



Munich Personal RePEc Archive

The determinants of poverty in Mexico: 2002

Garza-Rodriguez, Jorge

Universidad de Monterrey

2004

Online at <https://mpra.ub.uni-muenchen.de/65995/>
MPRA Paper No. 65995, posted 11 Aug 2015 15:30 UTC

The Determinants of Poverty in Mexico:2002

Jorge Garza-Rodríguez
University of Monterrey, Mexico

Abstract

This study examines the determinants or correlates of poverty in México. The data used in the study come from the 2002 National Survey of Income and Expenditures of Households.

Using the official extreme poverty line, a logistic regression model was estimated based on this data, with the probability of a household being extremely poor as the dependent variable and a set of economic and demographic variables as the explanatory variables. It was found that the variables that are positively correlated with the probability of being poor are: having a female household head, size of the household, living in a rural area, household head working in agriculture, working without remuneration and having a self-employed household head. Variables that are negatively correlated with the probability of being poor are: education level, age of the household head and whether the occupation of the household head is being a small entrepreneur or not.

1. Introduction

Poverty in Mexico is widespread and pervasive. According to official Mexican Government estimates (Cortés *et.al*, 2002), 52.7 million people were living in poverty in 2002, which represents 51.7 percent of the Mexican population. Extreme poverty affected 20.7 million people, equivalent to 20.7 percent of the total population.

The high poverty rates prevalent in the country are a reflection of both low incomes and an unequal income distribution. Mexico has one of the more unequal income distributions in the world. According to the World Bank (1999), only eleven countries in the world have a worse income distribution than Mexico. This feature of the Mexican economy is not new; it has been one of its distinct characteristics for a long time. According to Székely (1998) income distribution in Mexico improved between the years of 1950 and 1984, but then worsened after that year. The Gini coefficient decreased from 0.52 in 1950 to 0.44 in 1984 but then increased to 0.49 in 1992 and increased even further to around 0.52 during the rest of the nineties.

During the 1980's and 1990's, the period in which income distribution has become more unequal, the Mexican economy experienced a deep transformation which involved a major shift in the development model that the country had been following until the 1970's. Important manifestations of this change were the macroeconomic stabilization programs that were implemented, the process of trade liberalization, the privatization of state-owned enterprises and banks, deregulation and the reduction or elimination of barriers to foreign investment in important sectors of the economy since 1988.

After these reforms, the Mexican economy started to grow consistently, although slowly, from 1987 until 1994. However, after a series of political events, including the appearance of a guerilla movement in the south of the country and the assassination of the Institutional Revolutionary Party presidential candidate, the Mexican economy entered one of the most profound crises in recent history. Gross Domestic Product fell 6.2 percent in 1995 and the peso lost half its value against the dollar. The real minimum wage fell by 13 percent, while real private consumption decreased 9.6 percent. Although the economy eventually recovered during 1996, the gains were not enough to compensate for the losses that occurred during 1994. Thus, per capita real GDP was still 4.8 percent lower in 1996 as compared to 1994, average real wages were 22 percent lower than in 1994 and real private consumption was 7.5 percent below the 1994 figure.

During the 1994-1996 period there was a slight improvement in income distribution in the country. The Gini Index decreased from 0.5338 in 1994 to 0.5191 in 1996. The income share of the lowest three deciles increased slightly and the share of the highest decile decreased. However, a closer look at the income distribution reveals that the persons situated in the lowest three percentiles of the distribution, the poorest of the poor, reduced their share during the period.

According to the estimates obtained by Garza-Rodríguez (2000), both moderate and extreme poverty increased in Mexico during the 1994-1996 period, and both the depth as well as the severity of poverty also increased in the same period. Although the author did not decompose the poverty changes as due to decrease in income and the worsening of income distribution, it is possible that both factors played a role in the increase in poverty levels that occurred during the period. Thus, although the Gini coefficient declined during the period, indicating a reduction in income inequality, the Lorenz curves for the two years intersect in the lower percentiles of income, which indicates that the income share of the poorest of the poor decreased during the period.

The poverty profiles constructed by the author for both years indicate that although poverty is predominantly rural in Mexico (60 percent of the rural population was poor in 1996), urban poverty more than doubled during the period, from 9 percent of urban population in 1994 to 21 percent in 1996. This indicates that although poverty alleviation programs should concentrate in the rural sector, the urban sector should not be neglected when designing and implementing policies to mitigate poverty.

Another variable that the poverty profiles suggested as an important determinant of poverty was the level of education of the household head. In both years considered in the study, poverty incidence was higher the lower the level of instruction of the household head. For example, 58 percent of the number of people living in households headed by persons with no instruction was poor in 1996, while only 2.7 percent of the number of people living in households headed by persons with at least a year of college was poor in the same year.

Suggesting a strong correlation between poverty and occupation of the household head, poverty incidence is higher for households whose head works in a rural occupation or in a domestic occupation and it is lower for households whose head works in a professional occupation or in a middle level occupation.

The poverty profiles also showed that poverty rates are higher for households with the following characteristics: they live in rural areas, have more than five family members, their head has a low level of education and works in the primary sector or in a domestic occupation.

To test the hypothesis about the determinants or correlates of poverty we use a logistic regression with the dependent variable being the dichotomous variable of whether the household is extremely poor (1) or is not extremely poor (0). The explanatory variables considered in the analysis were: gender, age, education, the occupation of the household head, and size and location (rural or urban) of the household.

The paper is organized as follows: Section 2 reviews the literature and main empirical findings about the determinants of poverty in several countries and in Mexico; Section 3 describes the ENIGH 2002 Survey as well as the selection of variables from the Survey that will be used in this study. Section 4 presents the results of the multivariate analysis to explore the determinants of poverty in Mexico based on the 2002 ENIGH dataset. Finally, Section 5 proposes some conclusions based on the analysis developed in this study.

a) Studies about the Determinants of Poverty

Although the construction of poverty profiles is useful because it allows us to know whether poverty is increasing or decreasing as well as the changes in the composition of the population in poverty, poverty profiles do not throw much light about the causes of poverty. They only provide a description of poverty according to several economic, demographic or social characteristics, but do not go in depth as to look for the underlying causes of differences in poverty rates across population groups and/or across time.

However, while the literature on poverty measurement is by now relatively developed and abundant, there are very few studies dealing with finding the determinants or causes of poverty. In general, these studies have used different methodologies, including ordinary least square regression where the dependent variable is continuous, logistic regression where the dependent variable is binary, and quantile regressions where the dependent variable is income.

In one of the first studies about the determinants of poverty, Kyereme and Thorbecke (1991) estimated a cross-section regression model for Ghana, using the 1974-1975 Ghana Household Budget Survey. In their model, the dependent variable was the total calorie gap for each household in the Survey and the explanatory variables were a set of economic, demographic and geographic location variables. They found that income and education of the household are inversely related to household calorie gap.

Rodríguez and Smith (1994) used a logistic regression model to estimate the effects of different economic and demographic variables on the probability of a household being in poverty in Costa Rica. The data they used was from a national household-income survey carried out in 1986. Among other results, the

authors found that the probability of being in poverty is higher the lower the level of education and the higher the child dependency ratio, as well as for families living in rural areas.

Coulombe and McKay (1996) used multivariate analysis to analyze the determinants of poverty in Mauritania based on household survey data for 1990. They estimated a multinomial logit model for the probability of being in poverty depending on household-specific economic and demographic explanatory variables. The authors found that low education, living in a rural area and a high burden of dependence significantly increase the probability of a household being poor.

b) Studies about the Determinants of Poverty in Mexico

Studies about the determinants of poverty in Mexico are few, and they use different methodological approaches.

Cortés (1997), using the ENIGH 1992, estimates a logistic regression of the probability of being poor as a function of several economic, demographic and location variables. He finds that the probability of being poor decreases with the number of years of education and increases with the burden of dependency and if the household is located in a rural area.

Székely (1998), using a different approach and based on the 1984, 1989 and 1992 Surveys reaches the conclusion that lack of education is the single most important factor in explaining poverty in the country. Other variables that he found as directly related to poverty are: household size, living in a rural area, and occupational disparities.

3. Description of the Data

a) Description of the Survey

This paper uses the information contained in the micro data from the National Survey of Incomes and Expenditures of Households (ENIGH) for 2002, carried out in that year by the Instituto Nacional de Estadística, Geografía e Informática (INEGI), Mexico's national institute of statistics. The ENIGH surveys are carried out by INEGI every two years since 1992 and they are comparable since they follow the same methodology.

The surveys' sampling unit is the house and the unit of analysis is the household. The household and its members can be classified according to various socio-economic and demographic characteristics such as income and occupational characteristics, the physical characteristics of the residence and the services available to the residents of the household.

The characteristics included in the Survey are the following (and refer to the household residents): kinship relationship with the household head, gender, age, instruction level attained, school attendance, literacy status, and type of school attended.

The Survey's questionnaire asks about the labor force activity of household members, i.e. if they belong to the economically active population or to the economically inactive population. The economically active population includes the employed population and the unemployed population actively seeking employment. The employed population comprises the population 12 years and older who declared that they worked at least one hour a week. The unemployed population included those 12 years and older who were unemployed and actively looking for a job at the time of the interview. The economically inactive population includes housewives, students, retirees, renters, permanently disabled workers and discouraged workers who are no longer seeking work because they have been unable to find a job.

The economic transactions considered in the surveys are current transactions and financial or capital transactions. Current transactions are defined as those whose object is to cover basic needs and the result is not cumulative. Financial or capital transactions are those motivated by the desire to accumulate.

Current transactions include current income and current expenditures. Current income includes both monetary and non-monetary income (in-kind payments) received by household members during the reference period. The income concept registered in the surveys is net income, after deducting taxes, social security payments, union payments or other deductions. Current monetary income includes the following sources: wages, entrepreneurial income, rents, incomes from cooperatives, transfer payments and other current income. Non-monetary income comprises: auto-consumption (household production consumed in the household), in-kind payments, gifts, and the imputed rent from owner-occupied housing.

There were different reference periods for the variables included in the Surveys. For the socio-demographic variables the reference period was at the moment of the interview. For the income variable, the reference period was for one month before the interview up to six months before the interview. For the occupational characteristics the reference period was the month before the interview.

The Survey is statistically representative at the national level and at the urban and rural level, which implies that it is not possible to obtain inferences at the state level.

The ENIGH data were obtained through a two-stage stratified sampling design. First stage sampling units are Areas Geoestadísticas Básicas, AGEBS (basic geo-statistic areas) and second stage sampling units are housing units. AGEBS in urban areas measure around 20 to 80 blocks.

The Surveys include information about expansion factors for each selected house, and they are equal to the inverse of the probability of selection. In this sense, the expansion factor for each selected house indicates the number of houses that each house represents in the total population of dwelling units.

b) Poverty Line used in this Study

The poverty line used in this study is the official “food poverty line”, which could be interpreted as an extreme poverty line. This poverty line (measured at prices of the year 2000) is equal to 15.4 pesos per person per day for rural areas and 20.9 pesos per person per day for urban areas. This is the income necessary to purchase a minimum food bundle that satisfies the minimal nutritional requirements. Therefore, persons with income below this level are considered extremely poor since they do not have the income to buy enough food to satisfy their nutritional requirements.

3. Econometric Model

a) Introduction

Garza-Rodríguez (2000) analyzed the evolution of poverty levels and poverty profiles during the period 1994-1996. He looked at the issue of what happened to poverty during the period as well as what happened to the composition of the poor according to several demographic and socioeconomic characteristics. This knowledge can be useful since it allows us to know whether poverty is increasing or decreasing as well as the changes in the composition of the poor. However, it does not provide us with much insight about the causes of poverty. For example, is poverty higher in rural areas only because education attainment is low and family size is high in rural areas or is poverty high in rural areas even if we control for those variables?

While the literature on the measurement of poverty is relatively abundant, studies about the determinants or causes of poverty are scarce. However, it is precisely in this area where research can be most useful, since the main causes of poverty need to be understood in order to be able to design the most efficient policies to reduce it.

There are several approaches that can be taken in the analysis of the causes of poverty. If we follow the income approach, poverty can be thought as being caused by lack of income, which in turn can be caused by reduced command of economic resources available to the household. Thus, in general terms, poverty can be thought as being due to the limited amount of assets owned by the poor and to the low productivity of these assets.

Many variables can be considered as the determinants of income, and thus, of poverty. We can divide these variables into two general areas: the characteristics associated with the income generating potential of individuals and the characteristics associated with the geographic context in which the individual lives. The first kind of characteristics would include, for example, the assets owned by the individual, both physical and human, while the second type of characteristics would include, for example, the place in which the individual lives (urban or rural). However, there are severe problems in determining the direction of causality. Does poverty cause the characteristic or is it the presence of a given characteristic which causes poverty?. An example of this problem is whether poverty causes large households or a large household causes poverty. It is necessary to determine the direction of causality, but this is a difficult task that has not been solved yet due among other things to the unavailability of better data, especially panel data in developing countries. What we will try to do in this chapter is to get an approximation about the determinants of poverty, even if they could more properly be called the correlates of poverty.

We also need to separate the effects of correlates. For example, if we find that poverty is highly

correlated with rural location, and rural location is highly correlated with low education, then we need to know how much poverty is due to rural location and how much is due to low education. We approach this problem through the use of multivariate analysis, using a logistic regression. In order to explore the correlates of poverty with the variables thought to be important in explaining poverty a logistic regression model was estimated, with the dependent variable being the dichotomous variable of whether the household is extremely poor (1) or not extremely poor (0). The explanatory variables considered in the analysis were: gender, age, education and position in occupation of the household head, and size and location (rural or urban) of the household.

In this model, the response variable is binary, taking only two values, 1 if the household is extremely poor, 0 if not.

The probability of being extremely poor depends on a set of variables \mathbf{x} so that

$$\text{Prob}(Y = 1) = F(\boldsymbol{\beta}'\mathbf{x}) \tag{4-1}$$

$$\text{Prob}(Y = 0) = 1 - F(\boldsymbol{\beta}'\mathbf{x}) \tag{4-2}$$

Using the logistic distribution we have:

$$\text{Prob}(Y = 1) = \frac{e^{\boldsymbol{\beta}'\mathbf{x}}}{1 + e^{\boldsymbol{\beta}'\mathbf{x}}} \tag{4-3}$$

$$= \Lambda(\boldsymbol{\beta}'\mathbf{x}), \tag{4-4}$$

Where Λ represents the logistic cumulative distribution function.

Then the probability model is the regression:

$$E[y | \mathbf{x}] = 0[1 - F(\boldsymbol{\beta}'\mathbf{x})] + 1[F(\boldsymbol{\beta}'\mathbf{x})] \tag{4-5}$$

$$= F(\boldsymbol{\beta}'\mathbf{x}) \tag{4-6}$$

4.2 Empirical Results

The estimated regression is shown in Table 4.1. Except for the variables of being an entrepreneur or a member of a cooperative, all of the coefficients in the regression are significantly different from zero at the 95 percent confidence level. The variables that are positively correlated with the probability of being poor are: being a female household head, size of the household, living in a rural area, working in agriculture, working without remuneration and being self-employed. The variables that are negatively correlated with the probability of being poor are: having at least one year of primary education, having completed primary education, having at least a year of secondary education, having at least a year of preparatory school (senior high school) and having at least a year of college. Besides education, other variables negatively correlated with poverty are age of the household head and being a small entrepreneur.

Table 4.1 Logistic estimates of poverty determinants

Logit estimates	Number of obs =	13727
	LR chi2(15) =	3461.91
	Prob > chi2 =	0.0000
Log likelihood = -4919.9798	Pseudo R2 =	0.2603

	POBALIM	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
FEMALE		.3049149	.077831	3.92	0.000	.152369 .4574607
HHSIZE		.3086312	.0123905	24.91	0.000	.2843462 .3329161
RURAL		.7718235	.0583982	13.22	0.000	.6573652 .8862819

```

AGE | -.0364757 .0022364 -16.31 0.000 -.040859 -.0320924
AGWORKER | 1.207869 .0815507 14.81 0.000 1.048033 1.367706
WHOPMTWORKER| 1.383289 .5028421 2.75 0.006 .3977367 2.368842
COOPMEMBER | .1539129 .60445 0.25 0.799 -1.030787 1.338613
SELFEMPLOYED| .9119334 .062237 14.65 0.000 .7899512 1.033916
SMALLENTRPNR| -.4513081 .1626262 -2.78 0.006 -.7700496 -.1325665
ENTREPENEUR | -.0906324 .4155116 -0.22 0.827 -.9050201 .7237553
INCOMPELEM | -.7095517 .07329 -9.68 0.000 -.8531974 -.565906
COMPELEM | -1.159857 .0840046 -13.81 0.000 -1.324503 -.9952114
ATLSOMEHS | -1.579 .0937311 -16.85 0.000 -1.762709 -1.39529
ATLSOMEPREP | -2.317717 .1498255 -15.47 0.000 -2.61137 -2.024065
ATLSOMEUNIV | -3.323885 .2275425 -14.61 0.000 -3.76986 -2.87791
CONSTANT | -1.143369 .1509096 -7.58 0.000 -1.439147 -.8475919
-----

```

The variables in Table 4.1 are defined as follows:

DEPENDENT VARIABLE:

POBALIM Binary variable indicating whether a household

is below the extreme poverty line or not (1 if extremely poor, zero if not).

INDEPENDENT VARIABLES:

- FEMALE Binary variable indicating whether the household head is female or male (1 if female, zero if male).
- RURAL Binary variable indicating whether a household is located in a rural area (less than 15,000) or in an urban area (1 if located in rural area, zero if not).
- HHSIZE Size of the household.
- AGE Age of the household head.
- AGWORKER Binary variable indicating whether the household head works in agriculture or not.
- WHOPMTWORKER Binary variable indicating whether the household head receives payment or not.
- COOPMEMBER Binary variable indicating whether the household head works as a member of a cooperative or not.
- SELFEMPLOYED Binary variable indicating whether the household head is self-employed or works in the household without receiving remuneration or not.
- SMALLENTRPNR Binary variable indicating whether the household head is a small entrepreneur (employing from 1 to 5 workers) or not.
- ENTREPENEUR Binary variable indicating whether the household head is a large entrepreneur (employing more than 5 workers) or not.
- INCELEM Binary variable indicating whether the household head has incomplete elementary education or not.
- COMPELEM Binary variable indicating whether the household head has completed elementary education or not.
- ATLSOMEHS Binary variable indicating whether the household head has at least a year of high school or not.
- ATLSOMEPREP Binary variable indicating whether the household head has at least a year of senior high school or not.
- ATLSOMEUNIV Binary variable indicating whether the household head has at least a year of college or not.

4.2.2 Marginal Effects and Odds Ratios

Since the logistic model is not linear, the marginal effects of each independent variable on the

dependent variable are not constant but are dependent on the values of the independent variables (Greene, 1993). For the logistic distribution we have:

$$\frac{d\Lambda[\beta'x]}{d(\beta'x)} = \frac{e^{\beta'x}}{(1 + e^{\beta'x})^2}$$

$$= \Lambda(\beta'x)[1 - \Lambda(\beta'x)]\beta$$

(4-4)

Thus, as opposed to the linear regression case, it is not possible to interpret the estimated parameters as the effect of the independent variables upon poverty. However, it is possible to compute the marginal effects evaluating expression (4-4) at some interesting values of the independent variables, such as the means of the continuous independent variables and for some given values of the binary variables. This is the procedure we will use in the next sub-sections to draw graphs showing the effect of the independent variables on poverty.

Another way to analyze the effects of the independent variables upon the probability of being poor is by looking at the change of the odds ratio as the independent variables change. The odds ratio is defined as the ratio of the probability of being poor divided by the probability of not being poor. Table 4.2 shows the odd ratios for each independent variable as well as its corresponding standard error and confidence intervals, with the variables' labels being the same as in Table 4.1.

Table 4.2 Odds Ratios Estimates of Poverty Determinants

Logit estimates	Number of obs =	13727
	LR chi2(15) =	3461.91
	Prob > chi2 =	0.0000
Log likelihood = -4919.9798	Pseudo R2 =	0.2603

POBALIM	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
FEMALE	1.35651	.1055784	3.92	0.000	1.16459 1.580057
HHSIZE	1.36156	.0168704	24.91	0.000	1.328893 1.39503
RURAL	2.163708	.1263566	13.22	0.000	1.929701 2.426092
AGE	.9641815	.0021563	-16.31	0.000	.9599645 .9684171
AGWORKER	3.346347	.2728971	14.81	0.000	2.852035 3.926333
WHOPMTWORKER	3.987997	2.005333	2.75	0.006	1.488452 10.68501
COOPMEMBER	1.166389	.7050241	0.25	0.799	.356726 3.813751
SELFEMPLOYED	2.48913	.1549159	14.65	0.000	2.203289 2.812055
SMALLENTRPNR	.6367946	.1035595	-2.78	0.006	.4629901 .8758447
ENTREPENEUR	.9133534	.3795089	-0.22	0.827	.4045338 2.062163
INCELEM	.4918647	.0360487	-9.68	0.000	.4260505 .5678455
COMPLEM	.3135309	.026338	-13.81	0.000	.265935 .3696453
ATLSOMEHS	.2061812	.0193256	-16.85	0.000	.1715794 .2477611
ATLSOMEPREP	.0984982	.0147575	-15.47	0.000	.0734339 .1321173
ATLSOMEUNIV	.0360126	.0081944	-14.61	0.000	.0230553 .0562522

As can be seen in the Table, the variables FEMALE, HHSIZE, RURAL, AGWORKER, WHOPMTWORKER and SELFEMPLOYED have odd ratios greater than one, which means that these variables are positively correlated with the probability of being poor.

On the contrary, the variables AGE, SMALLENTRPNR, INCELEM, COMPELEM, ATLSOMEHS, ATLSOMEPREP and ATLSOMEUNIV all have odd ratios lower than one, which means that these variables are negatively correlated with the probability of being poor.

The confidence interval for the odd ratios of COOPMEMBER and ENTREPENEUR includes the number one, which means that these variables have no statistically significant effect on the probability of poverty.

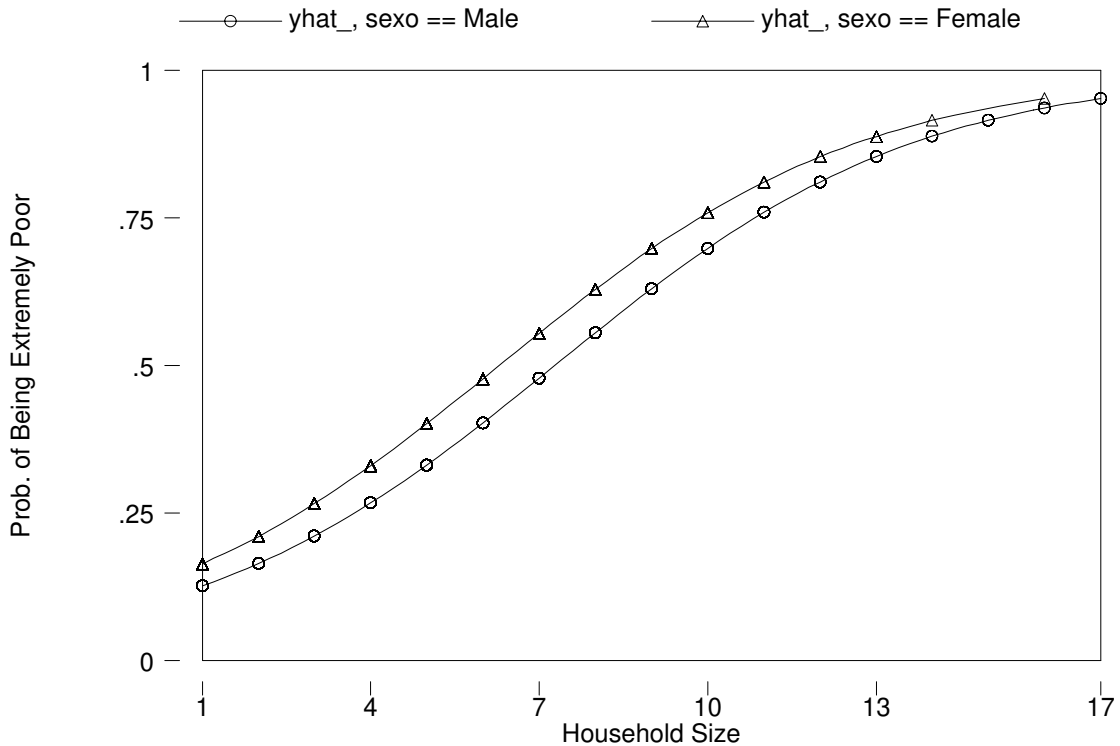
4.2.1 Poverty and Gender

Several studies have discussed the phenomenon of the feminization of poverty, which is said to exist if poverty is more prevalent among female-headed households than among male-headed households. This situation might be due to the presence of discrimination against women in the labor market, or it might be due to the fact that women tend to have lower education than men and therefore they are paid lower salaries. Using a different methodology than the one used in this chapter, Székely (1998) found no evidence that female-headed households are more likely to be poor than male-headed households. Using a logistic regression and the 1992 National Survey of Income and Expenditures, Cortés (1997) finds that the probability of being poor decreases by six percent if the household is headed by a woman.

Looking at the results of the logistic regression estimated above, it can be seen that the probability of being poor increases if the household head is female, although the marginal effect of this variable is relatively small.

Figure 4.1 shows the probability of being poor for male and for female-headed households. This graph is drawn based on the following assumptions about the values of the independent variables: the household head is 43.9 years old (the sample mean for this variable), the household is located in a urban area (63.5 percent of the households in the sample are located in a urban area), the household's head did not complete elementary education (the most representative education level of household heads in the sample) and the household head occupation is "not agricultural worker" (55.4 percent of the sample) .

Figure 4.1 Probability of being poor and gender of the head



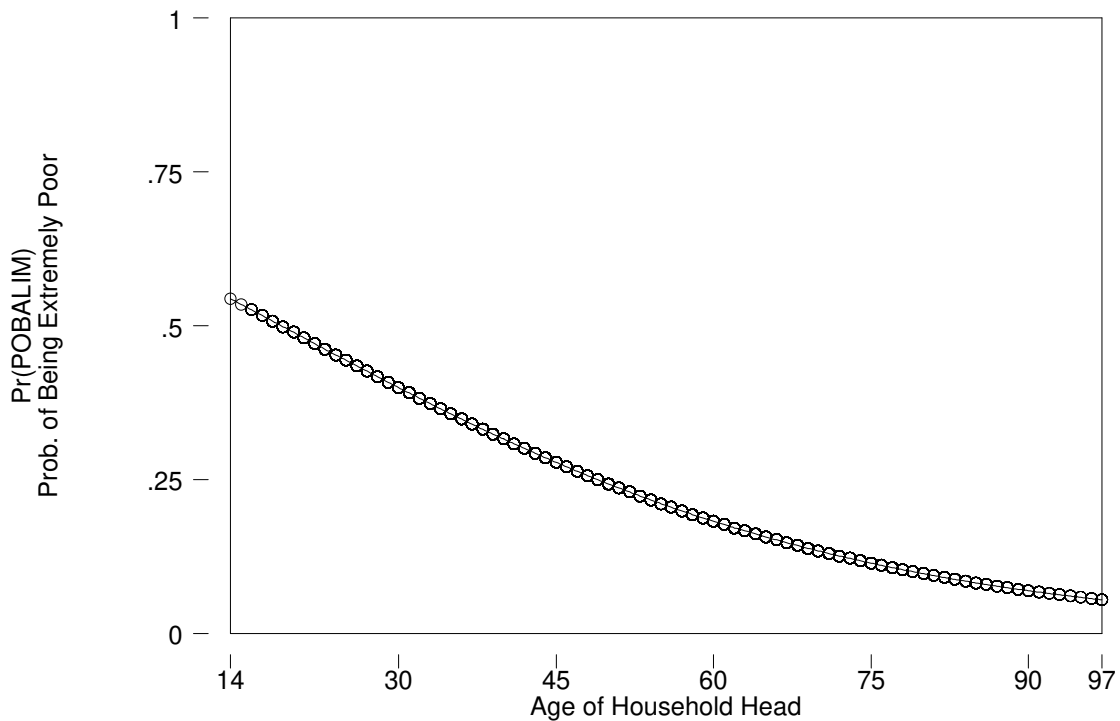
4.2.2 Poverty and Age

It is argued that poverty increases at old age as the productivity of the individual decreases and the individual has few savings to compensate for this loss of productivity and income. This is more likely to be the case in developing countries, where savings are low because of low income. However, the relationship between age and poverty might not be linear, as we would expect that incomes would be low at relatively young age, increase at middle age and then decrease again. Therefore, according to life-cycle theories we would expect to find that poverty is relatively high at young ages, decreases during middle age and then increases again at old age.

For the case of Mexico and based on the 1984, 1989 and 1992 Surveys, Székely (1998) finds that age of the head is not relevant in explaining poverty. However, using the 2002 survey and the methodology developed above we found that age of the head is statistically significant in explaining poverty, although the effect is not very strong, since as can be seen in Table 4.2 above, an increase of one year in the age of the head decreases the odds of being poor by only 3.6 percent.

As Figure 4.2 shows, the probability of being poor decreases with age. This graph is drawn based on the following assumptions about the values of the independent variables: household size is 4.1 members (the mean for this variable in the sample), the household head is male (80 percent of the households in the sample are headed by men) the household is located in a urban area, the household’s head did not complete elementary education, and the household head occupation is “not agricultural worker”

Figure 4.2 Probability of being poor and age



4.2.3 Poverty and Household Size

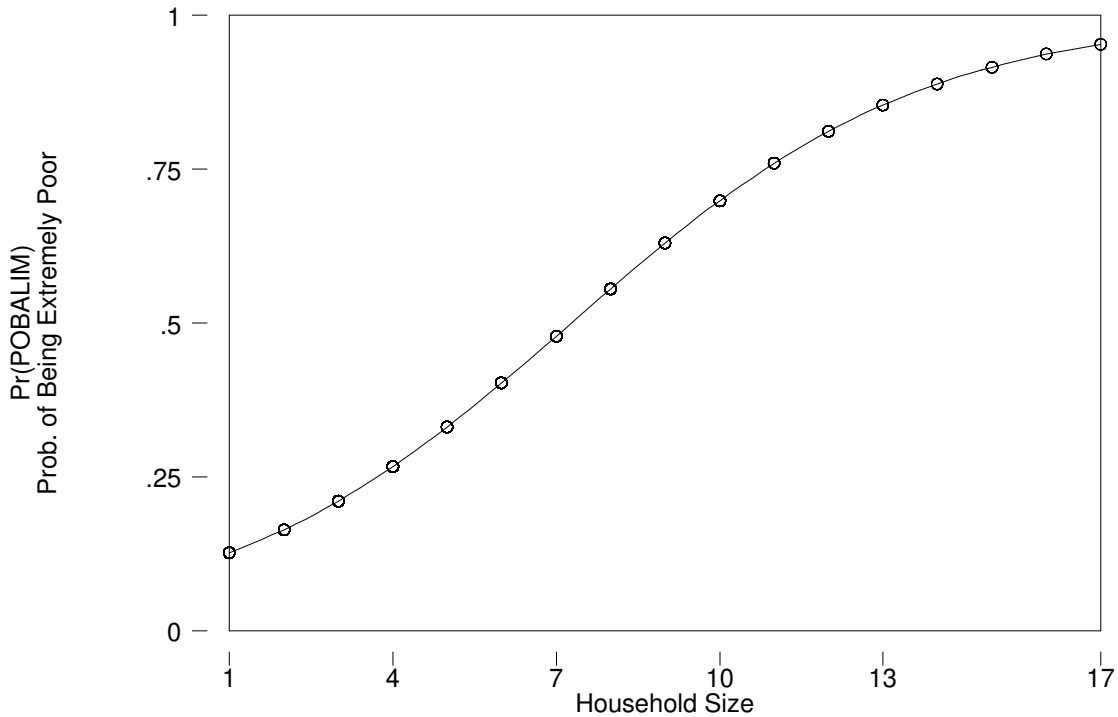
Large households tend to be associated with poverty [World Bank (1991a,b), Lanjouw and Ravallion (1994)]. The absence of well developed social security systems and low savings in developing countries will tend to increase fertility rates, especially among the poor, in order for the parents to have some economic support from the children when parents reach old age. It might be rational for them to increase the number of children in order to increase the probability that they will get support when they get old. High infant mortality rates among the poor will tend to provoke excess replacement births or births to insure against high infant and child mortality, which will increase household size (Schultz, 1981).

For Mexico's case Székely (1998), using the 1984, 1989 and 1992 Surveys, found that household size is relevant in explaining poverty, while Cortés (1997), based on the 1992 Survey, found a direct relationship between poverty and the burden of dependency. Using the 1996 data, we obtained similar results since, as can be seen in Table 4.2 above, an increase of one in the size of the household increases the odds of being poor by 41 percent.

Figure 4.3 shows the probability of being poor as the size of the household increases from its minimum to its maximum, assuming that the independent variables take the following values: the household head is 43.9 years old, the household head is male the household is located in a urban area, the household's head did not complete elementary education, and the household head occupation is "not agricultural worker".

It can be seen in Figure 4.3 that the effect of a change in household size upon the probability of being extremely poor is pronounced, and that this effect increases relatively rapidly up to a household size of around 10 members and then increases less rapidly up to the maximum household size of 17. Since 95 percent of households have between 1 and 9 members, the first part of the curve is the most relevant, which implies that household size has a strong correlation with poverty in Mexico.

Figure 4.3 Probability of being poor and size of the household.



4.2.4 Poverty and Rural-Urban Location

One of the most salient facts about poverty in developing countries is that it is higher in rural areas than in urban areas. The World Bank (1990) reports that the rural poverty rate was higher than the urban poverty rates for many developing countries during the 1980's. For example, in Kenya the rural poverty rate was six times the urban poverty rate, while in Mexico it was 30 percent higher during the same period. Although there may be problems associated to determining the direction of causality, several variables might explain why poverty is higher in rural areas than in urban areas. First, rural areas are heavily dependent on agricultural production, which in developing countries is characterized by low labor productivity and therefore low incomes. Second, historically government policy has been biased against rural areas, including price policy, educational policy, housing, and public services in general. Third, natural disasters such as drought or flooding tend to affect rural areas more heavily than they affect urban areas, and although at first we might think that these phenomena would only affect transient poverty they affect the stock of capital of the communities which in turn have a permanent adverse effect on poverty rates.

By constructing a poverty profile using the 1984 Survey, Levy (1994) concludes that poverty in Mexico is a predominantly rural phenomenon characterized by higher poverty rates in rural areas than urban areas. Cortés (1997) finds that the probability of being poor increases if the household is located in a rural area. Székely (1998) also concludes that rural-urban location is statistically significant as a cause of

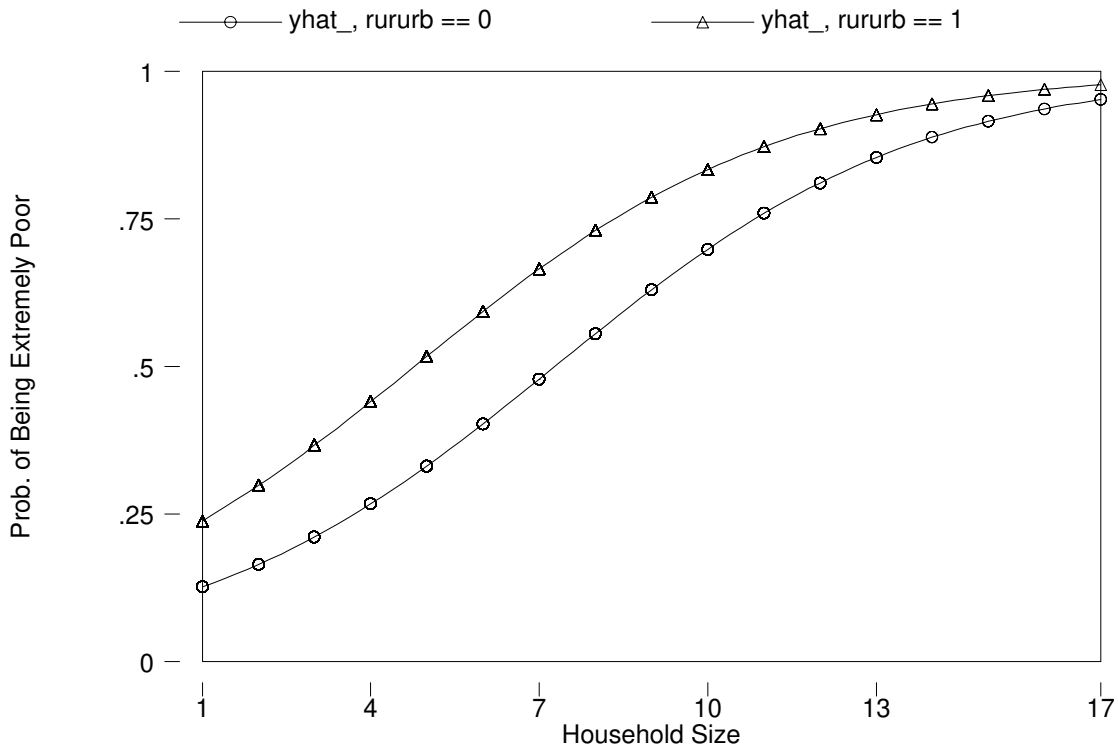
poverty in Mexico.

Our own estimates using the logistic regression for the 2002 survey indicate that rural location has a statistically significant positive effect on the probability of being poor. As shown in Table 4.2, the odds of being poor for a household located in a rural area are more than twice the odds of an urban household.

Figure 4.4 shows the effect of the size of the household and rural/urban location of the household upon the probability of being poor assuming that the independent variables take the following values: the household head is 43.9 years old, the household is located in a urban area the household's head did not complete elementary education and the household head occupation is "not agricultural worker".

It can be seen from the graph that the probability of being poor is significantly higher for a household located in a rural area than for one located in an urban area.

Figure 4.4 Probability of being poor and rural/urban location.



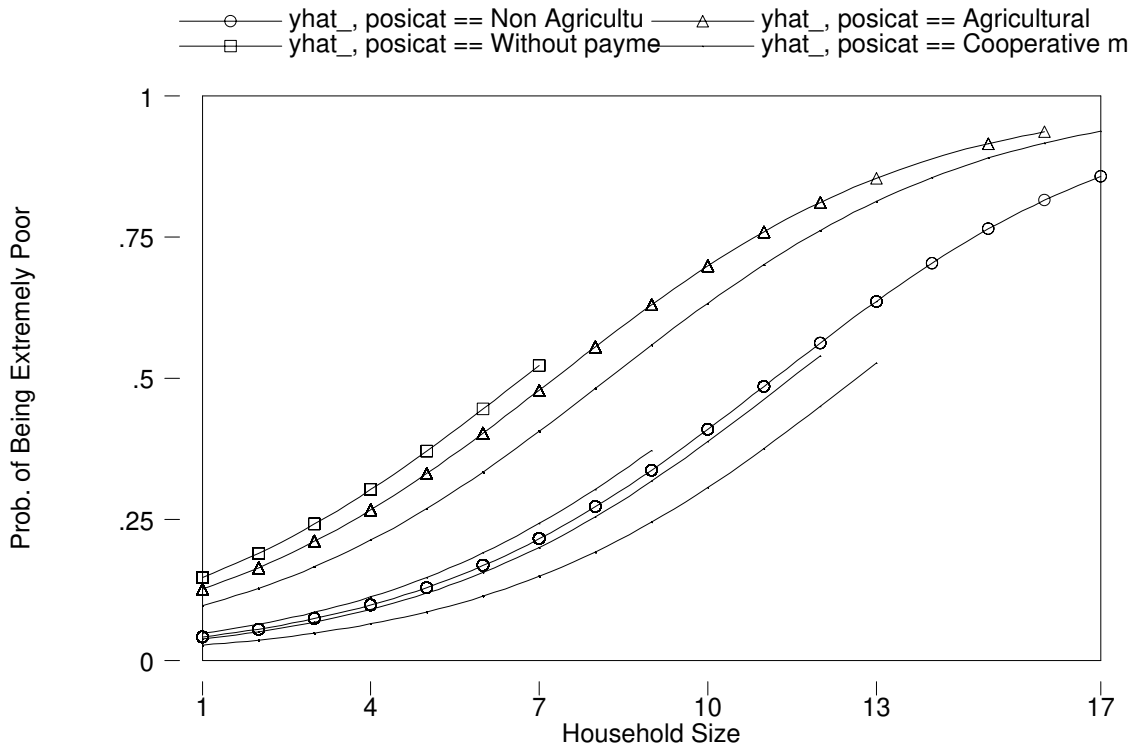
4.2.5 Poverty and Position in Occupation

Position in occupation of the household head has a high correlation with poverty because positions which require low amounts of capital, either human or physical, will be associated with low earnings and therefore with higher poverty rates. In our model we found that working in agriculture, working without remuneration and being self-employed worker increases the probability of being poor, while being a small entrepreneur decreases such probability.

Figure 4.5 shows the effect of the position in occupation variable on the probability of poverty, based on the following assumptions about the values of the independent variables: household head is 43.9 years old, the household head is male, the household is located in a urban area, and the household's head did not complete elementary education.

It can be seen from the graph that the probability of being poor is higher for households heads working without remuneration and for heads working in an agricultural occupation and it is lower for households whose head is a small entrepreneur.

Figure 4.5 Probability of being poor and position in occupation



4.2.6 Poverty and Education

There is generalized evidence in household surveys and censuses that education is positively correlated with earnings [Schultz (1988); Psacharopoulos (1985); Blaug (1976)]. Higher earnings in turn are associated to lower poverty levels.

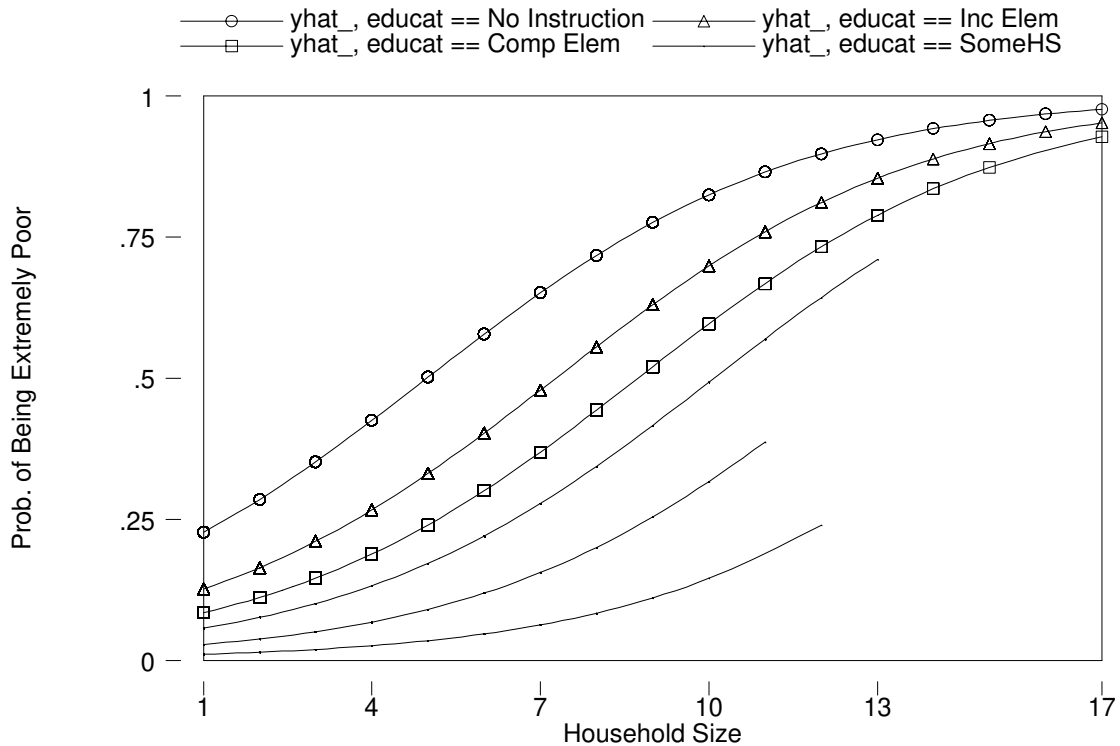
Education increases the stock of human capital, which in turn increases labor productivity and wages. Since labor is by far the most important asset of the poor, increasing the education of the poor will tend to reduce poverty. Thus, we might think of low education as one of the most important causes of poverty. In fact, there seems to be a vicious circle of poverty in that low education leads to poverty and poverty leads to low education. The poor are not able to afford their education, even if it is publicly provided, because of the high opportunity cost that they face. Many times they cannot attend school because they have to work to survive.

Both Székely (1998) and Cortés (1997) found that education is negatively correlated with poverty in Mexico. Székely reaches the conclusion that education is the single most important factor in explaining poverty in the country. The regression estimated in this chapter also finds that education has a significant effect on the probability of being poor.

Figure 4.6 shows the effect of the level of education on the probability of poverty, assuming that the other independent variables take the following values: the household head is 43.9 years old, the household head is male, the household is located in a urban area, and the household head occupation is “not agricultural worker”.

Figure 4.6 shows that the probability of being poor decreases as the level of education increases.

Figure 4.6 Probability of being poor and Education



4.3 Summary of Findings

The estimates from the logistic model estimated in this chapter indicate that the probability of poverty is higher for female-headed households, for households whose head has a low level of education and for households located in rural areas. Other variables that increase the probability of being poor are the size of the household and if the household head works in agriculture or is self-employed.

Conclusions

Reflecting the results obtained by Garza-Rodriguez (2000) in the construction of poverty profiles, the multi-variate analysis developed in this study shows that the variables that are positively correlated with the probability of being poor are: size of the household, living in a rural area, working in an agricultural occupation, having a female household headship, having a not remunerated occupation and being self-employed.

The multi-variate analysis shows that increases in educational attainment have an important impact on reducing the probability that a household is poor. The five binary variables for education representing increasing levels of educational achievement show that as educational achievement increases, the probability of being poor decreases.

The logistic model shows that a rural family has a high probability of being poor. Even when controlling for education, the size of the household, and the other independent variables in the regression equation, the rural/urban variable is statistically significant and this variable increases the odds of a household being poor significantly. We can only speculate what factors, in addition to poor education and a large household, result in rural poverty. The migration from rural to urban areas is probably selective of the most ambitious and entrepreneurial persons, leaving the less ambitious and less entrepreneurial household heads in the rural areas. These household heads are more likely to be poor.

Government policy also may contribute to rural poverty beyond the effect of poor education by providing fewer resources to rural residents for services such as medical care and by policies that reduce the incentives to increase agricultural production. Poor medical care, which includes problems in the delivery of contraceptive supplies and services, may contribute to the larger household size in rural areas (Chen, et al., 1990).

Suggestions for further research include the construction of poverty profiles at the state and regional levels, but this task could only be possible if INEGI expands the ENIGH Surveys to make them representative at the state and regional levels. Likewise, the availability of panel data is badly needed in order to be able to construct better models of the determinants of poverty in Mexico.

BIBLIOGRAPHY

Alarcón Gonzalez, D. (1993). *Changes in the Distribution of Income in Mexico During the Period of Trade Liberalization*. Thesis (PhD). University of California, Riverside.

Boltvinik, J. and Hernández-Laos, E. (1999). *Pobreza y Distribución del Ingreso en México, Siglo XXI, México*.

Castro-Leal, F.T. (1995). *Economic Inequality, Poverty and Growth: Mexico, 1984-1989*. Thesis (PhD). The University of Texas at Austin.

Chen et. al. (1990), "Economic Development, Contraception and Fertility Decline in México", *The Journal of Development Studies*, 26(3), April 1990, pages 408-424.

Chenery, H. et. al. (1974), *Redistribution with Growth*, London.

Comité Técnico para la Medición de la Pobreza, (2002). "Medición de la pobreza en México: variantes metodológicas y estimación preliminar". Sedesol, Serie Documentos de Investigación 1. México.

COPLAMAR (1983), *Macroeconomía de las necesidades esenciales en México: situación actual y perspectivas al año 2000*, México, Siglo XXI.

Cortés, Fernando (1997). "Determinantes de la pobreza de los hogares. México, 1992". *Revista Mexicana de Sociología*, Vol. 59, núm. 2 abril-junio 1997. pp. 131-160.

Cortés, Fernando (2001). "El cálculo de la pobreza en México a partir de la encuesta de ingresos y gastos". *Comercio Exterior*, Vol 51, Num. 10, pp. 879-884.

Cortés, Fernando; Hernández, Daniel; Hernández, Enrique; Székely, Miguel; Vera, Hadid. (2002). "Evolución y características de la pobreza en México en la última década del siglo XX", Sedesol, Serie Documentos de Investigación 2. México. Agosto 2002.

Cortés, Fernando, "Determinantes de la pobreza de los hogares. México, 1992". *Revista Mexicana de Sociología*, Vol. 59, núm. 2 abril-junio 1997. pp. 131-160.

Coulombe, Harold; McKay, Andrew, "Modeling Determinants of Poverty in Mauritania", *World Development*; 24(6), June 1996, pages 1015-31.

Damián, A.; Boltvinik, J. (2003). "Evolución y características de la pobreza en México". *Comercio Exterior*, Vol 53, Num. 6, pp. 519-531.

Garza-Rodriguez, Jorge, "The determinants of poverty in México: 1996". (2000). Ph.D. diss., University of Missouri-Columbia, 2000.

Greene, William H. (1993) *Econometric Analysis*. New York: Maxwell Macmillan, 2nd Edition.1993.

Hagenaars, A.J.M. and van Praag, B.M.S. (1985) "A synthesis of poverty line definitions", *Review of Income and Wealth*, 31 (2):139-154.

Hagenaars, A.J.M and de Vos, K. (1988) "The Definition and Measurement of Poverty", *The Journal of Human Resources*, (23):211-221.

Hernández-Laos, E. (1990). "Medición de la intensidad de la pobreza y la pobreza extrema en México (1963-1988)", *Investigación Económica*, 191, January-March, pp. 265-298.

INEGI (2002), Encuesta Nacional de Ingresos y Gastos de los Hogares 2000, Instituto Nacional de Estadística, Geografía e Informática, México, 2002.

INEGI-CEPAL (1993), *Magnitud y Evolución de la Pobreza en México 1984-1992*, Instituto Nacional de Estadística, Geografía e Informática, México, 1993.

Kyereme, Stephen S.; Thorbecke, Erik, "Factors Affecting Poverty in Ghana", *Journal of Development Studies*; 28(1), October 1991, pages 39-52.

Lanjouw, P. and Ravallion, M. (1994) "Poverty and Household Size", Policy Research Working Paper 1332, the World Bank, Washington, DC.

Levy, S. (1994), "La pobreza en Mexico", in *La pobreza en Mexico, causas y políticas para combatirla*, Velez, F., Editor. ITAM-FCE.

Lipton, M. (1983) *Poverty, Undernutrition, and Hunger*. World Bank Staff Working Paper No. 597, Washington, DC: The World Bank.

Lipton, M. (1997) . "Editorial: Poverty – Are There Holes in the Consensus", *World Development*, 25(7):1003-1007.

Lipton, M. and M. Ravallion, (1995) "Poverty and Policy", in: Behrman, Jere and T.N. Srinivasan, eds., *Handbook of Development Economics*, Vol.IIIB, Elsevier Science B.V.

Mukherjee,-Sanjukta; Benson,-Todd. (2003). "The Determinants of Poverty in Malawi, 1998", *World Development*. February 2003; 31(2): 339-58.

Lustig, N. (1992). "La medición de la pobreza en Mexico", *El Trimestre Económico*, 236, pp. 725-749.

Lustig, N. (1995). " Poverty in Mexico: The Effects of Adjusting Survey Data for Under-reporting", *Estudios Economicos*, Vol. 10, pp. 3-28.

Meier, G.M. (1984). *Leading Issues in Economic Development*. New York: Oxford University Press.

Mukherjee,-Sanjukta; Benson,-Todd. (2003). "The Determinants of Poverty in Malawi, 1998", *World Development*. February 2003; 31(2): 339-58.

Psacharopoulous, George (1985) "Returns to Education: A Further International Update and Implication", *Journal of Human Resources*, 20:4, pages 583-604.

Psacharopoulous, George et al.(1996) "Returns to Education during Economic Boom and Recession: Mexico 1984, 1989 and 1992". *Education Economics*;4(3), December 1996, pages 219-30.

Ravallion, M. (1993) *Poverty Comparisons*. Fundamentals of Pure and Applied Economics Volume 56, Harwood Academic Press, Chur, Switzerland.

Rodriguez, Adrian G.; Smith, Stephen M. "A Comparison of Determinants of Urban, Rural and Farm Poverty in Costa Rica". *World-Development*; 22(3), March 1994, pages 381-97.

Schultz, T.P. (1981), *Economics of Population* Addison-Wesley. Reading, MA.

Schultz, T.P. (1988), "Education Investments and Returns", in: Chenery, Hollis and T.N. Srinivasan, eds., *Handbook of Development Economics*, Vol. 1, North Holland.

Seers, D. (1979), "The Meaning of Development" in D. Lehman (ed.), *Development Theory*.

Sen, A.K., (1985). *Commodities and Capabilities*, Amsterdam,; North Holland.

Sen, A.K. (1987). *The Standard of Living*, Cambridge: Cambridge University Press.

Streeten, P., Burki, S.J., ul Haq, M., Hicks, N. and Stewart, F. (1981) *First Things first: Meeting basic needs in developing countries*. New York: Oxford University Press.

Székely, Miguel (1995) "Poverty in Mexico during Adjustment", *Review of Income and Wealth*; 41(3), September 1995, pages 331-48.

Székely, Miguel (1998) *The Economics of Poverty, Inequality and Wealth Accumulation in Mexico*. St. Antony's Series. New York: St. Martin's Press; London: Macmillan Press; in association with St. Antony's College, 1998.

Viner, J. (1953), *International Trade and Economic Development*, Oxford.

World Bank (1990), *The World Bank Annual Report 1990*, Washington DC: The World Bank.

World Bank (1991a), *Assistance strategies to reduce poverty*. A policy paper, Washington, D.C.

World Bank (1991b), *Indonesia. Strategy for a sustained reduction in poverty*. Washington, D.C.

World Bank (1999), *World Development Indicators*, Washington DC: The World Bank.