{E[\ln \pi_{S_1}(K, L, Z, X, D)] - E[\ln \pi_{S_2}(K, L, Z, X, D)]\}' \{\alpha_{S_1} - \alpha_{S_2}\} \quad (16)$$

In this case, equations 15 and 16 are written from the perspective of segment S_2 because its coefficients weight the differences in the predictors. In the Stata specification the categorical variables are normalised. Table 11 presents the results of the group comparisons by decades. Columns one and two compare the upper and middle segments. The endowment effect shows that the middle segment does lack capital. However, the coefficient effect shows that the upper-segment firms are more productive. For example, during the period 2008–2012, if the middle segment had had the characteristics of the upper segment, its log profits would have increased by 0.08. Similarly, if the middle tier had had the coefficients α of the upper

segment, its log profits would have increased by 0.53, implying that the profits gap of 0.74 is mainly explained by the coefficient effects. This suggests that, despite the similarities between the upper and middle segments in terms of observable characteristics and behaviours, there might be other abilities that the top performers display while doing business.

Table 11. Oaxaca-Blinder Decomposition of Differences in Mean Profits between Groups

	Upper segment = S1 = 1 Middle segment = S2 = 0		Upper segment = S1 = 1 Lower segment = S2 = 0	
	2008–2012	1994–1998	2008–2012	1994–1998
	(1)	(2)	(3)	(4)
Segment 1	6.729*** (0.014)	6.661*** (0.013)	6.728*** (0.014)	6.631*** (0.013)
Segment 2	5.993*** (0.015)	5.904*** (0.015)	5.258*** (0.009)	5.113*** (0.008)
Difference	0.736*** (0.020)	0.758*** (0.020)	1.471*** (0.016)	1.519*** (0.015)
Endowments				
Total	0.079** (0.027)	0.005 (0.025)	1.131*** (0.023)	1.105*** (0.021)
Capital	0.048*	-0.035	0.531***	0.423***
Labour	0.026*	0.002	0.068	0.229***
Woman	-0.007*	-0.002	0.152***	0.080***
Education	-0.003	-0.006	0.102***	0.096***
Features	0.021***	0.007	0.081***	0.070***
Management	-0.010	0.028	0.233***	0.117*
Institutions	-0.000	-0.000	0.016*	0.037***
Industry	0.004	0.002	-0.051***	-0.021**
Coefficients				
Total	0.527*** (0.035)	0.426*** (0.036)	0.787*** (0.057)	0.503*** (0.066)
Capital	0.540***	1.613***	-0.284**	0.397***
Labour	-0.122	-0.242	-0.386***	-0.822***
Woman	0.021**	0.006	0.156***	0.084***
Education	0.026	-0.001	0.003	0.011
Features	-1.128***	-0.069	-0.308	-0.339
Management	-0.315	-0.572*	-0.305*	-0.300*
Institutions	0.028	-0.009	0.005	-0.007
Industry	0.041	0.090	0.020	0.064**
Interaction				
Total	0.131*** (0.039)	0.327*** (0.039)	-0.448*** (0.058)	-0.089 (0.067)
Year effects	Yes	Yes	Yes	Yes
Observations	3,300	3,897	11,920	14,686

Standard errors in parentheses

*** p < 0.001, ** p < 0.01, * p < 0.05

Columns three and four compare the upper and lower segments. It is found that the endowments effect is almost twice as large as the coefficients effect. Regarding the endowments effects, the estimations show that during the period 2008–2012 the log profits of the lower segments would have been 1.13 higher if these firms had demonstrated the same observable features as the upper segment. The detailed decomposition shows that the lower-segment firms lacked endowments for every characteristic. The coefficients effect shows that if the lower segment had had the same estimates as the upper segment, its log profits would have increased by 0.79. In this case, the differences mainly arise from how the upper tier employs capital and labour. The latter factor is particularly problematic. Given that lower-segment firms mainly rely on unpaid family labour, if they were to start paying wages and kept operating the way they do, their profits would be reduced by approximately 25 per cent. The gender and managerial features are also significant. Overall, the results show that the main problem facing lower-segment microenterprises is that they are severely constrained in terms of capital.

The Oaxaca-Blinder analysis provides other complementary insights. First, the upper segment is better at managing capital stock when compared with the middle segment, and better at managing both capital and labour relative to the lower segment. Second, the upper and lower segments differ significantly in terms of all effects: endowments, coefficients, and interactions. Third, during the period 1994–1998 the upper and middle segments were more similar. Despite the resemblances in their empirical profiles, the differences in the effects of features, gender, and capital broadened over time.

8 Discussion and Robustness Checks

Once all three firm segments under study here had been ascertained according to their empirical probability of success and thus the implicit nature of their constraints, the features and problems that each of them faces were described in Section 5. Section 6 subsequently showed that, on average, microenterprises from the middle and lower segments have high average monthly marginal returns to capital. To explore the sources of profitability, Section 7 relied on a decomposition method and demonstrated (i) that even when the middle segment is very similar to the upper segment in terms of observable characteristics, the latter group of firms is more skilled at using their inputs to generate profits, and (ii) that despite the disadvantaged socio-economic and behavioural profile of the lower-segment firms, the differences between their profits and those of the upper segment are mainly explained by the lower levels of inputs.

The empirical features of the lower segment are particularly puzzling. On the one hand, the average monthly marginal returns to capital are very high. Even after the microenterprises are profiled according to their empirical probability of success, McKenzie and Woodruff's (2006) broader finding about high marginal returns at very low levels of capital continues to hold. On the other hand, the Oaxaca-Blinder analysis shows that the lower segment is severely

capital constrained. Overall, the observed profitability and need for capital is consistent with the above discussion of Table 2, which noted that microenterprises at the lowest half of the capital distribution accumulated the most capital between 1994 and 2012. In other words, they might be bootstrapping their way up by reinvesting their profits (Moll 2014).

The paper as a whole shows that the middle and lower segments exhibit constrained productivity and that the alleviation of their capital constraints requires different approaches. For instance, a policy targeting the middle segment might be cost-effective, but it should further consider that the provision of credit or savings devices ought to be complemented with an intervention that improves the micro-entrepreneurs' entrepreneurial skills. Regarding the lower segment, a financing policy is needed and also potentially profitable. Therefore, recent expansions of the conditional cash transfer programme *Prospera*, aimed at promoting entrepreneurial activities among the poorest households, do have empirical support and could become particularly relevant for poverty alleviation. However, the low socio-economic profile and the limited financial literacy displayed by this firm segment should be accounted for. Also, its incentives for capital reinvestment deserve further examination.

It is relevant to mention that throughout the analysis, value added has been used for robustness checks. It is measured as turnover minus the costs for intermediate inputs. This variable is also considered because it includes paid wages and the implied income of both the owner and unpaid workers.¹⁶ However, it is not used as the main profitability measure because the 2008–2012 data is not fully comparable within the time period or with the 1994–1998 data. Due to space constraints, the corresponding estimations are available upon request.

First, when value added is considered as a robustness check for determining firm segments, the economic units composing every segment remain relatively constant. Second, when the profitability measure is replaced, the alternative estimations of monthly marginal returns are naturally higher because value added is larger than the measure of self-reported profits. Still, the estimators are consistent and follow a similar pattern relative to Table 10. Lastly, monthly marginal returns to capital are also estimated with a semiparametric specification and the qualitative observation of high returns for the middle and lower segments is robust.

9 Conclusion

Despite the liberalisation reforms introduced in Mexico more than two decades ago, the performance of most economic units has remained below expectations. Microenterprises' levels of capital stock and profits have not changed substantially over time, nor has their average size. This is especially surprising in view of the fact that schooling levels, business experience, and the share of female entrepreneurs have increased.

¹⁶ The 2012 ENAMIN data shows that, on average, 49 per cent of the workers do not receive a wage. Also, 93 per cent of micro-entrepreneurs do not assign themselves a regular wage that is clearly separated from the firm's earnings.

Microenterprises are highly heterogeneous, and this paper has classified them into three segments – upper, middle, and lower – according to the empirical probability that they will be successful. The grouping of firms into segments is based on their empirical characteristics and provides a clear cut-off that enables an objective comparison of groups. By construction, the middle-segment firms primarily face constraints of an external nature while the lower-segment firms exhibit important internal constraints due to their socio-economic characteristics.

The analysis shows that the middle and lower segments exhibit constrained productivity and that this situation has persisted over time. Average monthly marginal returns to capital are high and this provides empirical evidence of the existence of factors limiting microenterprise growth. Between 1994 and 2012, the share of middle-segment firms increased and the average monthly marginal returns to capital remained at approximately 15 per cent. Therefore, the performance of a growing number of microenterprises has remained low, even though their characteristics and behaviour should lead to success, provided that they face no constraints. This finding is in line with the observed sluggish performance of the Mexican economy and provides evidence of the feasibility of cost-efficient policies.

Targeted interventions are more likely to be effective in the short run because the profile of middle-segment firms is already very similar to that of upper-segment firms (top performers). For example, the analysis shows that there are some behavioural features that significantly predict entrepreneurial success, such as the use of dedicated premises and book-keeping. Also, providing employment and actually paying a wage to workers is relevant. Microenterprises that started operating due to family tradition or to increase income exhibit more entrepreneurially driven performance. Lastly, firms that interact with governmental or trade institutions are more likely to do well in business.

Lower-segment firms have a low socio-economic and entrepreneurial profile but, surprisingly, exhibit very high average monthly marginal returns. The Oaxaca-Blinder decomposition analysis shows that the main difference between their performance and that of the upper segment is the lack of endowments. The largest effect comes from a lack of capital, and the descriptive statistics show that these microenterprises have an average capital stock of USD 1,390, which is approximately 18 times less than the top performers. Furthermore, only about one-quarter of them have premises.

Overall, this paper provides evidence of the existence of capital misallocation in the Mexican economy throughout the past decades. Microenterprises exhibit growth potential; however, they face different types of constraints, and policies should thus consider the differentiated needs of each segment.

Lastly, it should be noted that this paper contributes to the literature in various ways. First, it deepens the debate about microenterprises' potential for success and their plausible role as agents driving economic growth. Second, it refocuses attention on Mexico as the case study that sparked interest in constrained productivity and applies the recently developed methodology of segment classification. Third, it is the first study to undertake an inter-temporal comparison of microenterprise performance, characteristics, and behaviour.

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