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More Pushed than Pulled: Self-employment in rural Mexico ten years
after NAFTA

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Abstract

Who are the self-employed in rural Mexico? This paper tries to answer that question with special emphasis on the role of human capital in self-employment decisions. The model presented suggests that the need for leisure/flexibility may have a driving effect once the household framework is considered. Imperfect markets may hinder possible gains of self-employment with particular groups being more vulnerable (e.g. women). Some estimated parameters in this study for propensities to become self-employed and returns to education vary between 1994 and 2004, the first decade of the North American Free Trade Agreement (NAFTA). Pull and push factors emerge in the decision to enter into self-employment in rural area. Being self-employed still may be the best or sole option for a considerable percentage of the population. The latter may suggest that if self-employment in the rural sector is posed as a development strategy, this should come with adequate policy supports.

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I. Introduction

Economic analysis of the Mexican rural sector presents an extraordinary challenge for both policy makers and scholars: despite its difficulties it is very important. Before the North American Free Trade Agreement (NAFTA) started operating, opinions about its effects on the Mexican agricultural sector seemed quite divided. There was one camp that forecasted that it would cause severe trouble to Mexican farmers given that they do not have access to credits and subsidies as their American and Canadian counterparts. The optimistic group predicted that the agricultural sector would flourish, assuming that foreign investments and comparative advantages on fruits and vegetables should surpass any negative effect of free trade. More than ten years later¹, opinions on the net effect of NAFTA are still divided. Even with the general benefits of globalization for national wellbeing, there are adjustment costs for some groups in the country, globalization produces winners and losers. The commercial opening of the country benefited principally commercial agriculture (Lederman et. al. 2004) and it had little impact for the poor people dedicated to low-scale agriculture; subsistence farmers have seen how the prices of their small surpluses (usually grains) drop.

Poverty indices remain very high in the rural areas (Cortes et al. 2002), and migration (to cities and out of the country) has not ceased. High levels of poverty combined with slow economic growth in the formal sector have forced a large part of the developing world's rural population to move into self-employment and to conduct activities in the informal labor market. We believe self-employment is a critical variable to understand poverty, welfare and the development process in rural areas.

¹ NAFTA started operating on January 1, 1994.

There are many factors that may possibly explain the decision to enter into self-employment; these could be ‘push’ or ‘pull’ factors (Messenger and Stettner, 2000). The push factors generally make wage-employment less attractive or not viable, for example low wages, lack of prosperity or unemployment (Stanworth and Curran, 1973). In this situation a person is ‘pushed’ into self-employment by a lack of alternatives. In other study, Audretsch et al. (2006) conclude that unemployment reduces the chances of enjoying a paid job and the opportunity cost to become self-employed. On the other hand, the pull factors make self-employment more attractive, for example flexible schedule, work environment, high profits, etc. Structural economic transformations, particularly the move from a good-producing economy to a service-based economy, have been identified as an important ‘pull’ factor that influences the self-employment decision.

Who are the self-employed in the rural Mexico? Why are some people self-employed? What are their characteristics? Are they pushed or pulled to entry into self-employment? These are some controversies that this study pretends to explore. This investigation analyzes changes in the characteristics of Mexican rural households one decade after the entrance of NAFTA and identifies the determinants of rural self-employment; the role of human capital in rural self-employment decisions and the role of household specificities on the labor strategies are considered too. It highlights factors such as the nature of the employment sector, age, level of education, gender, marital status, family size, region of the country and physical capital with the purpose of understanding better the labor market in the rural sector.

Mexico’s rural areas represent an important key for the growth of the country as a whole. Policy makers are interested in implementing policies to impulse employment in

these areas, and given that self-employment has contributed significantly to the quantity of new jobs in the rural areas, they need to study rural self-employment and its role as a potential solution to unemployment and poverty. Policies for stimulating entrepreneurship and self-employment in the rural areas will have to take the factors that characterize the self-employee into account. The knowledge of self-employment as an emerging human resource priority can improve public policies and the programs that support and promote self-employed people.

The main conclusion of this study is that the women, the least educated and the older persons have higher probabilities to being self-employed (vulnerable people). Also, the self-employed perceive a lower wage than the wage workers. The women self-employed were working especially in the agricultural sector before NAFTA, but after it they have turned principally to work in the retail and service sectors (see graph 8 in the appendix 1), while the men self-employed have been working principally in the agriculture sector before and after NAFTA (see graph 9 in the appendix 1).

The paper is organized as follows. Section II briefly reviews the literature on determinants of self-employment and its connection to the rural economy. In section III an expanded canonical model investigates the effects of households' characteristics and human capital on self-employment decisions. Section IV introduces the data and presents a snapshot of rural Mexico in 1994 and 2004. In section V the estimation strategy is delimited and the econometric analysis performed. Section VI briefly concludes and suggests some avenues for future research.

II. The literature self-employment and self-employment on a rural context

A number of approaches have been developed to explain the supply and demand of self-employment, emphasizing various degrees of sociological, psychological and economic factors. Messenger and Stettner (2000) expose two traditional theories that attempt to explain the entry into self-employment in terms of workers' economic utility. The pull theory asserts that workers are pulled into self-employment due to their own particular knowledge and skills, and their need for non-pecuniary benefits such as autonomy and flexibility (Knight, 1933). Stanworth and Curran (1973), establish that pull factors make self-employment more attractive, for example high profits or a more flexible schedule (caring children is usually more compatible with self-employed worker than employed worker). In the other side, the push theory holds that people are pushed into self-employment when they lack good opportunities in the wage and salary labor market (Schumpeter, 1934); thus, potential employees who have the most limited wage and salary options or particular barriers, would be those most likely to enter self-employment.

Granger et al., (1995) have used a similar dichotomy but with other labels: the "unemployment push" and the "entrepreneurial pull". The first is characterized as a cyclical unemployment which restricts labor market opportunities and push persons to self-employed, and the second is when the economic vitality combined with personal ambitions increase the number of self-employed.

There are many studies about the determinants and characteristics of the self-employed. Rees and Shah (1986) have reported a non-linear relationship between self-employment and age. Calvo and Wellisz (1980) and Kidd (1993) concluded that an individual's age might affect her propensity to become self-employed via a number of

different channels. For instance, age may act as a proxy to capture the effects of the individual awareness, knowledge and experience in the labor market thereby reflecting general human capital. Also, as an individual becomes older, she may have accumulated the financial resources required for self-employment, hence age may capture effects related to financial, as well as human capital. Brown, Farrell and Harris (2002) found that the proportion of individuals in self-employment increases with age, a finding that is consistent with the hypothesis that older, displaced workers might turn to self-employment given their relatively low probability of re-employment. It might also reflect the ability of older workers to acquire the necessary start-up capital for and to better absorb the income uncertainty associated with self-employment, on the account of their longer accumulation of wealth. They also found that individuals in self-employment have relatively few formal qualifications.

Other finding is that home ownership is positively associated with self-employment. Johansson (2000) concluded that house ownership, a higher age, and little unemployment experience tend to decrease the risk of existing self-employment, and thus make self-employment duration longer. In addition, he found that individuals with wealthier parents are more likely to become self-employed, supposedly because their parents' money can help alleviate liquidity constraints.

Blanchflower (2004) found that in Europe the probability of being self-employed is lower the more educated an individual is, while the opposite is true in US. The evidence regarding the relationship between education and the propensity to become self-employed remains inconclusive. Schiller and Crewson (1997) have reported that couples with young children, may be less likely to bear the risk associated with self-employment.

Blanchflower (2000) concluded that that in the OECD countries the probability of being self-employed is higher among men than women and rises with age. The least educated have the highest probability of being self-employed. Other finding of the study is that workers in agriculture, retailing, real state and construction are especially likely to be self-employed. Self-employment rates are generally higher in poorer countries (with respect to other OECD members) such as Greece, Turkey, Mexico, Korea and Portugal. As a proportion of non-agricultural employment self-employment has declined in some countries (Austria, Belgium, Japan, Luxembourg, Norway, Spain, Netherlands and the USA) but increase in others (Australia, Canada, Finland, Iceland, Ireland, New Zealand, Portugal, Sweden and United Kingdom).

Quinn (1980) speculated that some wage-and-salary workers switch to self-employment toward the end of the life cycle as an alternative to withdrawal from the labor force. He assumes that there is much more flexibility in hours and wages among the self-employed and that the change in class of work is a form of partial retirement. Fuchs (1981) conclude that self-employment at older ages is a well-established feature of the US labor market. Paniagua (2002) established that the development of self-employment is a consequence of the tertiary processes in western societies, and a solution to high rates of unemployment and under employment and the difficulties of professional insertion in the labor market.

Crosta and Pezzino (2003) concludes that even though agriculture represents a fundamental resource in a context of poverty, most rural household in Mexico now derive a large portion of their incomes from non-farm employment. The point was previously made by Sadoulet, De Janvry and Davis (2001).

III. The Household Economy

Under the standard neoclassical/rational paradigm households are utility maximizers. Notice however, that even under the assumption of complete markets and exogenous prices² the problem of understanding intrahousehold allocations cannot be fully avoided. Moreover, when incomplete markets and rural households are considered, complex patterns of income and utility maximization appear. Many variables play an important role in the household's working decisions, among them: household size, the profile of household members (age, gender, education, etc.), ownership or access to land (including quantity and quality), season, market conditions, etc.

We investigate the labor decisions of households. Although individuals are the ones who supply labor it is difficult to understand their working behavior without considering their household/family structure and circumstances. Under this simple framework individuals can “consume” leisure³ and work for someone else or work as self-employed. Our departure is the canonical model of household labor supply.

Consider the following static household problem,

$$\text{Max}U(c_h, l_i(s_i) \mid i = 1, \dots, I) \quad (1)$$

s.t.

$$pc_h \leq \sum_i L_i w_i + m \quad (2)$$

$$\bar{L}_i = L_i + l_i \quad \forall i \quad (3)$$

$$w_i = f(e_i, l_i, s_i) \quad \forall i \quad (4)$$

² The separability assumption allows modeling the maximization of income independently of the household preferences. The detailed discussion for farm households is found in Singh et al. (1986).

³ In this study “leisure” is defined in very broad terms: it can be time devoted to rest, raise children, perform domestic tasks, used to acquire human capital (attend school), etc.

where the function U is the utility of the household (in a unitary sense), c_h is the household's consumption, and l_i is the individual leisure. The budget constraint includes the price level p , the amount of hours each individual works L_i with a particular associated wage w_i and an exogenous income for the whole household. Both leisure and hours work add to the individual endowments. Finally e_i represents the educational level of each person and s_i her sociodemographic profile.

Behavior

The maximization problem posed is very similar to the standard textbook model, however two variants are present. First the utility produced by leisure depends upon the specific sociodemographic characteristics of the person who consumes it. Technically speaking there is a complementarity between leisure and other variables present in the household. That is, when maximizing:

$$\frac{\partial U}{\partial c_h} = \frac{\partial U}{\partial l_i(s_i)} \quad \forall i \quad (5)$$

so even under an egalitarian utility function leisure would not necessarily be consumed uniformly since s_i differs among household members.

Second, the wages depend upon specific educational profiles and on the demanded leisure. This is important, because the demand for leisure can have a wage effect besides the substitution effect. This means that when maximizing and applying the chain rule:

$$\frac{\partial U}{\partial c_h} = \frac{\partial U}{\partial c_h} \frac{\partial c_h}{\partial w_i} \frac{\partial w_i}{\partial l_i(s_i)} + \frac{\partial U}{\partial l_i(s_i)} \quad \forall i \quad (6)$$

Now the hypothesized sign of $\frac{\partial U}{\partial c_h} \frac{\partial c_h}{\partial w_i} \frac{\partial w_i}{\partial l_i(s_i)}$ is negative, assuming consumption is a normal good, and that greater flexibility is penalized. Thus, leisure is more costly than the forgone consumption. To the extent that markets are imperfect, the penalization of acquiring extra leisure may be dramatic.

IV. The data

The meaning of rural varies country to country, but in official definitions it usually refers to concentrations of population under a certain threshold, which generally set at 1,000 to 2,500 individuals. In this study we consider locations with less than 2,500 individuals like rural.

The data source for this analysis is ENIGH 1994 and 2004 (Encuesta Nacional de Ingreso y Gasto de los Hogares), which are household income-expenditure surveys, collected by INEGI (Instituto Nacional de Estadística Geografía e Informática). The main aim of these surveys is to provide a reliable source of information on household expenditure, income and other aspects of household finances, as well as a series of sociodemographic characteristics. The ENIGHs allow inferring some ideas of the rural Mexico. The differences among ENIGH 1994 and 2004 are minimum.

We can deduce some information of the data; the percentage of workers in the agricultural sector in rural communities is significantly higher than in other sectors, in spite of it decreased during last decade from 64% to 57% (see table 4 in the appendix 1). As a result, the service and manufacture sectors has acquired importance among working age people. The years of education of the rural persons have increased, but these still

being low. The agricultural sector employs workers with less qualification, and consequently they receive the lowest wages (see table 4 in the appendix 1).

The proportion of women that work increased in last ten years, but they work less hours, they have less years of education and receive lower wages than men counterparts (see table 6 in the appendix 1). In spite of, the proportion of working age women that do not work is still high, most of them are housewives, the share of rural women between sixteen and sixty five years old doing domestic work decreased in the last years, it was approximately 60% in 1994, and 53% in 2004.

In the last decade the proportion of self-employment women is higher than self-employment men, women find in self-employment a manner to collaborate with the expenditure of the family and to have a flexible job (see table 5 in the appendix 1). Caring children is more compatible with a self-employed work than a wage work; this fact is consistent with the pull theory explained in the section II. While people working in the agricultural sector is still the dominant group in rural areas (see table 5 and 6 in the appendix 1), the proportion has declined after NAFTA (see table 6 in the appendix 1).

In the last decade the rural households advance in several socioeconomic and cultural aspects, but this improvement has not been enough. Some of the households persist in a very precarious situation with vital necessities unsatisfied, like water or electricity (see table 7 in the appendix 1). The family size and the index of economic dependency have decreased in the last years. In spite of the percent of illiterate persons greater of fifteen years old has been reduce in the last decade, it continue high in 2004 (17.82%), as well the percent of illiterate head household maintain elevated in 2004 (21.50%). The mean of the head household's education increases but it is continue below

elementary education (2.93 to 4.4). The percent of women head household raises of 10.31% to 20.29%.

V. Estimation strategies and econometric analysis

Some estimated parameters in this study for propensities to become self-employed and returns to education between 1994 and 2004 are presented in this section.

A natural starting point for the discussion of who are the self-employed consists of investigating which variables are correlated with participation in the labor market on that condition (self-employed). The literature discussed in section II provides a series of guidelines and suggestions regarding which variables are expected to have an effect on the self-employment decision (e.g. gender, age, etc.). This first objective can be accomplished directly with standard probit analysis. A very nice feature of this characterization is that the estimates of the probit analysis can be utilized to explore self-selection issues. Under this interest, the probit can be seen as a first stage, and later the Inverse Mills Ratio (IMR)⁴ is calculated to measure and correct self-selection; it is used in a second stage equation (Heckman 1979).

In this paper the maximization problem posed in section III suggests that there can be a self-selection effect of self-employment in returns to education of the employed. First of all because the “sample” would not be complete (i.e. migration, people working without payment in their home, etc.). So it is worth it to explore a selection effect in returns to education, and if found investigate if it is pushed or pulled driven.

⁴ The inverse Mills ratio is Usually denoted $\lambda(Z)$, and defined by $\lambda(Z) = \phi(Z)/\Phi(Z)$, where $\phi(Z)$ is the standard normal pdf and $\Phi(Z)$ is the standard normal cdf.

The returns to education are associated with increases in the labor productivity as a result of the greater availability of knowledge and abilities, which are obtained mainly by investment in formal education; such investment produces a benefit for the persons translated in a higher labor income. We analyze the returns of education in the rural Mexico using a Mincerian equation, where the labor income of the worker is presumed to depend upon years of education, and some sociodemographic characteristics. Thus, our second stage equation will be a Mincerian equation augmented with the IMR (Inverse Mill's Ratio) of the first stage.

Who are the Rural Self-employed?

We start by estimating a probit model (both for 1994 and 2004) to explain the decision of becoming self-employed. In this model the probability of living in rural areas and being self-employed depends on the person's gender⁵, age, years of education, marital status, number of children, and the economy sector in which they work. Our samples consist of economically active adults aged between sixteen and sixty-five, non-students that report labor income. They live in locations with 2500 persons or less. The equation estimated for each year is:

$$RuralSelf-employed = \beta_0 + \beta_1 Female + \beta_2 Education + \beta_3 Age + \beta_4 MaritalStatus + \beta_5 Agriculture + \beta_6 Manufacture + \beta_7 Retail + \beta_8 Couple + \beta_9 Children + \beta_{10} Ownership \quad (7)$$

The dependent variable (*Rural self-employment*) in this study is a dichotomous variable set to one if the person reports herself as self-employed and set to zero

⁵ We tested a double selection model (Amemiya 1985), with the hypothesis that there was a previous self-selection of the women who decided to participate in the labor market. However, we didn't find conclusive evidence to reject the null hypothesis of no female self-selection into the labor market.

otherwise⁶. The variable *Female*, takes a value of one if the individual is women, and zero otherwise. The variable of *Education* is a discrete variable describing years of education, and it focuses only on formal education and completed years of education. The variable of *Age* is self explained (in discrete numbers). *Marital status* is a dummy variable set as one if the person is married or in cohabitation and is set as zero otherwise (separated, widowed, divorced and single). *Agriculture* is a dummy variable set as one if the person works in the agriculture sector, and zero otherwise. *Manufacture* is a dummy variable set as one if the person works in the manufacture sector and zero otherwise and *Retail* is a dummy variable set as one if the person works in retail sales. The category of reference is the *Service* sector. *Children* consider the number of children below six years that live in the house. *Ownership* is a dummy variable set as one if the person owns a house⁷ and zero otherwise.

The parameters of this model can be interpreted as the effect on the probability of being self-employed in the rural sector of an infinitesimal change in each independent continuous variable and the discrete change in the probability for dummy variables. The rural self-employment probit parameters estimated for 1994 and 2004 are presented in Table 1. All the parameters have the expected sign, with varying degrees of significance.

Probit Procedure						
Analysis of parameters estimates						
	1994			2004		
Parameter	Estimate	t-value	p> t	Estimate	t-value	p> t
Intercept	-3.47151**	-14.40	0.000	-2.96663**	-14.23	0.000

⁶In otherwise are included the employees in non-agriculture sector, employees in agriculture sector, employed persons without payment, employers with workers and employee in a family company.

⁷The house could be entirely paid or under a mortgage.

Female	0.13800	1.12	0.262	0.12640	1.31	0.190
Education	-0.00935	-0.69	0.490	-0.01030	-1.02	0.306
Age	0.00663*	1.68	0.093	0.01397**	4.20	0.000
Agriculture	0.89923**	7.51	0.000	0.70768**	7.33	0.000
Manufacture	0.50835**	3.14	0.002	0.01075	0.07	0.945
Retail	0.69060**	3.66	0.000	0.77646**	6.04	0.000
Status marital	0.75157**	6.20	0.000	0.1316	1.45	0.146
Child	0.09915**	2.67	0.008	0.07606*	1.78	0.074
Ownership	0.31386**	2.90	0.004	0.21648**	2.22	0.026
Log likelihood	-650.8924			-702.1816		

Table 1. Result of the probit models for 1994 and 2004. Values with ** significant at a 95% level, values with * are significant at a 90% level.

The probit analysis shows very interesting results. First, in spite of *Female* is not a statistically significant variable it has the anticipated sign, being rural women increments the probability of being self-employed; they found in self-employment a way to cooperate with the expenditure of the family and have a flexible job. This result is compatible with the pull theory; it establishes that some pull factors, in this case a flexible schedule, make more attractive the self-employment.

The opposite effect appears in the educational level, although this variable is not statistically significant, it has the expected sign, the less human capital a person acquires the more likely she or he will be self-employed; this result is maintained during the last decade. This result is consistent with the push theory; a person is 'pushed' into self-employment because his low educational level restricts his alternatives in the wage labor market.

The probability to be self-employed rises with the age, and this effect is higher in the year 2004 than 1994. This result is consistent with the push theory; displaced older

workers might turn to self-employment given their relatively low probability of re-employment and their lack of opportunities in the wage labor market. Quinn (1980) establishes the older workers are attracted into self-employment because they see it as a form of partial retirement, age in this circumstances is a pull factor. Finally, age reflects the ability of older workers to acquire the necessary start-up capital for their own business; in this perspective age acts as a pull factor. Age may reflect effects related to financial as well as human capital, and it could be a pull or a push factor, but given the disadvantaged situation of the rural areas it is more related with the push theory.

The home ownership is positively associated with self-employment; however its influence seems decreasing. A house may be used as collateral to secure loans necessary to start up small business, and it is a pull factor that makes self-employment more attractive.

Marital status remains statistically and economically significant explaining the probabilities of being self-employed, nevertheless its influence seems decreasing. This result may reflect some leisure necessity that matches with the pull theory and makes self-employment more attractive. In addition it may be a sign of a form of risk pooling with married people being attracted to self-employment because they can offset some income risk with other household member.

If there are children less than six years old in the family, the probability of being self-employed increases, it probably will reflect some preference/need for leisure consistent with the pull theory.

Finally, with respect to the sector of the economy, the probit analysis shows that self-employment is less likely to occur in the service sector. Some further investigations

are needed to disentangle the causalities, i.e. if it is the consequence that services pick the people with the highest education levels.

We generate the inverse Mill's ratio (IMR) of this probit model, and then include it as an explanatory variable in the estimation of the Mincerian regression.

The Returns to Education in Rural Mexico

We analyze the returns of education in the rural Mexico using a Mincerian equation. Our primary specification for the conditional expectations function for earnings is a semi-logarithmic spline and step model (Hungerford and Solon 1987). The model permits that the log-wages changes at different rates depending of years of education at different stages of the school career, as well as to make discrete steps at particular years of education. The β 's are splines, and the sum of β 's is the slope of the log-wage function at a particular level of education. The employed specification is the following:

$$\begin{aligned} \ln W = & \alpha_0 + \beta_y Y + \beta_j P(Y-6) + \beta_H J(Y-9) + \beta_{CH} CH(Y-12) + \theta_1 Exp + \theta_2 Exp^2 + \theta_3 Selfemployment \\ & + \theta_4 Male + \theta_5 MaritalStatus + \theta_6 North + \theta_7 South + \theta_8 Ownership + \theta_9 Mill'sRatio \end{aligned} \quad (8)$$

Where,

VARIABLE	DESCRIPTION
$\ln W$	Is natural logarithm of the worker's hourly wage
Y	Is the number of years of education completed
$P, J, H y C$	Indicators functions that set one if the person has completed the elementary school, middle school, high school and college respectively. Years 6, 9 and 12 are the

	diploma year corresponding to these levels of education
<i>Exp</i> ⁸	Is the number of years of labor market experience
<i>Exp2</i>	Is the number of years of labor market experience to the square
<i>Self-employment</i>	Set 1 if the person is self-employee, 0 otherwise
<i>Gender</i>	Set 1 if the person is male, 0 otherwise
<i>Marital Status</i>	Set 1 if the person is married or cohabited, 0 otherwise
<i>Regn</i>	Set 1 if work in the north region, 0 otherwise
<i>Regs</i>	Set 1 if work in the south region, 0 otherwise
<i>Dumten</i>	Set 1 if the person is own of the house, 0 otherwise
<i>Mill's Ratio</i>	Is the Inverse Mill's Ratio of the probit that explains self-employment

Table 2. Description of variables

Table 3 summarizes the results.

	1994		2004	
	Parameter estimate	t Value	Parameter estimate	t Value
α_0	-0.661624	-4.406225	-1.153015	-7.811667
β_y	0.071755	8.115925	0.072140	7.994734
β_j	0.009311	0.449213	0.035473	1.882119
β_H	0.099471	3.830760	0.059636	2.571745
β_C	0.115030	4.499190	0.134852	6.520057
$\Theta_1 \text{Exp}$	0.044303	8.844710	0.050773	12.033344
$\Theta_2 \text{Exp}^2$	-0.000652	-8.321627	-0.000579	-8.100854
$\Theta_3 \text{Self-employment}$	-0.993902	-14.693423	-0.780558	-11.045043
$\Theta_4 \text{Male}$	0.130874	3.409334	0.235445	6.970426

⁸ Experience = Age – Years of Education – 5.

Θ_5 Marital Status	0.572841	11.619665	0.207044	5.871350
Θ_6 Regn	0.051939	1.582238	0.206354	6.272055
Θ_7 Regs	-0.143784	-3.907045	-0.316344	-8.900481
Θ_8 Ownership	-0.097996	-2.395163	-0.087329	-2.481982
Θ_9 Mill's ratio	0.635066	15.059181	0.784103	16.524616
R^2	0.2869		0.3574	

Table 3. Results of the log-wage model. Values in bold are significant at a 95% level

It is observed that in both estimations, the model and the majority of the coefficients are statistically significant. In both years, the slopes increase with the level of education in the rural area (β 's >0). Consequently, the returns to middle school years ($\beta_y + \beta_j$) are greater than those to elementary years (β_y); the returns to high-school years ($\beta_y + \beta_j + \beta_H$) are greater than to middle school; and the returns to collage ($\beta_y + \beta_j + \beta_H + \beta_C$) are greater than to high school.

The returns of elementary education are almost the same in both periods ($\beta_y \approx 0.7$). The difference of returns between elementary school and middle school is higher in 2004 (0.10) than in 1994 (0.8). The returns of high school are higher in 1994 (0.18) than 2004 (0.16), and the returns of college are similar in both years (≈ 0.30). We can infer that the returns to middle school in the rural Mexico are higher after North American Free Trade Agreement (NAFTA), and that is due principally to increases in the relative demand for skill workers. There is a positive and diminishing return of the labor-market experience, and this effect has maintained over this time period.

There is a negative effect in the labor income if the person is self-employed. Possibly, self-employed workers are paying a premium for the flexibility of their work (for example women), which is consistent with the pull theory. As well it could be

because self-employed commonly have low levels of education than wage employees, which is well-matched with the push theory.

Also, there is a positive effect in the labor income if the person is married or in cohabitation. The workers in the north of the country receive higher wages than the workers in the central part of Mexico, and they receive higher wages than workers in the south. The north region of the country is the most exposed to international trade and the wage gains are higher in this region. Regional differences in wages continued to widen during the last decade. Males receive a premium over women, and this gap has increased after NAFTA in the rural areas. In spite of the fact that ten years have passed, other effects are qualitatively very similar.

The coefficient to the inverse Mill's ratio is significantly positive in both periods indicating a positive selection into "being self-employed in both periods" and it support the selectivity bias correction procedure to obtain better estimators.

VI. Implications and conclusions

This paper intends to shed some light on the evolution of self-employment in rural Mexico between 1994 and 2004. A simple model was presented to analyze rural self-employment.

Pull and push factors emerge in the decision to enter into self-employment in rural areas. Women, older persons and least educated persons are pushed into self-employment by a lack of alternatives. In addition, the impact of economic restructuring, slow economic

growth and high unemployment in the rural areas have created a push to self-employment.

On the other hand, the women, the married people and the person with children are looking for a flexible job, they are attracted by the self-employment as the pull theory establishes. The persons with a house could easily acquire a loan to start a business; as a result they are attracted into self-employment too.

The importance of self-employment among women in the last years has risen because it permits women to work more autonomously and it possibly will provide the flexibility needed to achieve the family obligations. However the poor education, the low and instable income associated with self-employment set many self-employed, especially women, in an uncertain financial situation. Women generally face difficulties in starting up a business; they tend to start a business with less capital than men (Rooney et al 2003).

Human capital accumulation raises individual incomes, but under imperfect markets, the lack of physical capital and other factors (i.e. technology) may hamper its returns. Once controlling for education: self-employed persons do have smaller returns to human capital compared to their employed counterparts. There is a reduction in this effect in 2004 with respect to 1994, but still its magnitude is economically significant. It is very possible that self-employed rural workers are paying a premium for the flexibility of allocation their time or because of they have lower educational levels than wage employees.

From a development perspective the fact that both women and rural workers in the south have smaller returns than their male/north counterparts, and that these effects

are accentuating themselves raises a red flag. As so, if job opportunities appear in rural areas, this may facilitate that workers exit self-employment. The evidence found, suggests that the latter effect can be highly correlated to human capital. Again, that it is not uniform across regions.

In terms of economic public policy, rural self-employment is a development strategy that be supposed to come with adequate public policy supports because it is expected to be a possible exit from poverty and unemployment. Self-employment appears as catalyst to job creation. Government actions may help create the proper environment to self-employment and promote it. For example, micro credits targeted at vulnerable groups (women, people living in southern Mexico) may prove effective because one of the most considerable problems in the rural Mexico is the lack of access to credit and financial institutions. In the next section we present various public policy recommendations to rural self-employees.

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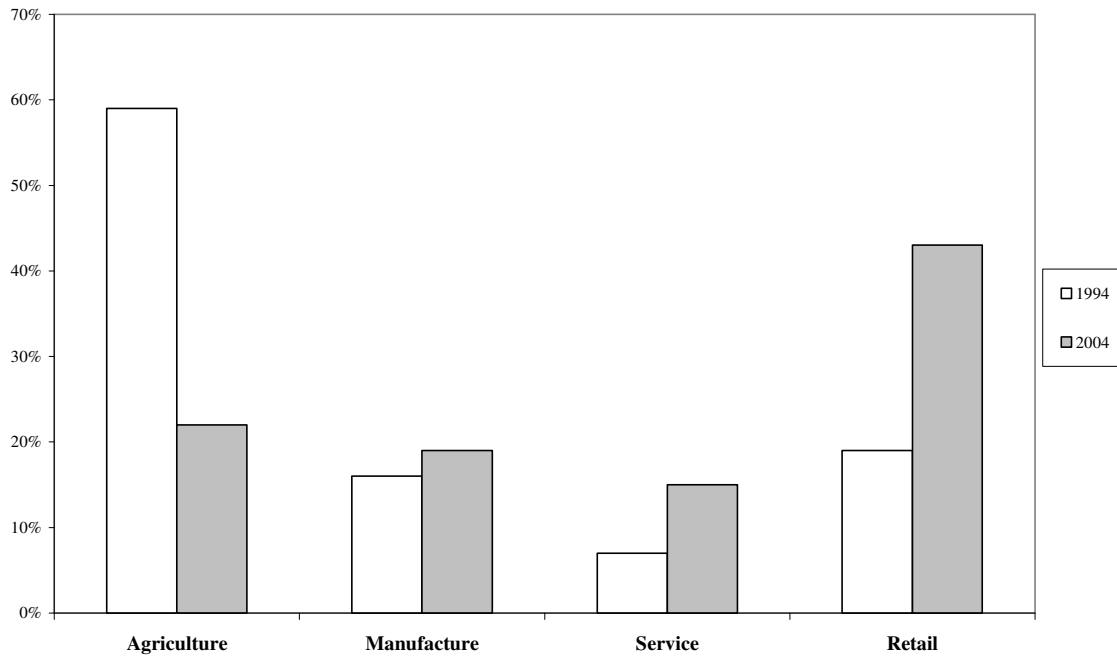
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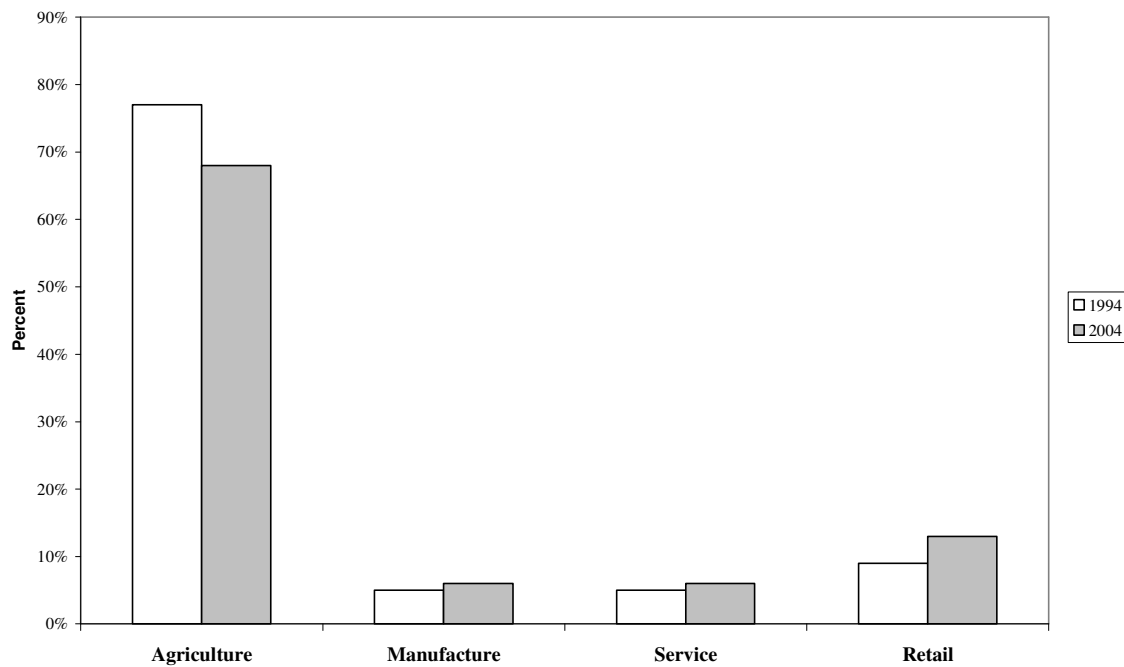
Appendix

Distribution of self-employed women per economic sector



Graph 1. Source ENIGH: Distribution of women self-employed per economic sector.

Distribution of self-employed men per economic sector



Graph 2. Source ENIGH: Distribution of men self-employed per economic sector.

Sector	1994			2004		
	Mean of education	Mean of labor income	Percent of working age people in the sector	Mean of education	Mean of labor income	Percent of working age people in the sector
Agriculture	3.70	1,722	64%	4.23	1,846	57%
Manufacture	4.93	3,621	12%	6.62	6,296	14%
Service	5.04	2,132	10%	6.9	2,377	14%
Retail	6.86	7,053	14%	6.86	8,458	21%

Table 4. In the rural Mexico the majority of the working age people work in the agriculture sector. The agriculture sector employe the workers with less qualification and they have the lower labor income, while the service sector employe the workers with the highest qualification and the highest labor income.

	1994			2004		
	Female	Male	Total	Female	Male	Total
Self-employment	47%	30%	34%	37%	25%	29%
Employee	52%	65%	62%	61%	70%	67%
Entrepreneur	1%	5%	4%	1%	4%	3%

Table 5. Distribution of the rural workers by position in the work. The proportion of women in self-employment is higher than men in both periods.

Self-employment				
	1994		2004	
	Male	Female	Male	Female
Mean of Age	43.03	40.88	44.30	41.61
Mean of Education	3.12	2.41	4.64	4.96
Mean of hours work	52.08	26.69	49.63	35.87
Mean of income*	4,526	1,945	4,870	2,903
Percent in Agriculture	77%	59%	68%	22%
Percent in Manufacture	5%	16%	6%	19%
Percent in Service	5%	7%	6%	15%
Percent in Retail	9%	19%	13%	43%
Percent married or cohabited	85%	90%	87%	71%
Employed				
	1994		2004	
	Male	Female	Male	Female
Mean of Age	30.79	30.01	33.48	32.66
Mean of Education	4.78	5.24	6.46	7.25
Mean of hours work	51.21	37.31	47.56	41.06
Mean of income*	5,554	5,408	4,876	3,789
Percent in Agriculture	65%	34%	54%	24%
Percent in Manufacture	7%	19%	10%	20%
Percent in Service	11%	35%	13%	41%

Percent in Retail	4%	12%	5%	14%
Percent married or cohabited	51%	46%	64%	42%
Entrepreneur				
	1994		2004	
	Male	Female	Male	Female
Mean of Age	42.69	40.94	43.98	38.22
Mean of Education	4.49	4.18	5.75	8.83
Mean of hours work	53.64	48.7	54.96	40.72
Mean of income*	8,340	7,203	12,115	11,274
Percent in Agriculture	81%	60%	63%	35%
Percent in Manufacture	2%	17%	9%	19%
Percent in Service	9%	3%	7%	11%
Percent in Retail	5%	20%	8%	35%
Percent married or cohabited	91%	79%	85%	24%

Table 6. Characteristics of the rural workers. A large amount of the rural workers are in the agriculture sector, but this amount has decreased in the last decade. People in the service and retail sectors has increased in the last decade. The women work fewer hours than men and this gap is bigger among self-employees. The rural self-employees are the least educated and they receive the lower total income.

*Weighted with the population expansion factors.

Rural Household's Characteristics		
	1994	2004
Family Size ^a	5.00	4.26
Index of Economic Dependency ^a	2.59	1.92
Persons Per Room ^a	2.99	1.54
Illiterate People Greater of Fifteen Years Old ^b	24.87	17.82
Head Household Illiterate ^b	31.89	21.50
Women head household ^b	10.31	20.29
Head household's education ^a	2.93	4.4
Head household's age ^a	46	49
Household with earth floor ^b	36.09	25.24

Household without energy ^b	16.97	4.05
Household without tube water ^b	44.91	23.91
Household without restroom ^b	87.94	11.72
Household with refrigerator ^b	28.29	60.11
Household with TV ^b	55.82	79.21
Household with radio ^b	24.56	55.06
Household with car ^b	3.98	26.77

Table 7. Rural household's characteristic. The rural households improve between 1994 and 2004; however some of them persist in a very precarious situation with imperative necessities unsatisfied.

a) Average.

b) Percent.