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Poverty and Labor Supply of Women: Evidence from Egypt[1]

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Abstract

This study investigates the behavior of labor supply of women at different levels of poverty. It is widely demonstrated in the literature that variables such as age and level of education, as well as the demographic, social, and financial characteristics of the household affect the decision of labor supply. However, this study argues that these determinants work differently according to the poverty level or the well being of the household, adding another dimension to the literature on the female labor supply in MENA.

There have been quite a few studies on the women's labor supply in the MENA region. Some have focused on labor supply and its elasticities in Egypt and Turkey [El-Hamidi (2003), and Tunali and Baslevent (2000)], others have focused on the fertility and timing of marriage in Morocco [Assaad and Zouari (2003)], the poverty aspect is yet to be considered in the labor supply analysis.

Only recently a couple of studies have handled the role of poverty in labor supply. Eberharter (2001), shows a difference between the gender role in the labor market between those above and below the poverty line in Germany. Dessing (2002) points to different labor supply elasticities for different wage rates in the Philippines.

I start with the assumption that participation of women in the labor market is governed by social and traditional gender roles, as well as economic factors. This assumption is validated only when household income is above the household poverty line. When household income falls below the poverty line, only economic factors dominate the decision to join the labor market. Women below the poverty line are pressed by economic hardships and are expected to work more than those above the poverty line, i.e., they have negative elasticity of labor supply, unlike what the classical labor supply theory claims of positive labor supply elasticity at low wage levels (upward sloping portion of the canonical model). Several policy implications emerge from negative labor elasticity: the need to impose a minimum wage in order to avoid repeated cycles of poverty, in addition to providing specialized training and education programs.

1. Introduction

The focus on female supply side in Egypt is motivated by two simple facts: while females represent at least half the population in Egypt, they account for 27% of the total workforce[2] compared to 73% of their male counterparts[3] in 1998. The other fact is the liberalization of the economy, and implementation of stabilization and privatization policies required by the IMF. The common practice of public sector employment guarantee continued for decades and offered the highest rewards of education and experience in the labor market. Up until the mid 1980's, and despite partial liberalization in the mid 1970's, known as the "open door policy", the public and government sectors dominated the labor market by absorbing greater numbers of educated and experienced workers. The decade between 1988 and 1998 witnessed a rise in the pace of liberalization towards a market-led economy. Public sector employment guarantee came practically to an end by early 1990's, and employment in the public and government sectors started to decline. The burden of these restructuring policies is heavily borne by women, either directly or indirectly, a result emerging from their central role in market and home economies. If Egypt is to make effective use of its wealth of labor force, these shares have to change, which can not be achieved unless women engage in the labor force in greater numbers. By understanding female participation behavior, policy makers will be in a position to assess the likelihood of satisfying this adjustment, and generating effective policy prescriptions.

The analysis in this paper focuses on urban women, ages between 15 and 64. The choice of this sub-sample leads to rather reliable results, for the fact that urban females are most likely to be engaged in government and public sector jobs that are heavily affected by the privatization policies.

The objective of this paper is to test the assumption that the canonical model of labor supply does not work at low levels of wages (or income), and that factors that determine labor supply decisions differ according to the economic well being of the household where the worker lives.

The rest of the paper is organized as follows: Section 2 is a theoretical background on the labor supply model, and the new research on the link between poverty level and the decision making process. Section 3 presents a review of the literature. Section 4 lays out the econometric model. Section 5 covers the data and variables handling. Section 6 discusses the empirical findings. Finally, Section 7 provides concluding remarks and recommendations.

[2] 15 years or older

[3] Source: ILO Bureau of Statistics, for 1998.

2. Theoretical Background:

The classic, traditional, or canonical, labor supply model views a family as a single decision making unit, and that any factor affecting the husband's role in the labor market, provokes a response in the woman's labor participation decision. In other words, women assume a secondary role with regard to the labor supply of the family.
The classic theory holds that at low levels of income the substitution effect dominates, resulting in a positive elasticity of labor supply (raising wages raises hours of work). At high wage levels, the income effect dominates resulting in a negative elasticity (raising wages reduces hours of work). As a result, the labor supply schedule takes the C shape (backward bending) [Robins (1930)].

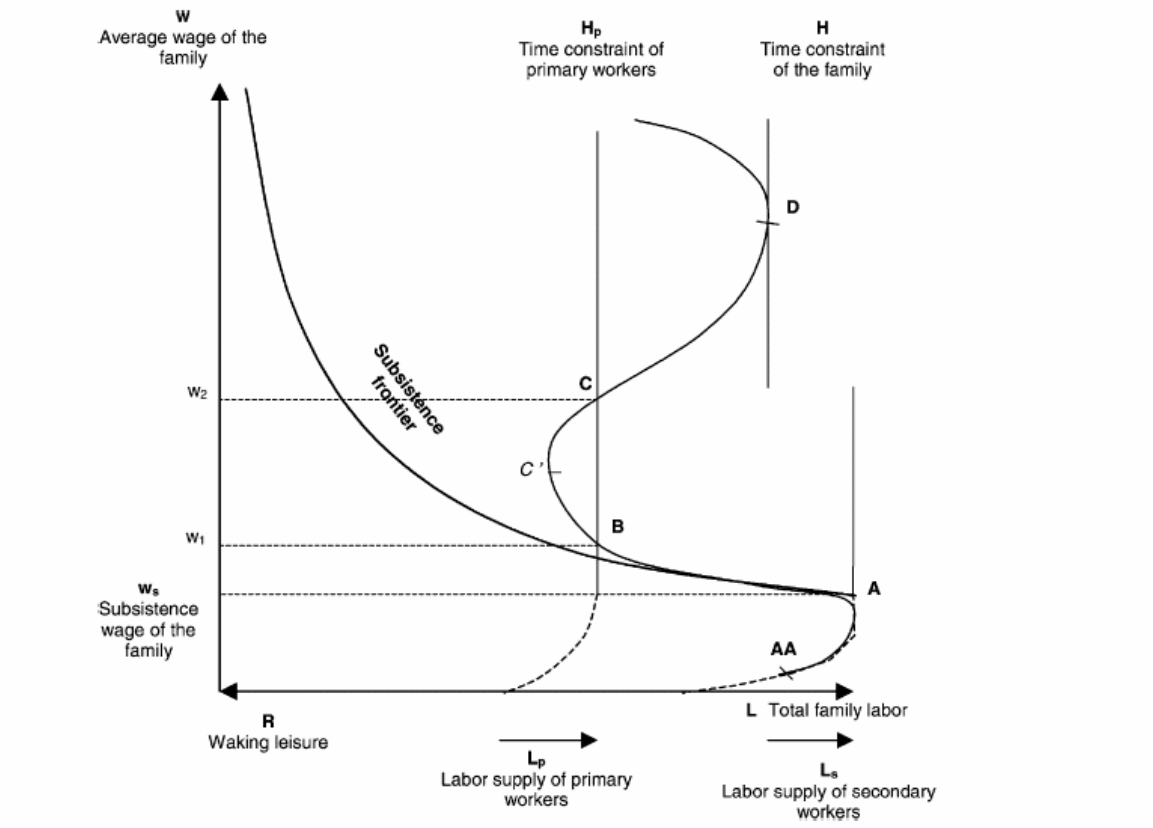
The drawback of this model is that it does not offer a clarification on whether, and to what extent, these effects differ at different levels of wages or income . Dessing (2002) shows how this traditional labor supply model fails to capture the behavior of poor workers. In practice, especially in the developing world, as wages fall, workers appear to work longer hours to maintain a living wage, representing negative labor supply elasticity.

During the 1960's, there has been evidence of negative labor supply (long hours of work at low wage levels). This development resulted in a backward bending labor supply schedule occur at low levels of income [Berg (1961)]. Most of the research done during that period focused on farmers and peasants which were presumed to have different needs and desires, therefore different preferences for work and leisure time. According to Berg (1961), Myrdal (1971), and Lipton (1983), those workers had a preference for leisure over work once they reached the minimum level of subsistence income, after which they reduce their work hours. Others such as Schultz (1964), Miracle and Fetter (1970), Gollas (1972) and Miracle (1976) offered a different interpretation. They argued that poor living conditions at those times and high rates of mortalities were enough incentives for workers to go back home once they satisfied their minimum needs.
Others went a different route. Hanoch (1965), Barzel and McDonald (1973), and Sharif (1991), among others, used the Cobb-Douglas utility function to explain the negative elasticity of supply at low wages; and while Sharma (1989) called it "deprived employment", Horton et all (1994) called it "the added worker effect"

The Reversed S-Shaped Labor Supply Model:

Dessing (2002) provides a different interpretation of negative labor supply elasticity in Figure (1) below. Unlike the reservation wage assumption of the canonical model, which is the primary factor in determining whether to participate in the labor market or not, the reversed S shaped model assumes that at very low levels of income, the family must devote all capable members to engage in labor market activities to cover their basic needs, and so they are kind of "forced employment". At income below the subsistence level, only the income effect dominates, and leisure is considered a luxury good, producing a labor supply that is negatively sloped. When basic needs are met, the labor supply shrinks (backward bending portion) that is when workers decide to free some of their work time for leisure or home work.

Figure (1)



The subsistence frontier traces a rectangular hyperbola, where family income remains constant. Along segment ABC', the income effect dominates the substitution effect: as wages fall, the family increases its supply of labor to maintain the level of income constant. This increase in the labor supply would be primarily due to secondary workers (spouses and children) seeking paid employment. It is more substantial than at higher wage levels.
Source: M. Dessing/ J. of Economics Behavior & Org. 49 (2002) 433-458

The canonical model emerges when family income exceeds subsistence level. The labor supply schedule slopes upward indicating a positive substitution effect, then slopes backward as a result of a negative income effect. At extremely very low levels of income, the family cannot cover expenses necessary to participate in the labor market (transportation, clothes, …etc), and as Dessing (2002) points out, in very exceptional cases, some family members may not be able to maintain the physical effort needed to complete the job and they are trapped into "forced unemployment".

There is a universal agreement that in most, if not all, developing countries, the traditional role of women is primarily responsible for the reproduction of the family: caring for other family members, and ultimately responsible for the survival of the family. That is why near the subsistence level, families increasingly depend on the supplemental income of the secondary workers, which is the wife most of the time (and children if they are at an age appropriate for work). Domestic work remains the responsibility of the woman even after joining the labor market and working long hours.

That puts an added burden on women. In the same time, that burden converts to an incentive to reduce the long working hours when basic needs are met, and further enhance the welfare of the family by taking care of the domestic activities. At higher levels of income such as in urban and industrialized areas, many domestic tasks are transferred to the market, which concurrently free some hours for women to spend in the labor market. In other words, at low wage levels we encounter labor supply elasticities that are negative, and become positive at higher wage rates.

Typically in Egypt, and urban Egypt in particular, males and women heads of households are working full time and are considered primary wage earners in the family. So their work hours seldom change with changes in wages. Secondary workers on the other hand, which includes married women and older children, also called "supplementary" workers, work at very low levels of wages to meet their basic needs, and also work at higher levels of wages. At intermediate levels, they withdraw from the labor market and substitute work with leisure. Substitution effect dominates, and they experience a positive elasticity of labor supply. At higher levels of income, people engage in new consumption patterns and social status necessitates joining the labor market.

Several interpretations for the positive elasticity of labor supply: lower fertility rates, health advancement, and higher levels of education for women. Women, and married women in particular, transfer some of their home activities to the market in form of hiring servants or organized services, The free time in turn is spent on acquiring new skills and joining the labor market, and employment is perceived as a higher social and sovereign status for women.

3- Review of the Literature:

Female labor has become an important factor in household income, thus improving the living conditions of double earnings families, and providing a barrier against economic instability and high levels of male unemployment. Furthermore, as women become more economically independent and contribute more to family subsistence, power relationships within the household tend to be more liberated, further improving the social status of women [Babb (1990)].

Female labor supply studies on the US and other advanced countries are quite numerous compared to those of developing countries. These studies have produced a wide-range of conflicting estimates of labor supply elasticities with respect to wages and income. In their comprehensive survey of that literature, Killingsworth and Heckman (1986) conclude that estimates of female labor supply elasticities in these contexts are large, both in absolute terms and relative to male elasticities, but they worry that the range of estimates is "dauntingly large." The wage elasticity estimates vary widely from –0.85 to over 14, depending on the data source, the sub-populations studied (which vary by age group, marital status, and race) and the statistical methodology used. Killingsworth and Heckman (1986) list a wide range of positive estimates of wage elasticities. Nakamura, Nakamura, and Cullen (1979) obtained negative uncompensated wage elasticity. Killingsworth (1983) attributes this result mainly to the exclusion of the schooling

variable from the hours equation. Another possible source of this result is the lack of work experience variable in the wage equation, and/or the selection terms.

Most studies of female labor supply in the developing world focus on the labor force participation decision rather than the hours-of-work decision, hence elasticity.
Sahn and Alderman (1988) estimate a labor supply function for Sri Lankan men and women using 1980-1981 data. They found the elasticity of labor supply with respect to wages is positive and lower in urban than rural areas (0.14 for rural men, 0.07 for urban men, 0.15 for rural women, and 0.03 for urban women). Connelly, DeGraff and Levison (1997) compared the determinants of participation in employment with the determinants of hours worked for urban Brazilian women using 1985 household survey data. Because there are a large proportion of households headed by unmarried females in Brazil, the authors divided their sample into women whose husband was present and single female heads of households. They found the unobservable factors that increase the likelihood of employment of single female heads actually caused their hours of work to decrease, once employed. For women with spouses, unobservable factors tended to operate in the same direction for both participation and hours worked.
Dessing (2002) analyzed 99 low income rural households between 1975 and 1976 in the Philippines. He reported negative elasticities of -0.39 to -0.46 for secondary workers in the household. Assaad and El-Hamidi (2001) produced elasticity estimates for Egyptian women using 1988 data. They found a 1% increase in wages results in 3.4% increase in hours of work. In summary, the existing research points to low elasticities of female labor supply with respect to wages in developing countries.

Alas, these studies did not consider testing for labor supply elasticities at different wage rates or income levels. Few studies reported discrepancy in labor supply elasticity by wage level. Sharif (1991) studies wage and self-employed labor supply elasticities of landless and near landless farmers in India using 1970 and 1971 data. His data showed a forward falling labor supply schedule at low wage levels and an upward sloping schedule at higher wage rates. But he does not indicate if this falling forward occurs below subsistence level. Dessing (2002) found negative elasticity for women at very low wage rate and positive elasticity at higher wage rate. Eberharter (2001) also found difference in participation practice between women below and above the poverty line in Germany.

Turning to poverty studies on Egypt, El-Laithy, Lokshin and Banerji (2003) provide an analysis of poverty evolution in Egypt between 1995/96 and 1999/2000, constructing household specific poverty lines. They found the urban poor to be the least educated: only 1/3 of them can read and write, live in large families and work in the informal sector or low paying jobs. Datt and Jolliffe (1998) estimate 15.7 million persons (26.5%) poor in 1997; about 5 millions of them are extremely poor. Female labor participation ranges between 1/3 and 1/4 of that of males. Still, these studies did not make the link between participation patterns and wage/income levels.

4. The Econometric Model

The impact of labor market conditions on the labor supply decision is typically captured by the wage rate that depends on the individual's education and labor market experience [Killingsworth and Heckman (1986), Sahn and Alderman (1988), and Schultz (1995)]. According to the standard theory of labor supply, the participation decision is based on a comparison of the market wage a woman can obtain and her reservation wage, the wage below which no paid labor is supplied [Killingsworth (1983), and Killingsworth and Heckman (1986)]. The reservation wage is related to the opportunity cost of a woman's time at home (or in unpaid work), her unearned income, as well as other factors that may affect her preference for paid work, relative to other time uses. Thus, the labor supply function may be written as a function of the wage rate, other earnings and preferences. While an increase in the wage rate clearly increases the probability of labor force participation, the effect on the number of hours supplied is not as obvious, since both income and substitution effects come into play. The final decision depends on the marginal utility of consuming market goods and services purchased with wage income, relative to that derived from additional "leisure" time. This puzzling connection between labor force participation, the wage rate, and hours of work generates the need to know how hours respond to wages, if at all.

Killingsworth (1983) sorts empirical studies of labor supply into first generation studies (FGS), or second generation studies (SGS). FGS, which began in the 1930's and continued into the 1970's, estimate the parameters of the labor supply using ordinary least squares.

FGS generally assumed that the error term is randomly distributed and did not take into consideration the problem of selection into the workers' sample according to unobservable characteristics, which became an important issue in SGS. SGS are characterized by attempts to deal with these problems by taking into account the fact that individuals are not randomly selected into the working sample, and that a large number of observations have exactly zero hours of labor supply.
These studies typically specify individual labor supply functions as:

$$(1) \qquad h_i = \theta' x_i + u_i \quad \text{iff } w_i > w_{ir} \quad , \qquad h_i = 0 \qquad \text{otherwise}$$

where, h is the hours of work, $\theta' x_i$ includes the component of control variables, w is the real wage rate, w_{ir} is the reservation wage, and is u_i an error term. Although it is not always explicitly stated, h is the number of hours of *paid* work and therefore does not include any unpaid work carried out for a family enterprise or in the form of self-employment.

This specification recognizes the link between participation and hours of work decisions. Killingsworth and Heckman predicted wages for the working sample, and estimated a structural labor supply (hours) equation on workers only (they called it estimation procedure II). This also yielded inconsistent estimates of the parameters due to selectivity bias. In estimation procedure III, wages are predicted for all individuals from OLS wage equation estimates on the working sample and Tobit estimation is used on all individuals to obtain structural labor supply estimates. The problem with this method is that it still does not account for selectivity bias in the wage estimates and does not allow the determinants of participation to differ from those of labor supply.

Selectivity bias in the wage and labor supply models was first discussed by Gronau (1974), Lewis (1974), and Heckman (1974). They argued that employed workers are those who are offered higher "market" wages than their "reservation" wages. As a result, the sub-sample used for assessing the determination of wages and hours of work represents a non-random sample of the population. As Vella (1998) explains: selectivity bias is a result of the unobservable characteristics that is correlated in both wages and hours equations.

Heckman (1980) suggested a solution that can be found by identifying two equations: the selection equation, which models the probability of engaging in paid work, and the outcome equation, which applies only to those who are observed in paid work.[4] Heckman's procedure, which has become known as "Heckit" consists of first estimating a participation equation for all the observations in the sample, using standard probit / maximum likelihood technique model, in order to single out the employed from the non-participants. Second, using the parameter estimates from the participation equation to compute a variable λ (called the selection term), which is then included, in a second step, as an additional regressor in the outcome equation, to correct for sample selection bias. Finally, and once selectivity-corrected reduced form wage and hours equations are obtained, structural versions of the labor supply equations can be estimated by introducing predicted wage as a regressor in the hours equation. This is referred to as estimation procedure (VII) by Killingsworth and Heckman. This estimation procedure presents the great advantage that it solves simultaneously the two main problems that appear when facing the estimation of a simultaneous equation model, sample selection (selectivity) bias and endogeniety.

Because of the joint determination of wages and hours of work equations, there are two issues to be considered. First, if wages and hours of work are simultaneously determined, it is inappropriate to use actual wages in the hours equation. Second, the wage equation has to include variables excluded from the hours equation so that the predicted wage will not be perfectly collinear with the hours equation regressors. The wage equation includes dummy variables that distinguish between different regions of residence. Since there is no theoretical reason justifying the inclusion of region dummies, they are excluded from the hours equation.

[4] In this analysis, the observed outcomes for those who engage in paid work are either hours or wage. Although the Heckman sample selection model is written in terms of hours of work *H,* the same equations apply equally well to the wage *W.*

In view of that, first a regression of wages on age, age-squared, experience, experience-squared, education dummies, region dummies, and the estimated λ is run. The predicted wage is then used as a regressor in the hours equation where the wage elasticity is calculated. The hours equation includes age, age-squared, education dummies, and other factors that influence hours of work, but not the wage rate, such as: the number of children, other males' earnings, and the estimated λ.

The estimated hours and wage equations may be expressed as:

$$(2) \qquad \ln(w) = \delta_{xw}' x_w + \delta_w' \hat{\lambda} + \xi_w,$$

$$(3) \qquad h = \delta_{xh}' x_h + \delta_V V + \delta_w \ln(\hat{w}) + \delta_h' \hat{\lambda} + \xi_h.$$

Here, x_w denotes the vector of regressors in the wage equation, and x_h denotes the vector of regressors in the hours equation other than the wage, and V is other males' earnings, a proxy for non-labor. The hats ("^") indicate that the estimated versions of theλ's are being used and ξ is a zero-mean, heteroskedastic disturbance term, which is uncorrelated with the right hand side variables. Linear regression of (2), (3), and the generated regressors $\hat{\lambda}$ would yield consistent estimates of the regression parameters. This linear specification of the hours equation is the most frequently used form in the literature. It is hypothesized to see different patterns of participation to vary according to the level of poverty/ income.

Based on the previous discussion, The elasticity of labor supply with respect to own wage w_i, usually called the gross or uncompensated wage elasticity, is assumed to be negative for workers below the poverty line and positive for workers above the poverty line, for reasons mentioned earlier. According to the standard neoclassical labor supply model, the elasticity of labor supply h_i with respect to other males earnings V, should be negative if leisure is a normal good.

5. Data and Variable Handling

The empirical analysis is based on the 1998 nationally representative[5] household survey. The survey includes extensive data concerning basic demographics, employment, unemployment, occupational history, migration, education, earnings, and parental background. The ELMS 1998 was conducted on a sample of 5,000 households.

The survey collected data on hours and earnings. For regular workers (defined as continuously employed workers), annual hours of work were estimated by multiplying the average number of hours per day and the average number of days per week by the actual number of weeks worked per year. Wages for these workers were then estimated by dividing annual earnings by this estimate of annual hours. For irregular workers with more periodic employment, the reference year was divided into four quarters and the workers were asked about the number of months worked per quarter, the average number

[5] In all but the five remote border governorates.

of days worked per month, the average number of hours worked per day, and the average wage per day each quarter. An estimate of the number of hours worked per year was then obtained by adding the estimated quarterly hours. The hourly wage was obtained by dividing the average daily wage over the four quarters by the average length of the working day across the four quarters. In contrast to the number of days worked per month, neither of these two variables varies much across quarters resulting in fairly reliable estimates of hourly wage for irregular workers. There is, however, a significant room for measurement error in the estimation of work hours for irregular workers using this method because of recall problems and possibly some desire on the part of such workers to under-report the number of hours they supply. However, the low proportion of irregular workers among women wage workers (2%) makes such measurement problems trivial.

In order to account for the parabolic relation between age and the life- cycle of labor supply decisions, the squared age is used as an independent variable. Fuchs (1989), and other empirical studies show that women experience a shorter and more interrupted spells of labor market attachment, than men. For this reason, the influence of squared age on female labor supply is expected to be weak (and probably negative). Regional differences in labor opportunities are captured by regional dummies. Where Greater Cairo is the reference, Alexandria and Suez Canal Cities, Urban Upper Egypt and Urban Lower Egypt are three other dummies. As widely agreed upon, the more educated women, the more likely to be employed. To account for the strong correlation between human capital and labor supply, dummies for the highest level of education reached are included. They are: illiterate (the reference category), able to read and write, primary education, preparatory education, secondary education, university education, and post graduate education. Experience (calculated as the number of years since entering the labor market for the first time), and experience squared/100 are two independent variables in the wage equation. As widely known, experience is considered one of the factors in wage determination.

Studies of women in developing countries confirm that it is a common practice in the literature on the economics of female labor supply to account for individual and household characteristics that limit an individual's labor supply, such as the number of children, and wealth, or unearned income. Such information on household composition has been known to capture constraints and/or preferences regarding participation. I follow the mainstream of the literature and include the number of children 0-2 and the number of children 3-6, in the analysis. Because the survey does not provide a measure of unearned income, another instrument is used: the sum of total earnings of other male family members in the same household, on the assumption that, in Egypt, male employment decisions are exogenous to those of their females'. A significant and negative coefficient on other male earnings underlines the complementary role of leisure and income, if leisure is a normal good. Zabel (1993) for example, obtained a negative relationship between individual's annual working hours and the household's income situation.

The current survey does not provide enough information to calculate the poverty line. For this reason, I constructed a proxy variable for the wealth (asset ownership to be exact) of

the household where the worker lives. The poverty variable is thus proxied by a wealth score that is constructed using principle component analysis "Factor analysis"[6]. The wealth variable is a combination of three types of indicators: durable goods, housing assets, and financial assets. Durables include measure such as: fridge, freezer, TV, etc. housing assets include: flooring types, number of rooms, access to electricity, etc. the financial assets contain: dividends on assets or interest on bank accounts. [7]
Table A-1 in the appendix lists scoring coefficients for the wealth factor using maximum-likelihood estimation technique, without rotation, and retaining one factor. This factor captures the most common information between variables. This index is a standardized variable with mean of zero and standard deviation of 1. A change from zero to one increases the asset score by (scoring coefficient / S.D.) of the variable.
A new variable is then created containing the percentiles of the factor score.

Using the asset ownership as a proxy for wealth (or income level) is a robust one. It accounts for the status of the household during a long period of time rather than relying on a poverty line that accounts for consumption expenditures.

Various estimates of people living below the poverty line in Egypt have been reported, with the least being 18% [El-Laithy (2000)], and the highest being 36% of the population living below the poverty line [Fergany (1998)] in 1996. I used different cut off points for the wealth indicator to compare the elasticity at different levels: At 20%, at 40% and at 60% of wealth distribution

Underlying Assumptions
There are some key assumptions in this framework:

- Once the participation decision has been reached, there are no restrictions on the hours supplied.
- The labor supply decisions of other family members are exogenous.
- Earnings reported by other male members in the same household are considered assets to the female worker, and affects her labor supply decision.

The analysis is restricted to urban[8], non-agriculture[9] females, between the ages of 15 and 64, and not currently enrolled in school, comprising 72 % in 1998 of all urban females. The working sample, on which the analysis is based on, consists of 4843 females in 1998.

[6] This method is adapted from Assaad and Levison (2003).
[7] A complete list of wealth measure in Table (A-1)
[8] Keeping with the literature, and to avoid the problems of labor market definition associated with subsistence agriculture in rural areas.
[9] High rates of seasonal employment within the agriculture sector are justification for excluding them from the analysis.

6. Empirical Findings:

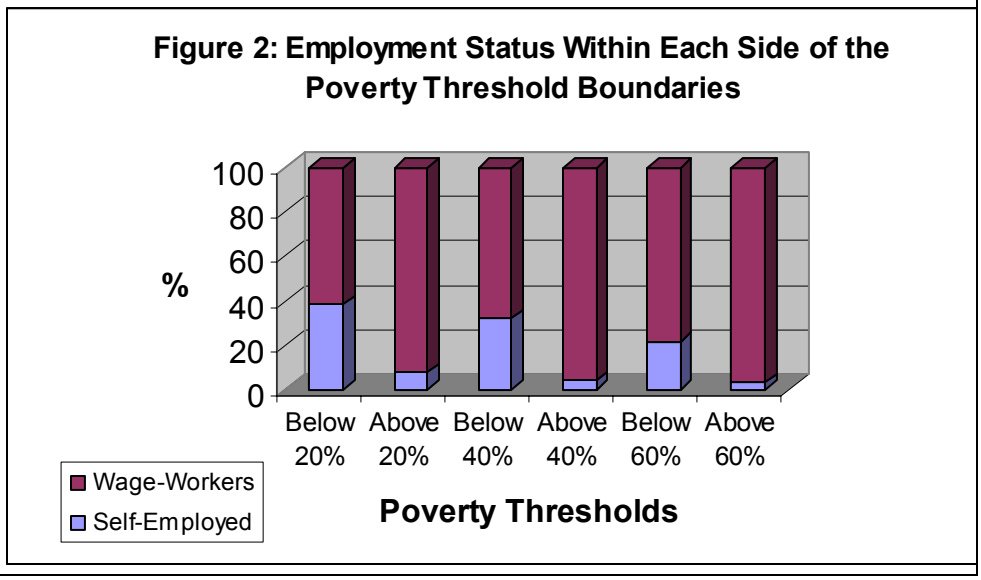
6.1- Preliminaries

Participation rates are presented in Table (1) below. Non participants constituted the majority of women in urban Egypt (about 80%). Wage workers, mostly working in the public sector, represented almost 18%, while self-employed women were the minority with 2%. Figure (2) displays the percentage of each employment status within each side of the threshold boundaries: below 20%, above 20%, below 40%, above 40%, below 60%, and above 60%. Table (2) displays means and standard deviations of variables used in the analysis for the total sample and by the three poverty levels. The mean age of the sample is 35 years. Those who work supply about 5 hours on average of their labor. Over a third of the sample (35%) is highly educated, with university or post graduate degrees. On the other spectrum, those who are illiterates or barely read and write constitute a little over a third (36%). About half of the sample resides in two metropolitan areas: Cairo, and Alexandria and Suez Canal. The majority of workers concentrating in the lowest 20% of the poverty threshold are working in the private sector. It drops down to 44% when workers are in the lowest 60% threshold. On average, 20% of the sample has infants and toddler up to 2 years, whereas 28% have children ages 3 to 6 years.

Table (1): Labor Force Participation Rates, Total Sample

Females 15-64, Urban Egypt, 1998

Employment Status	No. of Observations	%
Non-Participants	3,893	80.38
Self-Employed	100	2.06
Wage-Workers	850	17.55
Total	4,843	100



Insert Table 2 about here…..

Table (3) contains parameter estimates of the participation and wage equations (Heckman selection model). First, the insignificance of the selection term (inverse of mills ratio) is an indication that sample selection is not a problem. Negative age squared in the participation equation is an indication of shorter and interrupted spells of female labor force participation. Also, other males' earnings in the household increases the probability of participation in the labor market, contrary to classic theory assumption, and indicating that leisure is not a normal good. The returns to experience in the wage equation show a concave experience-wage profile. The significance of experience here could be attributed to the fact that most female wage workers in this sample work in the public sector which emphasizes the role of seniority in wage increase. All education coefficients have the expected positive sign, although not significant, but having a post graduate degree is a significant determinant of wages rates.

Insert Table 3 about here…..

6.2- The Hours (Labor Supply) Equations:
The assumption in this analysis is that those who are below a specific threshold act differently than those who are above that threshold. Poor people, or those who live under a specific threshold, are forced to work longer hours to overcome their economic hardships. Consequently, it is expected to obtain a negative elasticity for this sub-sample: the lower the wage rate the longer hours worked. On the other hand, at higher income levels, economic factors, as well as other factors such as social status, tradition, etc., play an additional role in deciding on the same issue.

Rather than running two separate OLS on below and above the specific threshold, I run one OLS including an interaction term between the poverty variable and predicted wages to account for different intercepts and slopes for both groups of workers. The interaction model is run separately for the three models: below 20%, below 40% and below 60%.

Results on hours equations are presented in Table (4). Table (4) confirms the stated hypothesis. The uncompensated elasticity of hours supplied with respect to own wages is negative and significant at the 1% level. This is seen in all three models. The coefficient of predicted log wages is the elasticity for those who fall below the threshold. The elasticity for those above the specific threshold is calculated by summing up the coefficients of the predicted log wages and the interaction term. As indicated in the table, a one percent reduction in wages results in 62% increase in hours of work for workers below the 20% of the poverty threshold. At a higher threshold, 40%, a one percent drop in wages results in a 52% increase in working hours. At the 60% threshold, a one percent reduction in wages leads to 41% increase in hours of work. Put it differently, the negative labor supply elasticity drops as the well being of households enhances.

Insert Table 4 about here…..

For the group on the other side, above the poverty threshold, it is expected to see positive labor supply elasticity, since they are now "presumably" governed by other factors, in addition to the economic factor. Alas, the only positive elasticity was found in model (3), though almost zero, at the upper 60% of the poverty threshold. This could be interpreted as the well being of the household should be high enough to deter female workers from working at low wage rates.

Age is a factor in determining hours supplied, even after wage is taken into account, indicating a life cycle role in this model. Education appears to affect hours of work negatively, although not all coefficients are significant, the trend points to the higher the level of education the lower the hours of work, indicating an increased preference for leisure, or domestic work. Holding wages constant, the availability of, and probably access to, other males' earnings has a positive, though small in magnitude, effect on working hours. Having children either in the 0-2 or the 3-6 age groups does not have any significant effect on hours of work.

Two general comments on Table (4): first, the relatively low $R2$-values imply that there is still a wide range of unidentified determinants explaining the decision to work extra hours or not. Second, these results indicate that the category of 15-64 years is a diverse of a group to have one labor supply function. Thus, an analysis of the determinants of labor supply using a disaggregated database should be the focus of further empirical investigations.

7. Conclusion

Results of this study, as well as recent findings, support the "Reversed S Shaped" labor supply schedule. At low wage rates, women are forced to work to meet their families' needs. At the same time, they are responsible for home activities and child care. That's why when conditions improve they probably withdraw from the labor market or work less hours. At higher levels of income, women transfer some or all of household activities to domestic laborer and join the labor market producing positive elasticities.

The negative labor supply schedule points to the need to limit exploiting workers at low wage rates and necessitates imposing, and enforcing, minimum wage legislation. Yet the withdrawal of women from the labor market at intermediate wage levels is an indication of a sigh of relieve from the subsistence trap. During that time, women improve the welfare of their families by reducing their hours of work outside the house. That means they have the opportunity to invest in training and education. However, these women find it difficult to perform either because of lack of time and income. Provision of such training programs is essential for breaking the poverty cycle at this stage. The initiation of these programs must be accompanied by providing simultaneous programs aiming at reducing domestic work and provision of day cares, in order for these programs to be successful.

The halting of public sector hiring of graduates, which further worsened employment opportunities in the 1990's, is likely to have had a conflicting impact on female labor supply; on the one hand by depressing the wage offered to female new entrants; on the other hand queuing in unemployment lines. In a study on female workers of Buenos Aires, Cerrutti M. (2000) found that most of female labor force participation growth has been in the self-employment sector, a result of falling job opportunities and labor conditions, and increasing levels of employment instability and unemployment among male primary earners. The same story may very well be valid here too, pending further research. Will self-employment increase the male/female earnings inequality or raise the relative economic status of women? Programs assisting women to setup their income-generating activities represent only one step in that direction.

Finally, policies should aim at facilitating the available natural gift by promoting labor demand industries that make intense use of female labor. Industries that are export-oriented, or labor-intensive manufacturing, may well create the base for such course of action.

Appendix A

Insert Table A-1 about here…..

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Table (2): Means and Standard Deviations of Variables Used in the Analysis

Urban Females ages 12-64, 1998

Below Poverty Line 1998	All Sample		Below 20%		Below 40%		Below 60%	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Log Hourly Wage	0.03	0.43	-0.11	0.46	-0.09	0.41	-0.06	0.38
Log Yearly Hours	1.48	3.00	0.84	2.39	0.93	2.50	1.02	2.59
Age	34.60	13.83	33.81	13.95	33.97	14.05	33.89	13.84
Experience	20.92	15.00	21.53	14.80	21.30	15.24	20.87	15.12
Illiterate (Reference)	0.29	0.45	0.61	0.49	0.49	0.50	0.41	0.49
Read&Write	0.07	0.26	0.09	0.28	0.08	0.28	0.09	0.28
Primary	0.09	0.29	0.07	0.26	0.10	0.30	0.10	0.30
Preparatory	0.13	0.34	0.10	0.30	0.11	0.31	0.12	0.32
General Secondary	0.07	0.26	0.01	0.11	0.03	0.18	0.04	0.20
University	0.19	0.39	0.11	0.31	0.15	0.36	0.18	0.38
Post Graduate	0.16	0.36	0.02	0.14	0.03	0.18	0.06	0.24
Private Sector	0.28	0.45	0.72	0.45	0.59	0.49	0.44	0.50
Greater Cairo(Referene)	0.30	0.46	0.10	0.30	0.16	0.37	0.20	0.40
Alex.&Sz Cnl.	0.19	0.40	0.13	0.34	0.18	0.39	0.19	0.39
Lower Urban Egypt	0.25	0.43	0.29	0.45	0.29	0.45	0.30	0.46
Upper Urban Egypt	0.26	0.44	0.48	0.50	0.37	0.48	0.31	0.46
No. of Children 0-2	0.21	0.41	0.29	0.46	0.26	0.44	0.24	0.43
No. of Children 3-6	0.28	0.45	0.37	0.48	0.32	0.47	0.31	0.46
Log other Males' Earnings	5.80	0.72	5.44	0.74	5.54	0.71	5.64	0.69

Source: Authour's own calculations; ELMS (1998)

Table (3): Participation and Wage Equations (Heckman Selection Model)

Variables	Participation Equation	Wage Equation
Age	0.105	-0.033
	(0.076)	(0.037)
Age Squared	-0.093*	0.053
	(0.053)	(0.027)
Experience		0.020*
		(0.012)
Experience Squared		-0.080**
		(0.010)
Ability To Read &Write	4.705	0.036
	(0.000)	(0.074)
Primary	4.824	0.074
	(0.000)	(0.069)
Preparatory	4.837	0.167
	(0.000)	(0.125)
Secondary	4.565	0.224
	(0.000)	(0.213)
University	-0.409	0.259
	(0.345)	(0.310)
Post Graduate	-0.370	0.457**
	(0.381)	(0.058)
Alexandria & Suez Canal	0.372	-0.034
	(0.333)	(0.052)
Lower Urban Egypt	4.824	-0.041
	(0.000)	(0.050)
Upper Urban Egypt	0.464	-0.037
	(0.307)	(0.048)
No. of Children 0-2	0.111	
	(0.325)	
No. of Children 3-6	-0.148	
	(0.309)	
Log HH Male Earnings	0.128**	
	(0.045)	
Constant	0.100	0.194
	(1.117)	(0.453)
Lambda	-1.224	
	(1.195)	
No. of Observations	4843	4843

Source: Author's own calculations; ELMS (1998)

Standard errors in parentheses
* significant at 5%; ** significant at 1%

Table (4): Hours Equations

Variables	Model (1) Below 20%	Model (2) Below 40%	Model (3) Below 60%
Predicted Log Wage	-0.624**	-0.519**	-0.206**
	(0.070)	(0.049)	(0.035)
Poverty Line	0.136**	0.112**	0.060
	(0.051)	(0.038)	(0.032)
Poverty Line X Predicted Wage(Interaction Term)	0.261**	0.250**	0.208**
	(0.073)	(0.053)	(0.010)
Age	0.020*	0.018*	0.018*
	(0.008)	(0.008)	(0.008)
Age2	-0.008	-0.006	-0.006
	(0.011)	(0.011)	(0.011)
Ability To Read &Write	-0.272**	-0.274**	-0.256**
	(0.096)	(0.096)	(0.097)
Primary	-0.099	-0.086	-0.069
	(0.085)	(0.085)	(0.085)
Preparatory	-0.194*	-0.209*	-0.167
	(0.094)	(0.095)	(0.094)
Secondary	-0.114	-0.108	-0.072
	(0.126)	(0.126)	(0.126)
University	-0.019	-0.024	0.018
	(0.051)	(0.052)	(0.049)
Post Graduate	0.043	0.032	0.075
	(0.053)	(0.054)	(0.051)
No. of Children 0-2	-0.056	-0.057	-0.056
	(0.035)	(0.035)	(0.035)
No. of Children 3-6	-0.048	-0.050	-0.048
	(0.030)	(0.030)	(0.030)
Log HH Male Earnings	0.017**	0.011**	0.014**
	(0.005)	(0.002)	(0.005)
Lambda	3.178**	3.209**	3.155**
	(0.981)	(0.981)	(0.990)
Constant	6.850**	6.927**	6.945**
	(0.166)	(0.168)	(0.169)
Observations	950	950	950
R-squared	0.30	0.30	0.29

Source: Author's own calculations; ELMS (1998)

Standard errors in parentheses
* significant at 5%; ** significant at 1%

Table (A-1)
Scoring Coefficients, Mean and Standard Deviation of Assets comprising the Wealth Factor (the Proxy for Poverty) In Urban Egypt, 1998

Variable*	Scoring Coefficient	Mean	Std. Dev.
Quality of Walls	0.023	0.754	0.430
Quality of floor	0.072	0.899	0.301
Quality of roof	0.071	0.837	0.370
Access to Piped water	0.032	0.978	0.148
Availability of Waste Collection Services	0.050	0.366	0.482
Own a Phone	0.109	0.455	0.498
Connected to Sewer/Spetic Tank**	0.055	1.733	0.524
Access to Electricity	0.015	0.995	0.072
Interert or Income From Dividends	0.027	0.032	0.175
Own a Fridge	0.123	0.847	0.360
Own a Freezer	0.037	0.060	0.238
Own a Dishwasher	0.017	0.021	0.144
Own a Colored TV	0.150	0.726	0.446
Own a B&W TV	-0.051	0.309	0.462
Own a Video	0.065	0.182	0.386
Own an Air Condition	0.035	0.043	0.203
Own a Microwave	0.008	0.015	0.123
Own a Gas Stove	0.086	0.830	0.375
Own a Kerosene Stove	-0.058	0.474	0.499
Own an Electric Fan	0.082	0.762	0.426
Own a Water Heater	0.144	0.475	0.499
Own a Space Heater	0.044	0.082	0.275
Own a Sewing Machine	0.037	0.222	0.416
Own an Iron	0.118	0.768	0.422
Own a Radio	0.062	0.815	0.388
Own a Washing Machine	0.069	0.918	0.274
Own a Camera	0.054	0.146	0.353
Own a Bycicle	0.021	0.221	0.415
Own a Scooter	0.004	0.020	0.142
Own a Car	0.051	0.089	0.285
Own a Taxi	0.006	0.009	0.097
Own a Van	0.008	0.014	0.116
No. of Rooms***	0.035	3.740	1.307

Source: Authour's own calculations; ELMS (1998)
***All variables are binary (0,1) except otherwise indicated.**
****Takes the value 2 if connected to public swere, value 1 If connected to spetic tank, and zero otherwise**
****No. of rooms ranges from 1 to 12**