RESHAPING THE LABOUR SUPPLY CURVE FOR THE POOR

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The low open unemployment rate observed in Mexico and the relatively high labour effort experienced by certain groups of people may have a common explanation: many households do not have enough assets to finance unemployment spells or non-market activities. In this study we show that most people from low-income families, especially women, participate more in the labour market if real wages decrease. We find similar results for the total labour supply equations. Regarding unemployment, we find that the family helps its members both to avoid unemployment by directly providing them with jobs and information, and to finance their unemployment spells. Finally we find that the family non-labour income has a positive impact on the accepted wages of unemployed people.

INTRODUCTION

There are various features of the Mexican labour force similar to those in developed countries. For instance, the rising trend of the female participation rate experienced in most industrialised countries over the past decades has also been observed in Mexico. While in 1950, approximately 13% of women entered the labour force in Mexico, 34.5% of the female population worked in 1995[1]. In the United States, for instance, 28.8% of women entered the labour force in1959; this figure increased to 55.7% in 1993. It seems that similar events have influenced this phenomenon in both places, such as the reduction in fertility, the rise in the number of clerical jobs, the urbanisation of the economy and, to an extent, the rise in real wages[2]. The trend of the male participation rate in Mexico has also been in line with the one witnessed in developed countries. This rate changed in Mexico from 88.2% in 1950 to 71.3% in 1979, although it has been increasing ever since and in 1995 approximately 78.2% of the males of working age participated in the labour force, as we can see in Table 1.

However, things start getting suspicious when we analyse other variables, such as the unemployment rate. The average unemployment rate in Mexico between 1979 and 1994 was 4.1%[3], lower than in most developed countries. For example, in 1993 the unemployment rate in Mexico was 3.4%[4], well below the OECD[5] average (approximately 6.0%) but closer to the rate experienced in highly developed countries, such as Switzerland

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[1] Instituto Nacional de Estadística, Geografía e Informática (INEGI) (1995), *Encuesta Nacional de Empleo.*
[2] See S. W. Polachek and W. S. Siebert (1993), G. S. Becker (1985) and J. Mincer (1985) among others.
[3] INEGI (1979-1994), *Encuesta Contínua de Ocupación and Encuesta Nacional de Empleo Urbano*.
[4] INEGI (1993), *Encuesta Nacional de Empleo Urbano.*
[5] Organisation for Economic Co-operation and Development.

(4.0%) and Japan (2.5%)[6]. It seems unlikely that the labour market situation in Mexico is better than in those countries, therefore we need to find an alternative explanation for this phenomenon.

Table 1
Participation rates by sex, 1950-1995
(%)

Period	Total	Male	Female
1950	49.5	88.2	13.1
1960	46.5	78.7	15.4
1970[a]	44.9	73.0	17.6
1979[b]	45.7	71.3	21.5
1991	53.6	77.7	31.5
1993	55.2	78.9	33.0
1995	55.6	78.2	34.5
1996	55.4	77.7	34.8

a. This figure was adjusted by P. Gregory (1986) for under-enumeration of male labour force members in the estimated amount of 419,000.
b. From this year onwards the information is taken from various employment surveys, and therefore it is not completely comparable with the previous years, when the information is derived from the censuses.
Source: 1950 and 1970 *Censos Generales de Población*, Secretaría de Industria y Comercio; 1960 O. Altimir (1974); 1979 *Encuesta Contínua de Ocupación*, INEGI; 1991, 1993, 1995 and 1996 *Encuesta Nacional de Empleo*, INEGI.

We believe that the answer lies in the fact that Mexican families do not have the institutional protection which is found in more developed countries, in terms of income and unemployment support programmes. Low unemployment rates reflect also the low levels of non-labour income among Mexican families. Many households do not have enough savings or assets to face economic difficulties[7]. Under these circumstances and with an imperfect capital market, only a few people in Mexico can afford to be unemployed. If a worker is made redundant he will accept a job offer relatively fast, especially if the person is the head of the household, rather than waiting for a better offer, because he might not have enough resources to do so.

The low levels of non-labour income and the lack of economic protection among Mexican families can also be responsible for other differences in the labour force between Mexico and industrialised countries. One difference closely related to the low unemployment rate is the real wage flexibility of the Mexican labour market. If workers do not have other sources of income, apart from their earnings, their asking or reservation wage can decrease easily, driving real wages down. Possibly that is the reason why in developed countries

[6] OECD (1994).

employment is the main variable that adjusts during the different stages of the economic cycle, whereas in Mexico the adjustment is done mainly through wages. The economic stabilisation programme of the 1980's and the one in 1995 relied on this fact. During the former, real wages fell nearly 45% over six years (1981-1987)[8] and the average decrease in real wages during 1995 was approximately 14.6% in the manufacturing industry[9].

Another feature of the labour force, for which we can also blame the lack of economic resources among Mexican families is the high participation rate of youngsters and elderly people. The participation rate for urban people between 12 and 15 years of age was 11.8% in the first quarter of 1993[10], but it is not difficult to find even younger people who left school, working on the streets in the largest urban areas. The strong labour regulations and the higher family income in developed countries make it difficult to see many youngsters in the labour market[11].

The situation is similar for old people. While in Mexico 26.6% of those between 66 and 75 years of age entered the labour force, in the U.S.A. around 20.4% of those between 65 and 69 years old were in the labour force, 10.7% worked between 70 and 74 years and only 3.8% entered the labour market if they were older. These figures are lower for the U.K. and almost negligible for Germany[12].

Apparently, Mexico has also longer working weeks than those countries[13]. In the first quarter of 1993, the average working time in urban Mexico was 40.5 hours per week[14]. In the same year France, Germany, Sweden and the U.S.A. worked 39.0, 38.0, 36.1 and 34.5 hours respectively[15].

The low levels of non-labour income can also give rise to an important phenomenon in the labour supply of poor families in Mexico. Standard economic theory indicates that labour supply curves are positively-sloped, even when wages are relatively low. If real wages fall, the worker will have fewer incentives to work and will offer less time to the market. An even lower wage may eventually drive the worker out of the labour force. However, this can only be true if the individual has other sources of income to cope with decreasing

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[7] INEGI (1992, 1989, 1984), *Encuesta Nacional de Ingreso-Gasto de los Hogares.*
[8] INEGI (1982-1989), *Sistema de Cuentas Nacionales.*
[9] INEGI (1996), *Encuesta Industrial Mensual.*
[10] INEGI (1993), *Encuesta Nacional de Empleo Urbano.*
[11] The OECD countries do not even contemplate this age bracket for their participation rate statistics.
[12] ILO (1994).
[13] However, there are no available data to compare the total days worked per year.
[14] INEGI (1993), *Encuesta Nacional de Empleo Urbano.*
[15] ILO (1994).

wages, or even to support himself out of the labour force. If the individual's non-labour income is not enough to meet his minimum or immediate necessities, the labour supply would behave very differently. In the absence of any other economic support, if a low earner has a reduction in his real wage he will not reduce his working time; furthermore, he will need to work *more* in order to maintain a subsistence level. This gives rise to a downward-sloping labour supply curve: the income effect offsets the substitution effect at very low wages, a phenomenon that does not seem to happen in developed countries.

Theoretically, the backward-bending labour supply curve has been mentioned regularly in the economic literature. However, the authors usually refer to the case when *high* wages make the income effect greater than the substitution effect[16]. Fewer authors have analysed the backward-bending labour supply curve when this phenomenon occurs in the lower part of the curve. Y. Huang (1976) and E. Berg (1962) brought up this particular issue for subsistence economies and Y. Barzel and R. McDonald (1973) and N. Stern (1984) analysed this phenomenon in a more general framework. In a recent study M. M. Khan (1995) obtained a backward-bending curve for subsistence families.

This situation can also arise in the aggregated labour supply, since a decrease in wages may force some people to enter the labour force in order to sustain the household expenditure level. It seems therefore that this phenomenon can partly explain the behaviour of the female participation rate in Mexico during the 1980's. During this period the average wage fell by approximately 9% and the participation rate of women increased by 22.2%. While some workers presumably left the labour market due to decreasing wages, some others - *added workers* - entered the labour force to help with the family economic situation. This phenomenon may also account for the increase in the male participation rate since 1979. A decreasing wage may have pushed some people to work in order to keep the family income.

The purpose of this paper is to assess the effect of the family non-labour income on the labour supply process of the individual. With cross-section data from the Mexican urban areas in the first quarter of 1992, and with information on 67,134 households (225,605 individuals) we will test the following hypothesis: a) a backward-bending labour supply curve in the region of low wages can be obtained when the individuals do not have enough non-labour income, b) the total labour supply curve will have different shapes, according to the level of non-labour income and the elasticity of substitution, c) the family non-labour

[16] A.O. Krueger (1962), J.M. Buchanan (1971), A. Deaton and J. Muellbauer (1980) and J. Muellbauer (1983).

income will have a positive effect on the incidence of unemployment, and d) the family non-labour income will have a positive effect on the accepted wages of the unemployed.

In Section I we develop a theoretical labour supply model, flexible enough to give rise to a backward-bending labour supply curve. In order to do that we use a quasi-homothetic CES utility function to derive a general labour supply. Under this setting we also discuss the implications of a Linear Expenditure Household Model (which is an especial case of the CES model) on the labour supply. We also analysed empirically the effect of wages on the participation of housewives. In Section II we estimate the total labour supply, including both participation and working hours together, for various members for various members of the household. In the last Section we analyse unemployment and estimate an empirical model of unemployment incidence and accepted wages. We used LIMDEP for all the estimations.

I. THE EFFECT OF WAGES ON PARTICIPATION

1. Theory

It has been said that if wages decrease, the individual will tend to reduce his working time (i.e. the substitution effect is greater than the income effect), and if market wages are too low the individual will not participate in the labour force. But behind this story we must be assuming that the individual has some non-labour income, in the form of assets, bank accounts, etc. that cover his minimum necessities. That is, his non-labour income is such that even if he does not participate in the labour force he can still manage to cover his minimum consumption needs.

Nevertheless if the individual does not have any non-labour income the situation changes, because if his real wage decreases there will be a certain point beyond which he could not decrease his labour supply for he would not be reaching his minimum income necessities. Furthermore, as his wage decreases he will have to increase his working time to meet that necessary income: a downward-sloping labour supply curve will occur in the region of low wages.

The main objective of this section is to prove that it is possible to get negatively sloped labour supply functions *in the region of low wages* if we introduce into the traditional model of labour supply the notion of minimum subsistence consumption or minimum necessary income. The key to obtaining a model that gives rise to this result will depend on the utility function we use, which must include that variable as its parameter.

If we choose a quasi-homothetic utility function, not only we keep much of the mathematical convenience of homotheticity, but this property introduces *automatically* into the utility function the concept of minimum subsistence consumption.

If for simplicity we first choose the quasi-homothetic version of the Cobb-Douglas utility function we develop the Linear Expenditure System. The maximisation problem for the individual is then

$$\begin{aligned} \text{max.} \quad & U = (C-\kappa)^{\alpha}(L-\mu)^{\beta}, \qquad \alpha + \beta = 1 \\ \text{s.t.} \quad & X = Lw + C, \qquad P = 1 \\ & L = T \\ & C,L \geq 0 \end{aligned}$$

where U is the utility function, κ is the subsistence level of the good C, μ is the subsistence level of leisure, $X \equiv Tw + N$, is the full-income, T is the total available time, w is the wage and N is the non-labour income.

It is important to notice that the level of κ is not a poverty line computed *a priori* which would tell us the amount of C which an individual *should* consume to achieve appropriate levels of health, housing, shelter, etc. κ is imposed by every individual or family according to their essential financial necessities. Another important point is that the concept of quasi-homotheticity leads us to take into account a minimum subsistence level of leisure.

The first order conditions imply

$$w = \frac{\beta}{\alpha}\left[\frac{C-\kappa}{L-\mu}\right] \tag{1}$$

where $\frac{\beta}{\alpha}\left[\frac{C-\kappa}{L-\mu}\right]$ is the Marginal Rate of Substitution (MRS).

An obvious but important result given rise by this model is that if the individual's minimum consumption requirements (κ) are greater than his non-labour income (N), he will not be able to leave the market even if the individual faces low wages (if wages are below κ-N/T-μ the individual definitely would not reach the non-starvation region[17]).

[17] A. Sen (1981).

Formally, the reservation wage (w^R) is the Marginal Rate of Substitution evaluated at the point where C=N and L=T, which is given by

$$w^R = \frac{\beta}{\alpha}\left[\frac{N-\kappa}{T-\mu}\right] \tag{2}$$

If $\kappa > N$, the reservation wage is negative and therefore $w > w^R$, the individual will *always* participate in the labour force.

If the individual works then the solutions for C and L are:

$$C^* = \kappa + \alpha(X - w\mu - \kappa) \tag{3}$$

$$L^* = \mu + \frac{\beta}{w}(Tw + N - w\mu - \kappa) \tag{4}$$

Notice that the essential minimum of C and L are met before any structure of preferences comes into play. We get the labour supply function:

$$H^* = (1-\beta)(T-\mu) - \frac{\beta}{w}(N-\kappa) \tag{5}$$

To get the shape of the curve we differentiate (II.15) with respect to w

$$\frac{\partial H}{\partial w} = \frac{\beta}{w^2}(N-\kappa) \tag{6}$$

This simple model gives rise to an important result, the sign of the slope of the labour supply curve depends only on the relationship between non-labour income and minimum necessary consumption. If $N > \kappa$, the supply will always be positively sloped, the substitution effect will always overcome the income effect. When wages are too low the reservation wage will be higher than the market wages and the individual will not work. If $N = \kappa$, it is clear that the labour supply curve will be a vertical line, the elasticity will be nil and there will not be changes in the working time. Finally if $N < \kappa$, if the non-labour income is not enough to cover the minimum consumption level, there will be more time

devoted to work if the wage rate decreases, we get the *perverse effect* that the curve will be negatively sloped.

Unfortunately the Linear Expenditure System is restrictive since it does not allow the slope of the labour supply to change direction if wages change. A Cobb-Douglas function, even in its quasi-homothetic version, has a constant elasticity of substitution (σ) of -1. However, if we incorporate the concept of quasi-homotheticity to a CES utility function and develop the labour supply model, as in Y. Barzel and R. J. McDonald (1973), we are able to obtain a more flexible and general labour supply curve.

Our utility function is therefore

$$U = [\alpha(C-\kappa)^{-\rho} + \beta(L-\mu)^{-\rho}]^{-1/\rho} \tag{7}$$

where $-1 < \rho < \infty$, $\alpha + \beta = 1$ and ρ is the substitution parameter.

Knowing that any monotonic transformation does not alter the order of preferences, the maximisation problem is now:

$$\begin{aligned} \text{max.} \quad & U = \alpha(C-\kappa)^{-\rho} + \beta(L-\mu)^{-\rho} \\ \text{s. t.} \quad & X = Lw + C \\ & L \leq T \\ & C, L \geq 0 \end{aligned}$$

For simplicity we only assume interior solutions then $T - L > 0$. We get the solutions for the variables:

$$C^* = \frac{X + w\left(\frac{w\alpha}{\beta}\right)^{\sigma} - w\mu}{w + w\left(\frac{w\alpha}{\beta}\right)^{\sigma}} \tag{8}$$

$$L^* = \frac{X + \mu\left(\frac{\beta}{w\alpha}\right)^{\sigma} - \kappa}{w + w\left(\frac{w\alpha}{\beta}\right)^{\sigma}} \tag{9}$$

$$H^* = \frac{(T-\mu)\left(\frac{\beta}{w\alpha}\right)^{\sigma} - (N-\kappa)}{w + w\left(\frac{w\alpha}{\beta}\right)^{\sigma}} \tag{10}$$

where $\sigma = -[1/(\rho+1)]$, which is the elasticity of substitution.

We now get a more general equation of the labour supply function, which although more complicated, has both the minimum consumption requirements and the elasticity of substitution as parameters. Clearly if $\sigma = -1$ the model becomes the Linear Expenditure System or Stone-Geary model and the labour supply function will be exactly as in equation (5).

Let us see how the labour supply changes when w does. We take the derivative of (10) with respect to w and let $A = \beta/\alpha$.

$$\frac{\partial H}{\partial w} = \frac{(N-\kappa)(1-\sigma A^{\sigma} w^{-\sigma-1}) - (T-\mu)A^{\sigma} w^{-\sigma}(\sigma+1)}{[(A/w)^{\sigma} + w]^2} \tag{11}$$

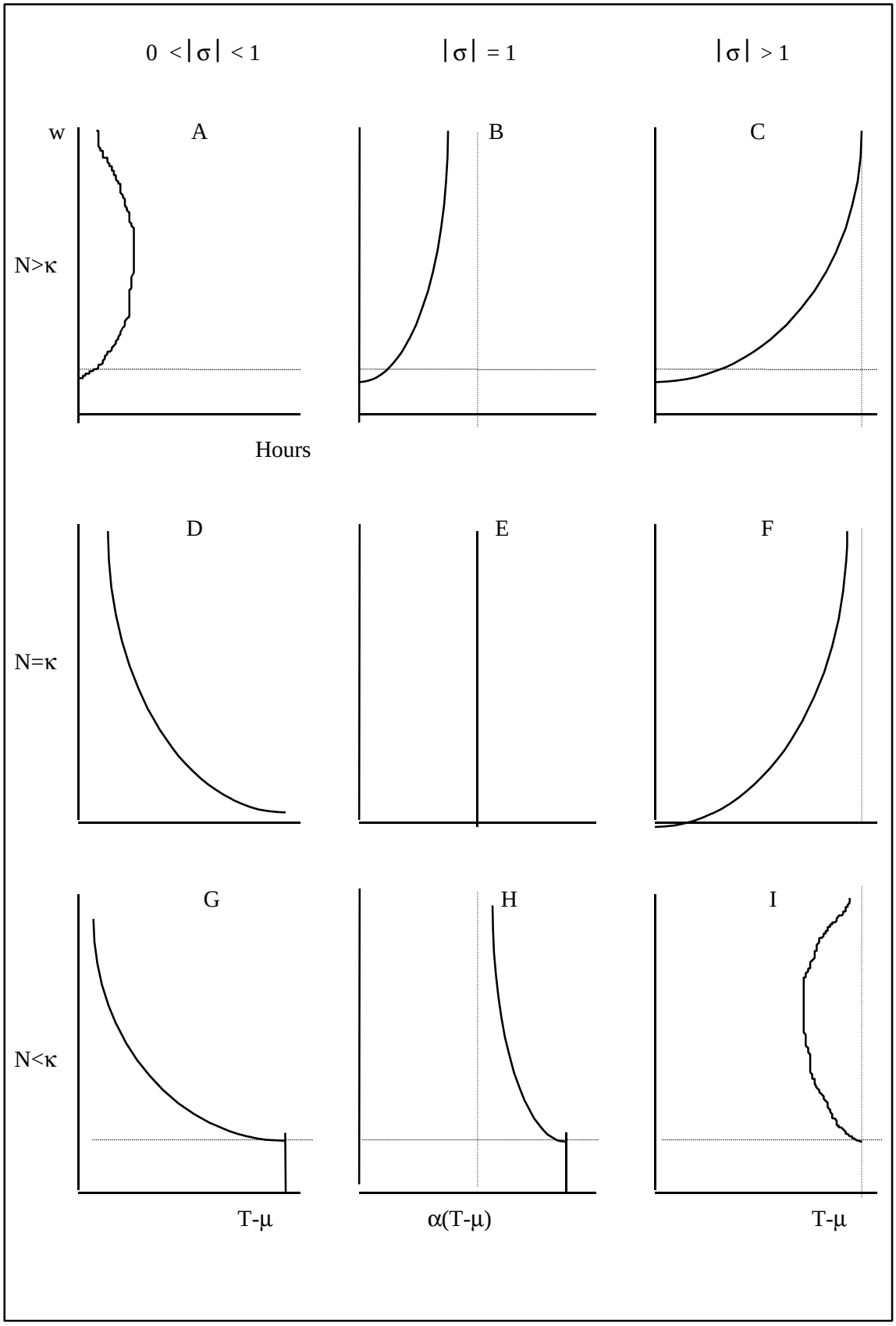
The sign of $\partial H/\partial w$ depends mainly on the value of σ and again in the relation between the non-labour income and the minimum consumption level.

If we compute the values of H for different wages and change the values of N, κ and σ, we get the following general shapes of the supply functions depicted in Chart 1, taken from Y. Barzel and R.J. McDonald (1973).

As we can see, it has been crucial to introduce the concepts of minimum consumption level and non-labour income because their relation determines the shape of the curve. For example, we know that if the individual has enough non-labour income, he will never have a downward-sloping curve in the region of low wages. Furthermore, he will have the option of retiring from the labour force if wages are too low. Additionally, when the substitution between C and L is quite low he might enjoy large amounts of leisure if he has high wages.

But the case we are more interested in is the one where the individual cannot afford his minimum consumption necessities without working, i.e., when $N < \kappa$. When this happens, the individual will *always* have a downward-sloping curve, at least in the region of low wages and he will not be able to leave the labour force even if he faces low wages.

Chart 1
Labour Supply curves obtained from a quasi-concave CES utility function.



With this model we have the possibility of getting a labour supply curve that has a negative slope when wages are low and a positive one if wages are relatively high; the curve changes direction.

2. Empirical Analysis of Participation

a) Estimation Technique

We estimate a *Probit* model of the following form:

$$\pi = Z + \varepsilon_\pi \qquad (12)$$

π is 1 if the individual participates in the labour force and it is 0 otherwise. Given Z, which can include in fact any observable variable, the individual's participation in the labour force will depend on the value of ε_π.

If we assume $\varepsilon_\pi \sim N(0,\sigma^2_\pi)$, where σ^2_π is the variance of error term, it is possible to derive the probability that a given individual i will enter the labour force as:

$$\text{Pr. } (\pi = 1) = \Pr\left[\frac{\varepsilon_{\pi i}}{\sigma_\pi} > -\frac{Z_i}{\sigma_\pi}\right]$$

$$= \int_{-\frac{Zi}{\sigma_\pi}}^{\infty} \phi(t)dt$$

$$= 1 - \Phi\left(-\frac{Z_i}{\sigma_\pi}\right)$$

$$= \Phi\left(\frac{Z_i}{\sigma_\pi}\right)$$

where $\phi(t)$ is the standard normal density function and $\Phi(\cdot)$ is the standard normal cumulative density function.

With this set of results and assumptions we can construct a probit participation equation, which can be estimated by the maximum likelihood method. The likelihood function can be written as:

$$L(\alpha,\beta) = \prod_{i \varepsilon J} \Phi\left(\frac{Z_i}{\sigma_\pi}\right) \prod_{i \varepsilon M}\left[1 - \Phi\left(\frac{Z_i}{\sigma_\pi}\right)\right] \qquad (13)$$

where J is the set of individuals who participate, M is the set of people who do not participate in the labour force and α and β are the parameters to be estimated.

The structural participation equation we will estimate can be summarised by the following expression:

$$P_i = \Phi_i(\pi_i)$$

$$\pi_i = Z_i + \varepsilon_{\pi i}$$

where P_i is the probability of participation and $\pi_i = Z_i + \varepsilon_{\pi i}$ is the probit equation.

Explanatory variables.

We can give Z_i a general specification, of the type $Z_i = \beta' v_i$, where $\mathbf{v_i}$ is a is a nx1 vector of exogenous variables, which includes hourly wages, non-labour income and other variables we will specify later on, n is the number of variables and β is the 1xn vector coefficients for v_i.

In the case of hourly wages, we developed a wage equation following Heckman's (1979) procedure. This variable is crucial in the model, since we argued that an explanation for the apparent low wage elasticity of participation can be found in the non-linearity of the labour supply curve. For this reason and in order to explain empirically the importance of having non-linear wages in participation, we set up two models for the first group of women: housewives. In the first one the wage rate is incorporated linearly and in the second one, the wage rate squared is included to investigate the non-linearity of the relationship. Once the non-linearity of wages is tested satisfactorily for this group, the wage rate squared is included in most of the groups[18]. We expect wages to have either a negative or a positive sign with respect to participation, according to their level and their relation to non-labour income, as explained in the theoretical model. Wages are in logs.

[18] The assessment of the backward-bending labour supply curves has been tested before adding quadratic terms in the wage rate. See J. Pencavel (1986), pp. 66-67.

The main set of data we used (ENEU) does not have information on non-labour income. However this variable was estimated from the Encuesta Nacional de Ingreso-Gasto de los Hogares, 1989 (Income-Expenditure Survey). This variable includes the value of property income, transfers and non-monetary income (including imputed rents) for the whole family in per capita terms[19]. As we stated in previous sections, we expected a negative relationship between non-labour income and participation.

We include other members' earnings per capita as an important complementary non-labour income variable. We also expect this variable to have a negative effect on the probability of entering the labour force.

A number of variables are included which also reflect factors determining the relationship between the wage rate and the reservation wage., such as age and number of children. For non-heads we include some variables related to the head of the household. We insert dummy variables reflecting the occupational status of the head (if he or she is employed, unemployed, or out of the labour force). Although we expect the last two categories to encourage women's participation, we also expect a different coefficient between an unemployed head and a head who is out of the labour force, because the former may represent a reduction in transitory rather than in permanent income.

If the head is employed we incorporate a set of dummies to measure his or her type of work (agricultural worker, industrial worker, self-employed, entrepreneur, etc.) We also include the estimated (log) hourly wage of the head, to measure the indirect income effect on the woman's participation decision. Finally, the size of the city is included, and we expect a positive relationship between this variable and the woman's probability of participating[20].

Finally, we would like to remark on the interpretation we will be giving to the participation estimations in this study. Participation is seen as the first step in the labour supply process: if certain conditions are met - in general, if at any moment, the market wage is greater than the reservation wage - the individual will enter the labour market.

Although this approach is useful in developing the theoretical model of individual participation, the empirical results we obtain from a Probit or Logit regression model can also be seen in a different way. These models will estimate the *probability* of participation within the group of people we analyse. We could estimate, for instance, that a 26 year old

[19] We scaled the variables by the number of members in the family, weighting children by 0.52, according to the Amsterdam equivalence scaling, see A. Deaton and J. Muellbauer (1981).

[20] G. Hernández-Licona (1996).

married woman, with 2 children, with an hourly wage of £3.00 and whose husband earns £32,000 *per annum* has a 26.4% probability of being in the labour force.

We can interpret this result by saying that, on average, 26.4% of the people with those characteristics will be working at a certain moment or, that those married women will be working on average for 26.4% of their *time* within a one or ten year period, say. In this study we favour the last approach. That is, we will take the probability of participation as a measure of working time, which will make it easier to understand the results we obtain.

b)Results

We estimated *Probit* equations for housewives, since we can compare these results with other studies more easily. The results can be summarised as follows, focusing only on the coefficient for wages:

(I) Probit equation including $\hat{w}$:

$\pi_i = -2.13 + 0.65\,\hat{w} + ...+$ log-likelihood = -21868

(0.09) (0.03)

(II) Probit equation including $\hat{w}$ and $\hat{w}^2$:

$\pi_i = -1.22 - 0.53\,\hat{w} + 0.41\,\hat{w}^2 + ..+$ log=likelihood = -21827

(0.11) (0.14) (0.05)

where $\hat{w}$ is the log of the estimated hourly wage; standard errors are in parenthesis.

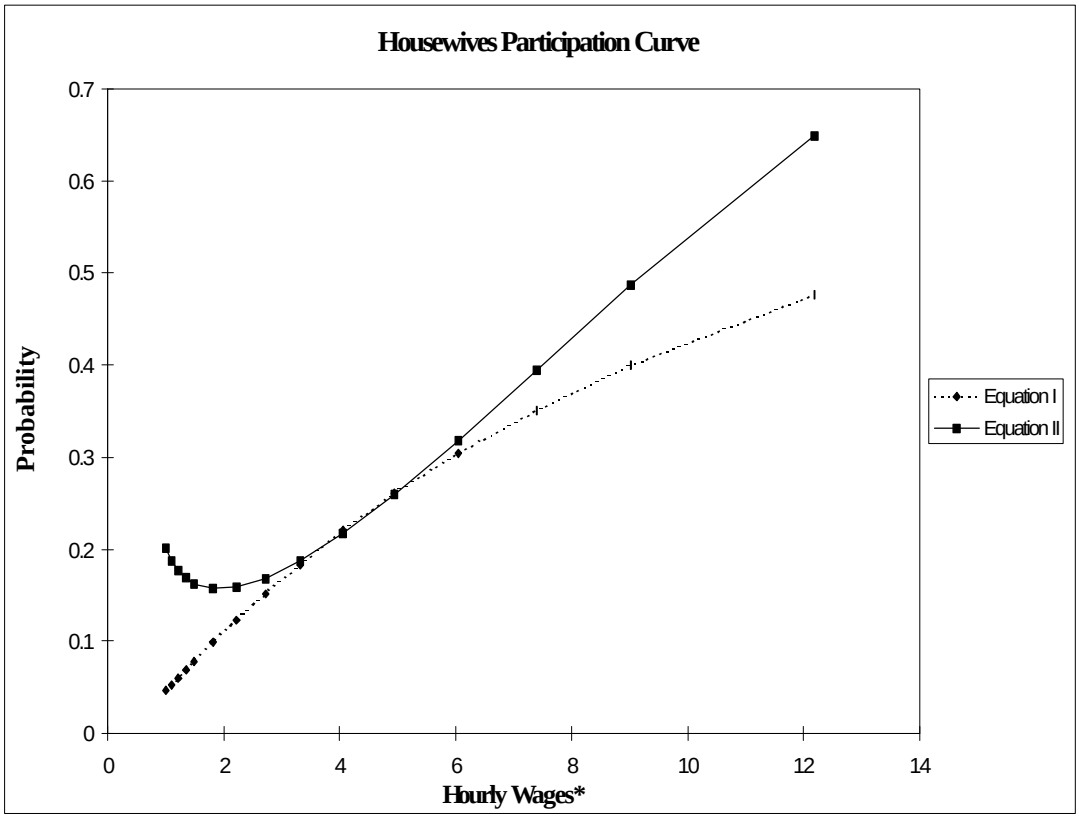
The first equation is linear in wages and, as expected, it has a positive sign (the higher the wages the higher the probability of entering the labour force) and it is strongly significant. However, when we specify the equation including squared wages, we can see that in fact the relation between wages and participation is non-linear.

If we assume that Equation I is the restricted model, the likelihood ratio test rejects it, since the likelihood ratio statistic we obtain (82.0) is significant at the 0.5% level. The t-statistics also favour the specification of the non-linear model since both coefficients involving wages are significant at the 1% level. However, in Equation II the coefficient of wages enters with a negative sign while the coefficient of wages squared is positive. This result depicts a backward-bending labour supply curve (participation curve), where the negative

slope is in the region of low wages, and the turning-point is around W=2.0[21], which is within the boundaries of the wage rate for women.

Chart 2 shows the two different labour supply (participation) curves we obtain with equations I and II. Two important features arise: the behaviour of low wage earners is described completely differently by the two equations; while the first equation predicts a very low participation for this group of people, the second one predicts a higher participation. Equation II also predicts that the probability of participation will rise as wages fall when they are below approximately 2 thousand pesos per hour.

Chart 2



* Thousands of I-1992 pesos.

The second important feature is that the elasticity is also different between both models. Table 2 presents the wage elasticity for Equations I and II. The linear Equation I has an elasticity of 0.79, evaluated at the wage mean, whereas Equation II presents an elasticity of

[21] From now on we will refer to **w** as the estimated hourly wage rate in logs and **W** as the estimated hourly wage, to avoid the frequent use of the *hat*. The hourly wage is always in thousand Mexican pesos of the first quarter of 1992.

0.98 at the same point. Because we forced the first model to be linear the overall elasticity of the curve was biased downwards.

Table 2
Wage elasticity for housewives

Equations	W=5.18[a]	W=5.21[b]	W=1.67[c]
Equation I	0.79	n.a.	n.a.
Equation II	0.98	0.99	-0.17

The elasticities were evaluated at the mean of probabilities and directly computed by changing wages 1%.
a. Evaluated at the overall wage mean
b. Evaluated at the wage mean of the high-wages region.
c. Evaluated at the wage mean of the low-wages region.
Source: INEGI (I-1992), *Encuesta Nacional de Empleo Urbano*.

However, for Equation II we needed to compute at least two point elasticity, for the curve has two very different slopes. We calculated an elasticity of -0.17 around the average wage of the negatively-sloped region, whereas for the positive slope, the mean wage elasticity was 0.99.

For purposes of economic policy it is important to take into account the fact that the two groups of people behave quite differently. For instance, if we do not take into account this phenomenon, tax and labour policies may not produce the desire effects on the population.

If we compare these figures with other studies, the positive elasticity in both models is higher than that obtained by R. Layard et. al (1980), who reported an elasticity of 0.49, or by H. Joshi (1986), who found an elasticity of 0.45, both for British married women. Although it is difficult to compare the elasticity of participation because we meet differences both in the levels of the wages and in the initial probabilities, we can say that for relatively high wages, the participation of Mexican housewives is more sensitive to changes in their wages than in the U.K. or U.S.A. In other words, Mexican housewives have more alternative activities in which to spend their time, apart from work, than in those countries. Unfortunately we cannot compare the situation in the region of low wages, as we do not know of any study which reports the elasticity in this region of the curve.

Our claim is that this type of backward-bending labour supply curve arises even when we analyse participation and not hours, because there are individuals without any non-labour income and very low wages, who have to supply more working time if real wages fall.

Hence, if we split the sample of married women between those without any family property income, who will be named *Poor* people throughout this study, and those with some property income, who will be called *Rich*, we can analyse better the origin of a non-linear labour supply curve[22].

A *probit* model, non-linear in wages like Equation II, was built for the two sub-samples of housewives - poor and rich -; the results are presented here. The complete models, including the coefficients for the rest of the variables are shown in the Appendix.

Poor Housewives:

$$\pi_i = \underset{(0.14)}{-0.65} - \underset{(0.20)}{1.00}\,\hat{w} + \underset{(0.07)}{0.62}\,\hat{w}^2 + ... +$$

Rich Housewives:

$$\pi_i = \underset{(0.17)}{-1.70} - \underset{(0.14)}{0.13}\,\hat{w} + \underset{(0.06)}{0.25}\,\hat{w}^2 + ... +$$

We can see that poor housewives give rise to a more significant bend in the labour supply curve than the one obtained for all housewives (our Equation II).

Perhaps the most important point is that for rich married women the curve's bend is not significant and therefore the probability of participation increases whenever wages increase (except for a very small region). Chart 3 presents the participation curve for poor and rich housewives. The income effect offsets the substitution effect when wages are very low for poor people, whereas for rich women this is not the case.

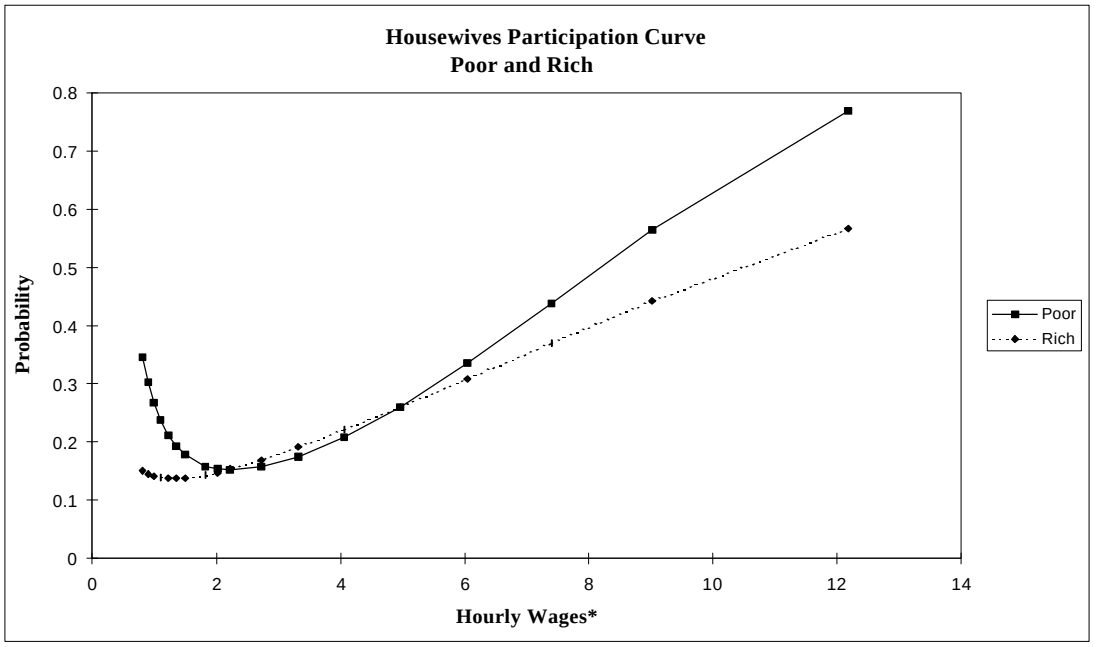
With everything else constant (including other member's earnings and wages) a reduction in the poor housewives' wages will increase their probabilities of working because the income necessities will be greater than their leisure ones, at this *survival* point (very low wages and no property income). As we mentioned before, the best way to understand this phenomenon is to treat the probability of participation as working time[23]: without any savings a reduction in their own wage will push some people to work more during the year. As we argued in before, in general low income individuals enter the labour force earlier and leave it later than wealthier people. For this reason, it will be more likely for them to be defined as workers at any moment in time.

---

[22] Between our two measures of non-labour income, the one with sources such as property income, imputed rents and transfers (we will call them *property income*), and the other one which includes only other member's earnings (wich we will call *family earnings*), we decided to split the sample only by the former, because that is the one we consider exogenous. Other member's earnings are not considered exogenous because there is interdependence between family members. See Appendix III.

[23] With this approach we in fact are assuming that all individuals are always in the labour force, if we consider a relatively long period of time as the time unit, i.e. a year or a decade.

Chart 3



* Thousands of I-1992 pesos.

For rich married women, on the other hand, except for a very small range in the curve, the substitution effect offsets the income effect and the curve is practically linear. As predicted, the backward-bending effect emerged in the equation for all housewives because of the presence of very poor people, for whom both non-labour income and wage rates are very low.

These results show that it is crucial to take into account the differences in the level of non-labour income between individuals when analysing and forecasting a labour force change due to changes in the wage structure of the overall population.

In this case, the average level of non-labour income per capita for rich housewives is around 0.87 million pesos per month, whereas for the poor ones it is 0.37 million pesos. Just to take a reference point, according to a government institution -Coplamar (Coordinación General del Plan Nacional de Zonas Deprimidas y Grupos Marginados) - a person should be considered moderately poor if she (he) could not meet a monthly consumption basket with a value of approximately 0.40 million pesos of 1992. According to this, the poor housewives' average non-labour income is very low and this situation gives rise to the supply behaviour shown before[24].

[24] Theory predicts that this behaviour will arise if non-labour income is less than the subsistence consumption level for each individual. Defining poor as those without any property income guarantees that the *household* faces this problem. But because total non-labour income includes also family earnings, it is not that clear that each *individual* faces this problem. That is why even with all the problems poverty lines have (they are

II. TOTAL LABOUR SUPPLY

Now that we described an important characteristic the labour supply curve may have in the presence of household poverty, we estimate here *total labour supply curves* for all members of the family.

It is possible that the constraints in the number of working hours do not allow us to correctly analyse the *ideal* working time of the individual. At the same time, the constraints on working hours can directly affect participation, since a person who wishes to work more hours (in order to receive more earnings) but who is rationed to do so will stay longer in the labour force. The contrary is also true. A person who is somehow constrained to work only for a short period of time will work, if possible, many hours a week during his or her working spells. The classical example are the young women who know they might suffer long spells out of the labour force due to pregnancy, child-bearing or even marriage. If they forecast these events well, they will generally tend to work hard during the previous months or years.

Therefore we need a single measure of the labour supply which encapsulates these effects and this is the total labour supply. For the whole population the total labour supply is the average working hours of all persons, including those who work and those without a job. Changes in this variable reflect changes in working hours and participation together. We can obtain exactly the same measure if we multiply the overall participation rate by the average working hours of those who are working. This variable can also be seen as the expected working hours of the population.

to apply this idea to the individual level we have to use the models of participation and working hours we developed in the previous chapters. The participation equation we estimated was of the following form:

$$P_i = \Phi(Z_i = \alpha_o + \widehat{\alpha_1 \ln w_i} + \widehat{\alpha_2 [\ln w_i]^2} + \alpha_3 \hat{N}_i + \boldsymbol{\gamma_1' x_i} + \varepsilon_{\pi i})$$

terribly subjective, for instance) we mentioned the Mex$ 0.40 millions figure just as a reference, to capture the "basic needs" of an average person in 1992. In the case of poor wives, for example, their total non-labour income is less than this poverty line. This particular poverty line was constructed by COPLAMAR (1983) including minimum necessities of food, shelter, housing and education.

where P_i is the probability function, w is the wage rate, $\hat{N}_i$ is the estimates property income and **x** are the other variables we mentioned before. The hours equation is:

$$H_i = \exp\{\alpha_4 + \overbrace{\alpha_5 \ln w_i(1-t_i)} + \overbrace{\alpha_6 [\ln w_i(1-t_i)]^2} + \alpha_7 \hat{VI}_i + \alpha_8 \hat{N}_i + \boldsymbol{\gamma_2}' \mathbf{x_i} + \zeta \lambda_i + \varepsilon_{Hi}\}$$

The total labour supply or expected weekly working hours for individual i is therefore given by:

$$E[Hi] = [P(\pi=1)]\, E[H_i|\pi=1] \qquad (14)$$

That is, the expected weekly working hours is the probability of entering the labour force times the expected working hours, given that the person is in the labour force (π=1).

Our main objective is to test whether the shape of the total labour supply curve is the one we have described theoretically throughout this work. That is, we would like to see under which circumstances we obtain a backward-bending total labour supply curve.

From the previous equations, a change in any variable x_i will change the total labour supply curve as follows[25]:

$$\frac{dE[H_i]}{dx_i} = \frac{d\left([P(\pi=1)]E[H_i|\pi=1]\right)}{dx_i}$$

$$= E[H_i|\pi=1]\left[\frac{\partial[P(\pi=1)]}{\partial x_i}\right] + [P(\pi=1)]\left[\frac{\partial H_i}{\partial x_i} + \left(\frac{\partial H_i}{\partial \lambda_i}\frac{\partial \lambda_i}{\partial x_i}\right)\right] \qquad (15)$$

Therefore, the change in the total labour supply from a change in x_i has two components. The first one is the change in the probability of participation caused by x_i keeping hours constant, and the second one is the change in hours worked by workers, keeping participation constant.

Since we did not include wages in the computation of λ_i, the change in the total labour supply or expected working hours when wages change is given by:

[25] M.R. Killingsworth (1983), p. 184.

$$\frac{dE[H_i]}{dw_i} = \left[\hat{H}_i\right]\left[f(\hat{Z}_i)\left(\frac{\alpha_1}{w_i} + \frac{2\alpha_2 \ln \hat{w}_i}{w_i}\right)\right] + \left[\hat{P}_i\right]\left[\left(\hat{H}_i\right)\left(\frac{\alpha_5}{w_i} + \frac{2\alpha_6[\ln w_i \hat{(1-t)}]}{w_i}\right)\right] \qquad (16)$$

where $f(\hat{Z}_i)$ is the value of the standard normal density associated with the value of $\hat{Z}_i$ and is given by $f(Z_i) = \frac{\partial \Phi_i}{\partial Z_i}$.

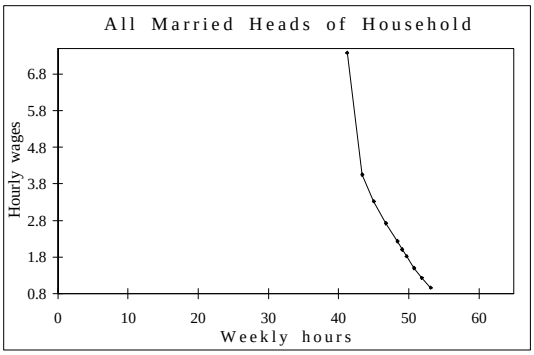
By changing wages we analytically simulated the total labour supply curves for various groups of people. We only included the groups for which we were able to estimate both the participation and the working hours models.

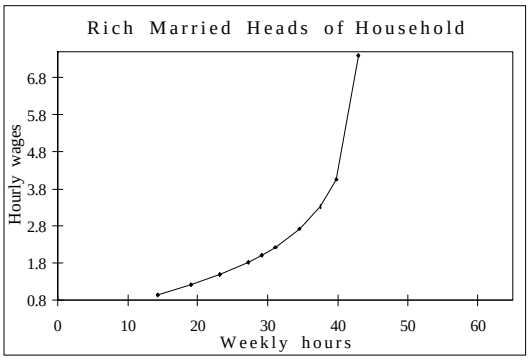
These total labour supply curves are then the estimated expected weekly working hours for the average individual in every group. We kept constant the other variables at their mean values for each group. The following charts (Charts 4) show the curves we obtained.

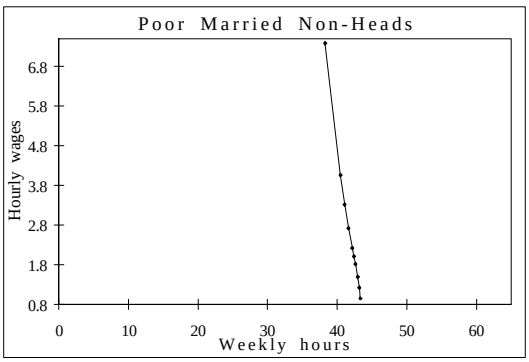
We can see that the total labour supply curve may take various shapes when we divide the sample by gender, marital status, position in the household and family non-labour income. The first result that deserves attention is that, except for three groups, the total labour supply curve for poor individuals is either downward-sloped or it is backward-bent in the region of low wages. As we claimed before, the lack of other sources of income, apart from earnings, is in part responsible for this behaviour, since the individual has to work harder if real wages fall.

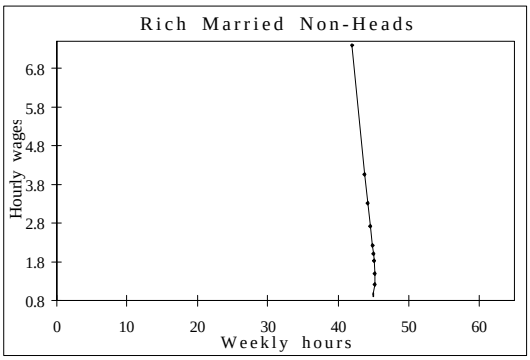
More specifically, the backward-bending total labour supply curve when the negative slope is in the segment of low wages was found among poor women, especially among housewives and other non-head relatives. On the other hand the curve for poor divorced non-head women is positively sloped. For this group of people either the theory is not supported or the allocation of the family's non-labour income, which we assumed equally distributed among the family members, is specifically uneven in these households.

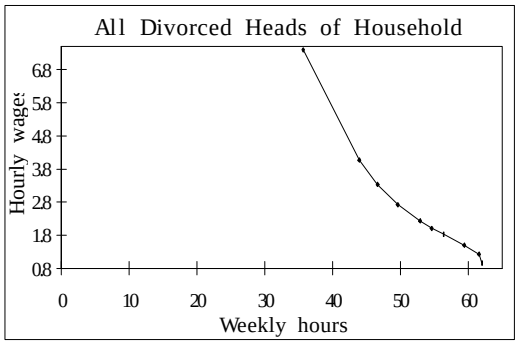
Charts 4
Male Total Labour Supply Curves.
(Hourly wages are in thousand of I-1992 pesos)

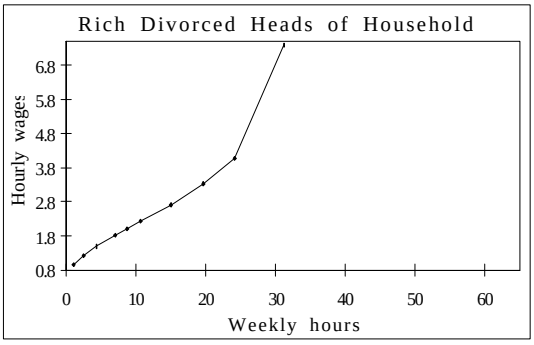


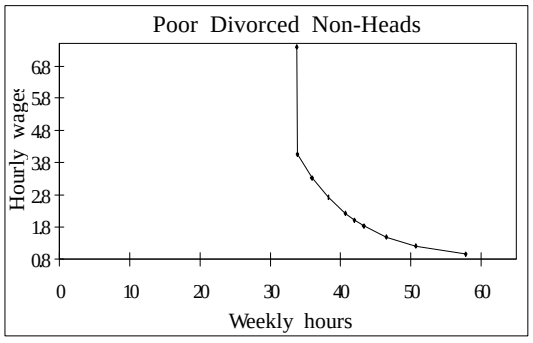


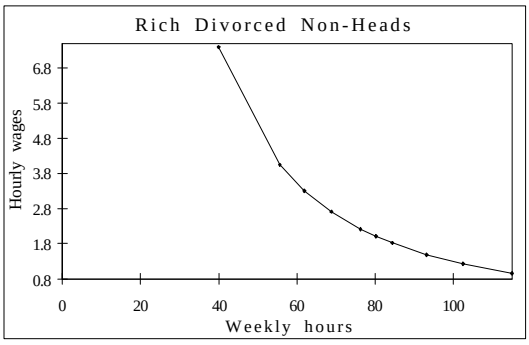


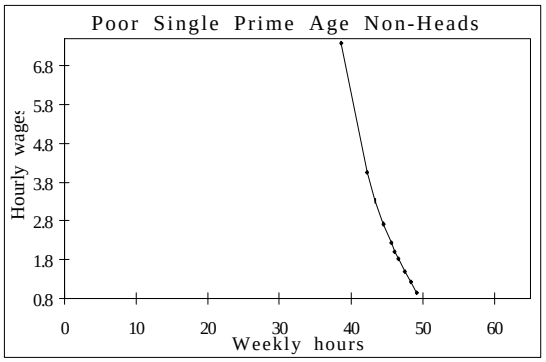


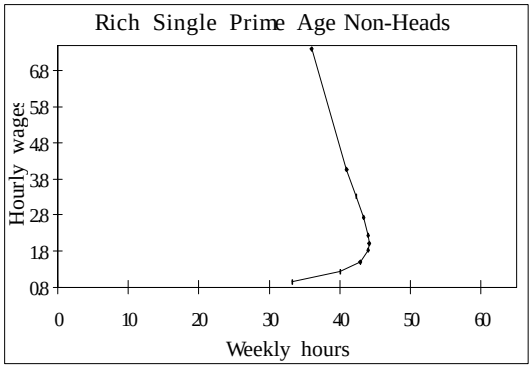




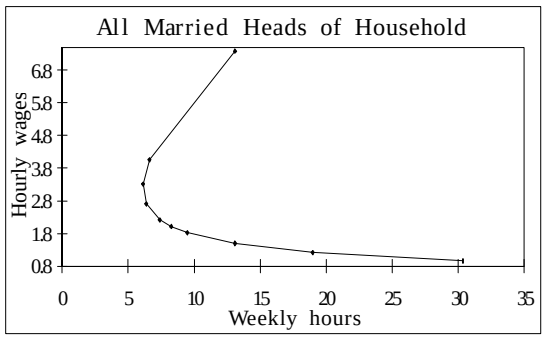


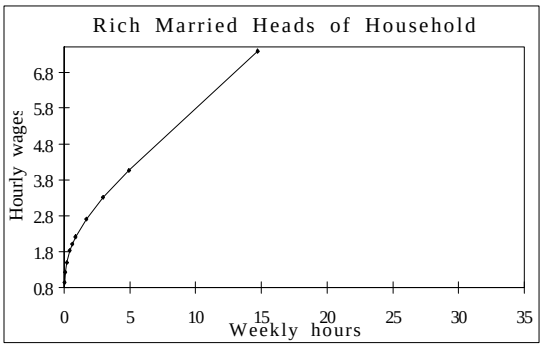


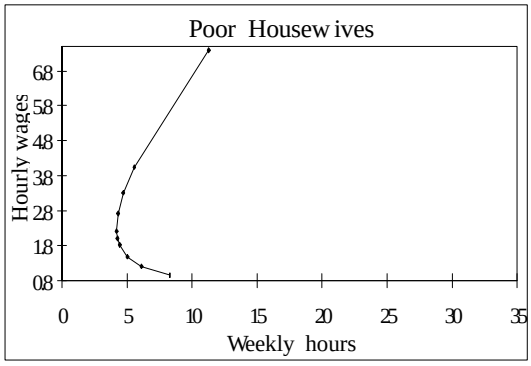


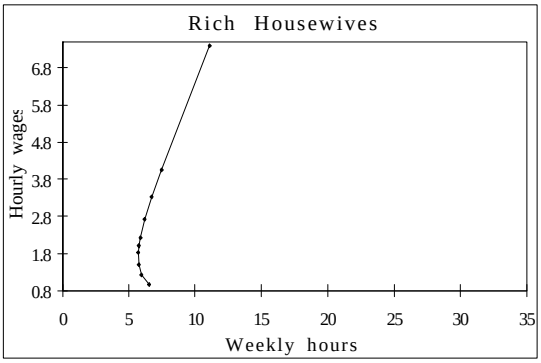


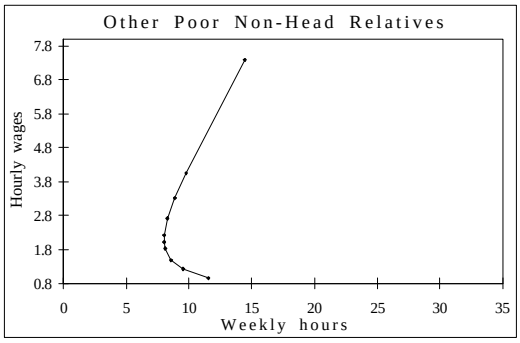
Female Total Labour Supply Curves
(Hourly wages are in thousand of I-1992 pesos)

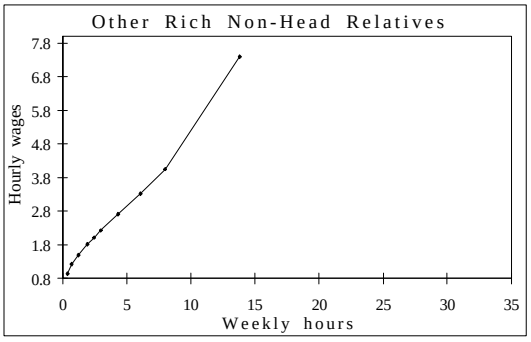


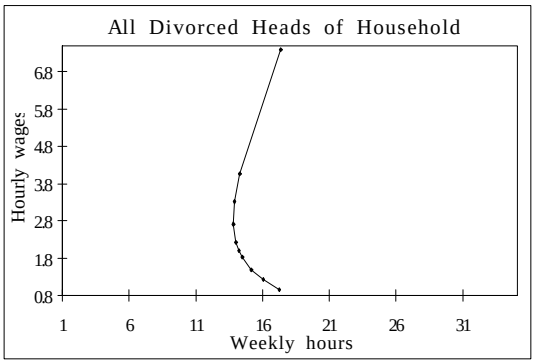


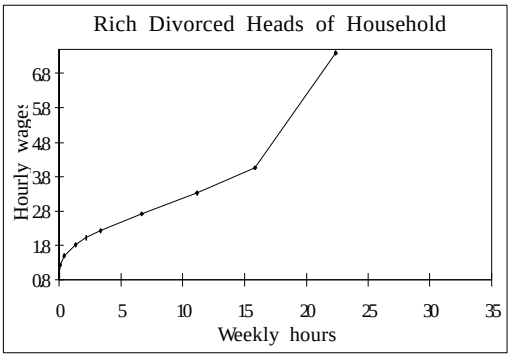


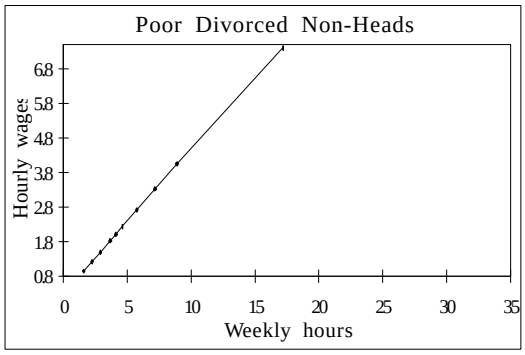


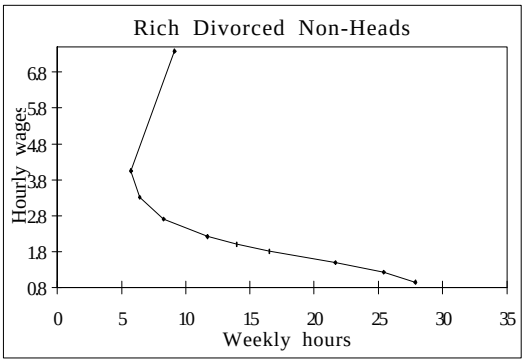


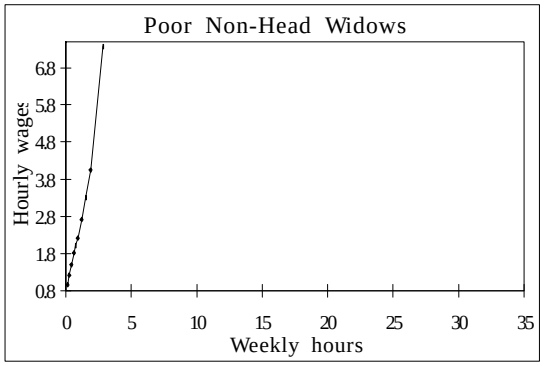


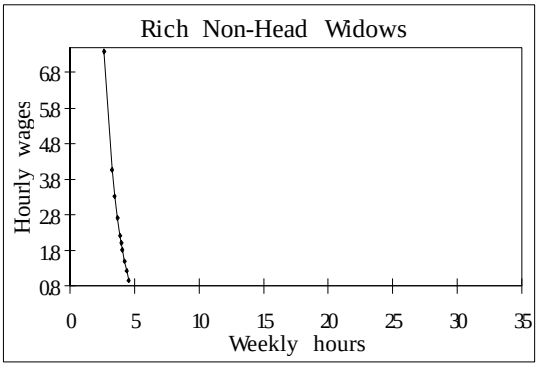


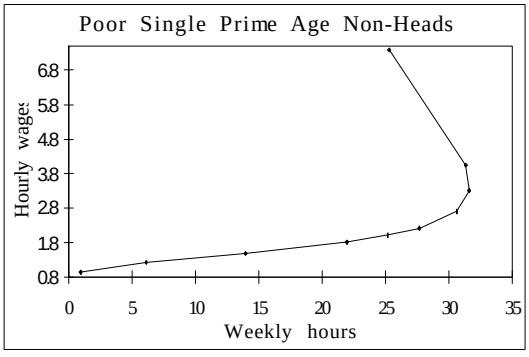


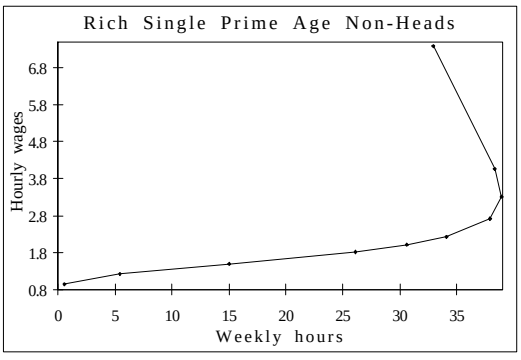












Perhaps the most important result is that these empirical curves resemble the theoretical curves we derived previously. Most poor groups have a backward-bending total labour

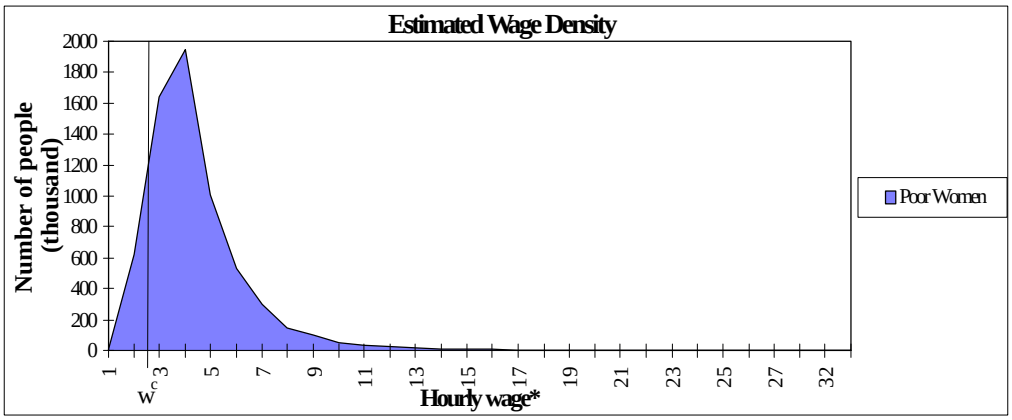
supply curve in the region of low wages. Women present this shape more than men; in fact, the male curves are in general more rigid than the ones for women. The theory says that in order to obtain a flexible labour supply curve, we need a relatively high elasticity of substitution between income and leisure (between market and non-market activities). Thus, we can explain a more flexible curve for women, since they can substitute more easily market time for non-market time. As it is usually accepted, the wage elasticity for women is higher than the one obtained for men[26].

In the case of the backward-bending curve in the region of low wages, the turning point, which we can call the hourly *critical wage* (w^c), was around Mex$2.9 thousand for all married women heads of household, Mex$2.5 thousand for poor housewives, Mex$2.3 thousand for other poor women relatives and Mex$2.8 thousand for poor divorced women. The average estimated hourly wages for all women was 4.9 thousand pesos in I-1992. In terms of Chart 5, which shows the density of women from poor families (according to our definition of *poverty*) in urban areas in I-1992, this means that the proportion of women who can earn less than this critical wage and who can have a backward-bending total labour supply curve is not negligible.

The fact that the *critical wage* is more or less similar for the different groups of poor women presenting a backward-bending labour supply curve implies that the minimum consumption level is also similar for these women. These individuals start working more time if the real hourly wage is reduced beyond approximately 2.8 thousand pesos. If the average working time for all employed women is 36 hours per week, this means that the downward-sloped labour supply curve is observed for some women when their total monthly earnings are reduced to approximately 0.433 million pesos of 1992[27].

Chart 5
Poor women's density

[26] Polachek, S.W. and W. S. Siebert (1993).
[27] Monthly earnings = 36 working hours per week x 4.3 weeks per month x 2800 pesos per hour.



a. The average estimated hourly wage for poor women is 3.9 thousand pesos.
* Hourly wages are in thousands of I-1992 pesos.
w^c is the critical wage.

III. UNEMPLOYMENT

1. Facts

The standard definition of open unemployment and the way unemployment is measured[28] give us a first clue as to the reason why unemployment is so low in Mexico. In the absence of unemployment benefits, only those with enough family savings can afford not to work for a long time. Single people and women usually have economic support from the head of the family. Although the head can receive support from the other members, his obligations to the family force him to accept a job rapidly.

As we showed in the first Section, the unemployment rate in Mexico has been relatively low in comparison with other countries. The average unemployment rate in Mexico between 1987 and 1994 was only 3.2%, and it only increased substantially when in 1995 the Gross Domestic Product (GDP) declined abruptly after the financial crisis at the end of 1994. In1995 the GDP decreased by 6.9% and the average unemployment rate was 6.3%. Although this represents an average annual increase of approximately 70% in the unemployment rate, the level is still relatively low, especially if we take into account that this has been the worst economic crisis in Mexico for almost sixty years.

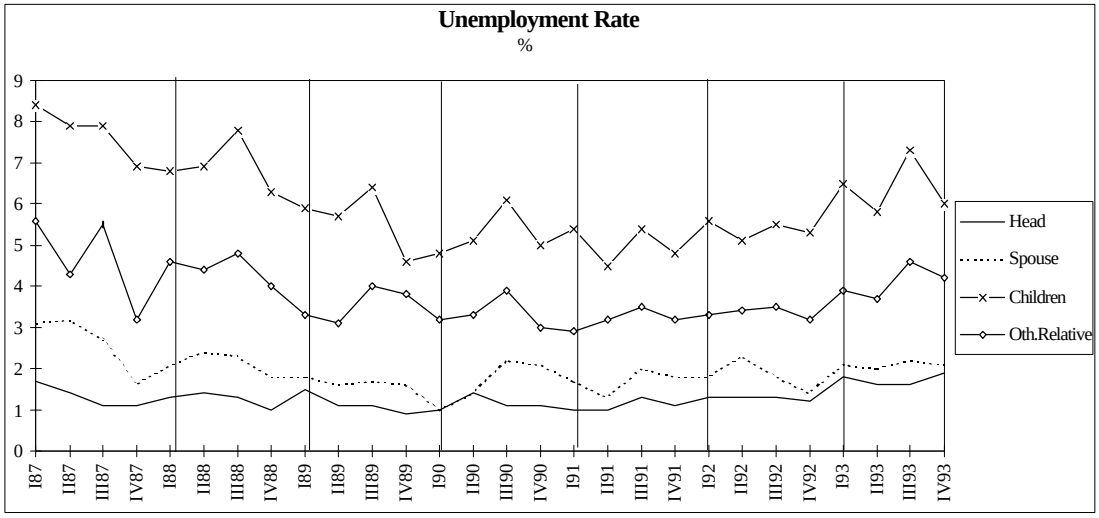
Chart 6 presents one of the most important features of the Mexican labour market, which is the fact that heads of the household have a very low incidence in unemployment. This result is typical for countries without unemployment benefits (as many Latin-American countries) or with very low benefits, such as Italy[29]. The head of the household is the main

[28] ILO (1993)

[29] For example, in Italy husbands have an unemployment rate of 2%, while the overall unemployment rate was 10.2% in 1993 (OECD, 1994).

breadwinner of the family and usually he or she cannot afford to search for a job for a long time. Nor do they enter unemployment voluntarily. They usually sacrifice high expected wages for a hasty jump into employment, although some of them can continue searching for a better job even if they are already employed.

Chart 6



As before, we divided the population by those without estimated property income (poor) and those with positive values of this variable (rich)[30]. Table 3 shows the unemployment rates by position in the household and by property (non-labour) income. The table confirms the fact that heads of household have lower unemployment rates than the rest of the family, but it also shows the effect of non-labour income on unemployment.

Table 3
Unemployment rate by position in the household
and estimated non-labour income (%)

Position in the household	Estimated Non-labour Income	
	Poor	Rich
Head	0.01	3.6
Spouse	1.7	1.7
Son/ Daughter	6.2	4.9
Other relative	3.0	3.7
Friend or guest	0.0	4.5
Total	2.2	3.9

Source: INEGI (I-1992), *Encuesta Nacional de Empleo Urbano.*

[30] See Appendix III for the estimating procedure of this variable.

On average poor individuals have lower unemployment rates than those with positive values of non-labour income. The most important difference is again among heads of the household: there were practically no unemployed poor heads in the sample.

If we observe the unemployment rate by schooling, we find out that it behaves very differently from the figures obtained from developed countries. Usually in those countries the less skilled people have higher unemployment rates than the more skilled ones. Table 4 shows that the unemployment rate grows with the level of schooling up to those with unfinished preparatory level (unfinished high school), then the unemployment rate falls. The strong correlation between schooling and income is partly responsible for this behaviour. As mentioned before, low levels of (non-labour) income decrease the unemployment rate, thus low levels of schooling are also associated with low unemployment. This effect of schooling on unemployment is attenuated when in the econometric estimation we control by non-labour income.

Table 4
Unemployment rate by schooling (%)

Schooling	Unemployment rate
No schooling	1.2
Uncompleted primary	1.9
Primary	2.2
Uncompleted secondary	3.4
Secondary	3.8
Uncompleted preparatory degree	4.9
Preparatory	3.5
Uncompleted university degree	4.1
Graduate	2.5
Postgraduate	0.3
Total	2.9

Source: INEGI (I-1992), *Encuesta Nacional de Empleo Urbano.*

Age also plays an important role in explaining unemployment. Young people, usually those less than 21 years old, have a large incidence of unemployment. The unemployment rate decreases with age, although between 45 and 75 years it seems stable around 1.3%.

2. Estimation

a) *Unemployment incidence*

First of all it is important to determine which groups of people are prone to be unemployed and which personal or family characteristics would push them to this state. In order to do that we construct a Probit model for the labour force in the first quarter of 1992. Here the

independent variable takes the value of 1 if the individual is unemployed and the value of 0 if he is employed.

The main explanatory variables are the following. The position in the household and the marital status are also important in explaining unemployment, because married and heads of the household will in general have short unemployment spells. Schooling is also incorporated with dummy variables, the base being individuals without schooling. As we said before, education and training can influence the chances of entering unemployment, but also we have to include this variable in order to control and separate the effect of the non-labour income. We include the number of children and the number of adults in the household to have a measure of the family needs. We expect them to speed job search but to reduce the acceptable wage offers Thus, the net impact of this variable is ambiguous. We thus include the number of children squared to see if this *ambiguity* can be revealed statistically by depicting a non-linear relation between needs and unemployment.

We mentioned before that information about job opportunities comes usually from members of the family and friends. To measure this effect we included in the model the number of members of the household who have a job, and we group them by sex, to see if the individuals were helped more by members of the same sex. Two other variables, apart from the family income, which measure the effect of the family on the individual's chances of being unemployed were included. The first is the proportion of the rest of the family who are employed and the other is a dummy variable recording whether any of the family members has his or her own business. We divide our main explanatory variable, non-labour income, in two, as we have done throughout this work. We include first the estimated property income of the family and secondly we include the earnings of the other members to see if they affect unemployment incidence differently. The equation is in the Appendix.

b) *Estimating the accepted wage equation for the unemployed.*

An important result from the theoretical model of job search implies that the individual's accepted wage will be influenced by the length of his unemployment spell. Thus the variables that explain duration can also explain the accepted wage. In various studies where the information on duration is not complete, or it is not available at all, some inference about the job searching process can be analysed by looking at the accepted wage[31].

The density of accepted wages is

$$f(w_a) = \frac{f(w)}{\int_{\chi}^{\infty} f(w)\,dw}, \quad \chi = w. \tag{17}$$

where $f(.)$ is the density function.

Therefore if we estimated with OLS the equation for accepted wages for those who found a job, we may obtain a considerable bias in the estimates due to the way we selected the sample[32].

The model for accepted wages can be written as[33]

$$\ln w_i = y'_i\beta + u^w_i, \;\; u^w_i \sim N(0,\sigma_w^2) \quad \text{if } S_i > 0$$

$$S_i = y'_i\beta + z'_i\gamma + \varepsilon_i \tag{18}$$

This model can be estimated by the Heckman's technique. We first estimated the Probit model as in the previous section, we computed the λ's (the inverse Mill's ratio) and then we estimated the following model by OLS

$$\ln w_i = y'_i\beta + \lambda'\zeta + u^w_i \tag{19}$$

This formulation requires that all variables included in y also be included in z, since χ depends on the mean of the offer distribution[34]. But in order to identify the reservation wage, it is needed that some variables affecting the reservation wage function do not affect the wage offer, as analysed by N.M. Kiefer and G.R. Neuman (1979). In this case, we only included in the structural wage equation, that is in y, age, age squared, sex, marital status, schooling, the family non-labour income, the unemployment rate in the city and the dummy variable measuring if the individual had labour experience. We assumed the rest of the variables affect the reservation wage but they do not affect the mean of the wage offer distribution. In order to do that, we estimated first a probit equation (with all unemployed people in I-92) and then we estimated a (log) wage equation for those who found a job in II-92. The equation is in the Appendix.

3. Results

We found that the family variables have important effects in explaining unemployment. The heads of the household are those more prone to enter unemployment. Since they are the

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[31] T. Devine and N.M Kiefer (1991).
[32] J.J. Heckman (1979).
[33] T. Devine and N.M. Kiefer (1991), p. 38.
[34] Ibid.

most important source of income, they cannot afford to be without a job for a long time. The family property income has a crucial effect on the possibility of being unemployed. The elasticity for this variable is positive, thus, in general, a rich household may present higher unemployment rates than a poor one. The individuals whose families have a business, presented a lower probability of entering unemployment, which reflects the importance of the family safety net in the labour market. This variable takes the value of 1 if any family member had his or her own business, from large successful corporations, to *taco* stands on the street. The variable is 0 otherwise. We can see that the unemployment incidence is reduced significantly if the family has a business. The effect is larger for men than for women. As we said before, when possible, the family offers the individual its *know how* about the labour market in terms of information, contacts and, especially, jobs in a family enterprise. This might be the member's first job option, which increases his chances of skipping unemployment. But if the member does not take the family's offer, he will seek an alternative job still with the economic support of his family. The wealthier the family, the higher his expected duration.

Apart from these variables, we also included the number of family members[35] employed to explain unemployment. The results are what we expected: the more members with jobs, the lower the unemployment incidence. But not only that, we divided the number of employed members by sex and we found that if there were more women working, women's unemployment incidence was lower than if there were more men working. We found the same effect for men. The probability of being unemployed was lower for men if more male members had a job than if more women worked. These results confirm that the help the family provides is not only through income, but also through the information and contacts in the labour market.

The impact of non-labour income may well go beyond the likelihood of unemployment and the duration of the unemployment spells. The income support (usually analysed in terms of unemployment benefits) can be seen as a way of increasing the bargaining power of the unemployed when searching for jobs[36].

The best way of coping with the uncertainty of the job search is with resources, both in terms of time and in terms of direct income. In this way, a certain degree of unemployment

[35] We also include *friends* as family members, if they lived in the same household and shared some expenses.

[36] D.T Mortensen (1986), H. Kasper (1967). Many other models take into account this reality, see for example K. Burdett (1979), K. Burdett and T. Vishwanath (1988), M.G. Kohn and S. Shavell (1974) and M. Rotschild (1974) among others.

is *necessary* for the individual because he needs time to find or wait for the best offers. Unemployment is therefore seen as an investment for the individual. In a way, the whole economy needs also a certain degree of unemployment, frictional unemployment, because this guarantees more efficient matches between employers and employees.

Most of the variables behave as we expected. The wage increases with age up to 45 years, and then it declines. Men receive higher wages than women. The expected accepted wage is 10% higher for men than for women, for an average individual[37]. In general, schooling also behaves as we expected. Accepted wages increase with schooling, especially after secondary level.

Labour experience increases as well as the accepted wage. For an average person, if he or she has had a job before increases the accepted wage by 13.8%. The number of children affects the accepted wage in a direct way, although one new child increases wages only 4%. Married and divorced people seem to accept lower wages than single people. Perhaps the fact that single people have a larger duration than married people can explain this fact. If the returns for investing in unemployment are positive, those who search longer can have better wages, *ceteris paribus*.

Finally we see that both family earnings and the property income have a positive effect on the accepted wage, although the coefficient of the former is not significant. However, because the effect on wages comes also indirectly from the Probit model of the chances of finding a job, the full effect of these variables (in fact, of all variables) on the accepted wages has to take this into account.

Thus, we have that:

$$\frac{\partial w_a}{\partial x} = \left.\frac{\partial w_a}{\partial x}\right|_{\bar{\lambda}} + \frac{\partial w_a}{\partial \lambda}\frac{\partial \lambda}{\partial x} \qquad (20)$$

that is, the full effect of a variable x on the accepted wage w_a, must take into account the direct effect (first term on the right) and the effect through λ (the second term on the right).

With this procedure, for an average person the property income elasticity is 0.017 and the family earnings elasticity is 0.015, which are almost identical. In other words, if the family

[37] All computations take into account not only the coefficients of the wage equation, but the changes in the probit equation through changes in λ.

non-labour income of the average person increases roughly by 100 US dollars per month, his accepted wage will increase almost 2.8%[38]. This is not a very large increase, but enough to suspect that the distribution of income will tend to get worse with time if those who start the *game* of search with bigger endowments (controlling for education and labour experience) will also get better jobs.

As we have seen, there is life, and also unemployment, ever without having unemployment benefits. This is because the family becomes the main support for its members. Therefore, the level of the family income affects unemployment, and the existence of many families with very low non-labour income is in part responsible for the low levels of the unemployment rate in Mexico.

That is why having a low unemployment rate in Mexico must lead us to suspicion: many people do not have time to take advantage of unemployment as an investment for better earnings and this may have adverse consequences for the distribution of income. It will be important to encourage the application of policies that help to solve these problems without increasing unemployment to uncontrollable levels; this is not an easy task.

CONCLUSIONS AND POLICY IMPLICATIONS

The objective of this paper has been to assess the effect of the household poverty on the labour supply process in Mexico. This seems important not only for the understanding of the labour supply in this particular country, but also for the light it may shed on the current debate about the strength of the welfare state in developed countries.

We have found that the lack of income and unemployment programmes, together with a low level of family resources, can have important consequences on the labour force, since it generally increases the labour effort of the family members, reducing therefore their time in other activities such as child-caring or education. Low levels of non-labour income may also reduce the reservation wage and thus the accepted wages of low income families, affecting the overall distribution of income. The weakening of welfare programmes elsewhere can lead to the same situation, especially among poor families.

[38] Some authors have analysed this phenomenon but their explanatory variable is, as always, the level of unemployment benefits. R.G. Ehrenberg and R.L. Oaxaca (1976) found a small effect of the replacement ratio on earnings and P.L. Burgess and J.L. Kingston (1977) found that an increase of one dollar of weekly benefits would increase annual earnings by $25.

So, what can we do about the results we obtained? How can we ease the labour burden of some individuals? How can we increase the bargaining power of those who have few economic resources? There is a simple answer, which nevertheless is extremely difficult to implement: poverty alleviation. However, it seems that there is a question which should be asked first: Is it advisable to do anything? For these results show that there is a great degree of flexibility in the Mexican labour market precisely because there is not a strong welfare system. We then confront the old dilemma, which nevertheless is still an up-to-date: Should governments strengthen the welfare state protecting low income families? However this policy would increase labour costs, public spending and unemployment, and would make the labour market more rigid. Or should we weaken the welfare system, keeping a flexible and competitive labour force, despite the labour burden it imposes on many households and the negative effect it has on the overall distribution of income?

A proper answer would ask for another dissertation. We nevertheless favour a direct intervention of the government on poverty alleviation programmes, but not through unemployment benefits, as is done in developed countries, since those programmes may create some distortions in the labour market. In Mexico many families work hard to pay for basic things such as doctors and medicines, books and pencils or simple infrastructure. If the poverty programmes bring a solution to these *basic needs*[39], the indirect increase of the non-labour income of poor families would increase their bargaining power, relatively to that of employers. This may relieve many households from selling their souls to the labour force, for once the basic needs are covered, poor families can choose better what to do with their time. For men and women do not live by bread alone, do they?

[39] The Solidarity programme of 1988-1994 was not a bad idea, if it wasn't for its political objectives. The new proposal of giving direct income support to poor families appears to be also a good idea, since it does not distort relative prices and relieves these families from the burden of buying basic goods. The programme should include free medical services for poor families.

APPENDIX

HOUSEWIVES PROBIT PARTICIPATION EQUATIONS

Variable	All Housewives		Poor Housewives		Rich Housewives	
	∂P/∂X	t-ratio	∂P/∂X	t-ratio	∂P/∂X	t-ratio
Constant	-0.405	-19.76	-0.208	-11.79	-0.585	-14.63
Personal characteristics						
Estimated gross wage (log)	-0.176	-3.89	-0.320	-5.12	-0.047	-1.01
Estimated gross wage squared (log)	0.135	8.88	0.197	9.05	0.087	3.98
Age	0.023	15.64	0.019	9.80	0.027	11.43
Age squared	-3.3E-4	-18.90	-2.8E-4	-12.16	-3.8E-4	-13.76
Number of births	-0.030	-9.65	-0.028	-7.18	-0.031	-6.17
Number of births squared	0.002	7.11	0.001	4.99	0.002	4.67
Household characteristics						
Number of children	-0.025	-4.97	-0.019	-3.16	-0.033	-3.74
Number of children squared	0.002	1.65	0.001	0.88	0.002	1.06
Proportion of others in household work	0.077	13.83	0.081	11.64	0.071	7.80
Servants living in household	-0.225	-7.72	n.a.	n.a.	-0.158	-4.32
Number of single women	0.003	0.94	0.007	1.79	-0.003	-0.47
Number of old women	3.5E-5	0.00	0.027	1.89	-0.051	-2.36
Other member's earnings	-0.148	-18.15	-0.211	-15.90	-0.113	-10.44
Estimated property income	-0.147	-3.94	n.a.	n.a.	-0.196	-4.30
Head characteristics						
Estimated gross wage (log)	-0.051	-6.51	-0.065	-6.33	-0.047	-3.66
Estimated gross wage if unemployed (log)	-0.038	-0.74	n.a.	n.a.	-0.046	-0.84
Estimated gross wage if out of labour force (log)	-0.141	-5.97	0.137	0.31	-0.158	-5.75
Full employed	-0.079	-8.34	-0.083	-7.31	-0.064	-3.93
Employee non-agriculture	reference		reference		reference	
Employee agriculture	-0.070	-2.12	0.053	0.95	-0.133	-3.05
Small firm (5 workers or less)	0.054	5.27	0.052	4.38	0.060	3.14
Large firm (more than 5 workers)	0.030	1.39	0.113	1.00	0.014	0.59
Self employed	0.116	18.97	0.120	14.52	0.102	10.33
Unpaid family work	0.518	11.17	0.380	3.89	0.573	10.06
Employed	reference		reference		reference	
Unemployed	0.128	1.26	n.a.	n.a.	0.168	1.52
Out of the labour force	0.188	4.56	-0.136	-0.24	0.245	4.75
Involuntarily unemployed	-0.122	-2.98	n.a.	n.a.	-0.132	-3.00
Size of the city	0.002	5.32	0.001	2.49	0.003	5.46
Log-likelihood	-21827.0	N=49,473	-13167.0	N=29,852	-8610.7	N=19,592
χ^2	39787.0		2454.2		1629.9	

a. See note a. in Table III.6 for the correct interpretation of the coefficient ∂P/∂X.
n.a. Not available.

Probit model
Unemployment incidence

Variable	Women		Men	
	Coefficient	t-ratio	Coefficient	t-ratio
Constant	-1.229	-6.56	-2.256	-18.57
Personal characteristics				
Age	-0.076	-10.06	-0.024	-5.11
Age squared	0.0007	7.40	0.0003	5.02
Head	0.149	1.73	reference	
Spouse	reference		0.872	8.53
Daughter	0.319	4.07		
Son			0.373	8.05
Other relative, friend	0.074	0.92	0.178	3.69
Single	reference		reference	
Married/ Cohabitant	0.102	1.49	-0.224	-5.59
Divorced/ Separated	-0.040	-0.52	-0.212	-2.04
Widowed	-0.236	-1.93	-0.025	-0.21
No schooling	reference		reference	
Unfinished primary	-0.177	-1.95	0.034	0.49
Primary	-0.004	-0.06	-5.0E-4	-0.01
Unfinished secondary	0.141	-1.43	-0.704	-0.10
Secondary	0.051	0.65	0.056	0.82
Unfinished preparatory	0.138	1.53	0.117	1.60
Preparatory	0.031	0.41	0.018	0.25
Undergraduate	0.087	0.87	0.039	0.49
Graduate	-0.001	-0.01	-0.038	-0.52
Postgraduate	-0.858	-2.44	-0.745	-3.60
Number births	0.027	0.92	n.a.	n.a.
Number births squared	-0.004	-1.19	n.a.	n.a.
Household characteristics				
Number children	0.163	0.59	-0.024	-1.26
Number children squared	-0.004	-0.74	0.005	1.38
Number adults	0.068	4.26	0.078	7.49
Proportion of others employed	0.072	0.80	0.221	3.81
Number men employed	-0.083	-2.82	-0.156	-7.61
Number women employed	-0.149	-4.95	-0.053	-2.35
A family business	-0.130	-3.99	-0.358	-13.87
Other member's earnings	-0.119	-2.54	-0.033	-1.04
Estimated property income	0.395	6.32	0.628	18.98
Labour market characteristics				
Unemployment rate in the city (%)	0.174	11.61	0.155	13.95
Size of the city	0.007	3.16	0.008	4.60
Log-Likelihood	-4243	N=39,412	-7450.2	N=76,505
χ^2	1152.3		1271.0	

n.a. Not available.
Source: INEGI (1992), *Encuesta Nacional de Empleo Urbano.*

Accepted wage equation[ab]

Variable	Coefficient	t-ratio
Constant	-0.603	-2.09
Personal characteristics		
Age	0.090	7.27
Age squared	-0.001	-6.38
Sex	0.123	1.61
Single	reference	
Married/ Cohabitant	-0.172	-2.94
Divorced/ Separated	-0.258	-1.87
Widowed	0.090	0.51
No schooling	reference	
Unfinished primary	0.146	1.08
Primary	-0.154	-1.19
Unfinished secondary	0.001	0.003
Secondary	0.065	0.48
Unfinished preparatory	0.288	1.74
Preparatory	0.427	3.29
Undergraduate	0.556	3.22
Graduate	0.533	3.66
Postgraduate	0.663	1.09
Labour experience	0.135	2.14
Household characteristics		
Number children	0.044	2.63
Other member's earnings	0.063	0.08
Estimated property income	0.171	2.47
Labour market characteristics		
Unemployment rate in the city (%)	-0.019	-0.85
Size of the city		
λ	0.113	0.73
R^2=0.28		N=1,702

a. Hourly wages (thousand of II-1992 pesos).
b. Those unemployed in I-92 who found a job in II-92.
Source: INEGI (1992), *Encuesta Nacional de Empleo Urbano.*

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