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# Modernity vs. Tradition in the Determination of Female Labor Supply

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**Abstract**

This paper studies the role played by cultural variables, as distinct from that played by economic or demographic variables, in determining female labor supply and market outcomes. The paper is able to study issues hitherto unexplored in this context by using data on Arab women in Israel. The latter are characterized by both `traditional' and `modern' cultural attributes and display substantial heterogeneity. Hence they allow for the study of the influence of cultural factors, in particular `modernity' vs. `tradition,' on labor market performance. Doing so, the paper examines the formation of cultural attributes and the way they influence labor market performance.

The results point to a significant role played by culture. In particular, a descriptive analysis, a standard probit model, and a latent factor model (with modernity as the latent factor) all indicate that a woman who is more modern participates more. Modernity is defined by usage of modern technology, modern views on the roles of men and women in the labor market, life in a modern city, marital status, and fertility. The cultural variables explain participation almost as well as the standard variables, such as age, education, and demographic variables.

JEL codes: J16, J22, C25

**Modernity vs. Tradition in the Determination of Female Labor Supply**[1]

# 1 Introduction

This paper studies the role played by cultural variables, as distinct from that played by economic or demographic variables, in determining female labor supply and market outcomes. Recent literature, surveyed below, has shown that such cultural factors are important in explaining women's labor market performance. However the cultural variables in question have often not been precisely identified, their determinants have not been investigated, and their interaction with economic variables has not been sufficiently quantified. A key reason for these lacunae is lack of relevant data. The current paper is able to study these issues by using data on Arab women in Israel, who are characterized by both 'traditional' and 'modern' cultural attributes. These data allow for the study of the influence of cultural factors, in particular 'modernity' vs. 'tradition,' on labor market performance. The aim of this examination is, then, to enhance our understanding of the role and operation of cultural factors in the labor market. Doing so I examine the formation of cultural attributes and the way they influence labor market performance.

In order to study these issues, the paper examines the following specific questions:

(i) Does the participation rate of Israeli Arab women depend on cultural factors, such as religion, the degree of religious belief, views on the role of women in work and in the household, usage of "modern" technology (cars, computers, the internet), etc.?

(ii) Within the set of cultural factors, what is the relative role of the various factors? In particular, what is the weight of religious beliefs?

(iii) What is the importance of the cultural factors relative to standard economic factors – human capital variables, demographic elements, and technology? What are the interactions between the two sets of factors?[2]

By exploring these questions, the paper makes two key contributions:

First, it explores the cultural determinants of female labor force participation and labor market outcomes in a rigorous manner with relevant data and up-to-date econometric methodology. A challenge in the explorations of culture in economics is to show that the effects of culture can be studied rigorously. It needs to be shown that it is possible to separate the influence of culture from standard economic variables and to do so using well-founded

[1]I thank seminar participants at Tel Aviv University and UCL for helpful comments and Ori Rubin for research assistance. All errors are my own.

[2]With respect to the last two questions, note that studies in other contexts – such as crime or terrorism – found that the connections between levels of education and the degree of religious beliefs are not those usually expected (see, for example, the findings of Krueger and Maleckova (2003)).

empirical work.[3] The paper applies such empirical tools to a unique data-set to study the distinct role that cultural factors play.

Second, it uses the fact that the data display substantial heterogeneity, in terms of cultural attributes and in terms of labor market performance, to provide an explanation for the joint determination of cultural status, patterns of female labor force participation, and labor market outcomes. It shows that cultural variables have substantial explanatory power and it quantifies the relevant linkages.

The paper proceeds as follows: Section 2 provides the background with a brief overview of the literature, emphasizing recent research on cultural determinants of female labor supply, and evidence on the patterns of participation of Israeli Arab women. Section 3 presents the model. Section 4 presents the data to be used in estimating the model. The results are presented and discussed in Section 5. Section 6 concludes.

# 2 Background

## 2.1 Literature

The paper relates to several strands of literature, which I briefly review.

*Female Labor Supply.* A huge literature has extensively explored the determinants of labor supply in general and that of women in particular. This literature has sought to explain female labor force participation rates by studying the effects of economic and demographic variables such as own and spouse income, benefit income, taxes and subsidies, education, age, fertility, and household properties. Surveys include Killingsworth and Heckman (1986), Blundell and Macurdy (1999), and, more recently, Blundell, Macurdy, and Meghir (2007), Blundell and Macurdy (2008), and Eckstein and Lifshitz (2009); a methodological overview is provided in Heckman (2001).

There were substantial changes in female labor force participation (LFP) over time. The key development was a big rise in female LFP in advanced economies over the 20th century. In the U.S., for example, female LFP (for women aged 18-65) rose from around 2% (mostly young and unmarried) at the beginning of the century to a peak of around 72% in the late 1990s, with a levelling off and a small decline to below 70% since then. Married women took an important part in this process, especially from the 1930s. Beginning in the 1970s (cohort of the 1950s), mothers with children in care played an increasing role (see Attanasio et al (2008)). Explanations for this trend increase include technological progress affecting home production, decrease in the costs and increase in the availability of child care, medical advances, including the introduction of the contraceptive "pill" and the associated

[3] See the discussions in Guiso, Sapienza and Zingales (2006) and in Fernandez (2007).

decline in fertility, rise in education, wage increase (gender gap decline), decreases in discrimination, and changes in divorce law with rise in divorce rates. Reviews are provided by Costa (2000) and Goldin (1990, 2006).

In the current context Kasir and Yashiv (2009) present some estimates of female as well as male participation equations.

*Cultural Factors.* A more recent approach suggests additional considerations. This approach posits that preferences and motivation for participation are endogenous. For example, the roles for men and women in the labor market are shaped by beliefs or preferences that differ across societies and over time, influencing individual behavior. Hence a growing literature is now exploring the distinct role of cultural elements in explaining female labor force participation.[4]Culture is usually defined in terms of shared knowledge, understanding, and practice. The Oxford dictionary offers this definition: "The distinctive customs, achievements, products, outlook, etc., of a society or group; the way of life of a society or group." Fernandez (2007) suggests thinking of "differences in culture as systematic variations in beliefs and preferences across time, space, or social groups."

In terms of the literature studying the links between culture and economics, Guiso, Sapienza and Zingales (2006) argue that "until recently, economists have been reluctant to rely on culture as a possible determinant of economic phenomena. Much of this reluctance stems from the very notion of culture: it is so broad and the channels through which it can enter economic discourse so ubiquitous (and vague) that it is difficult to design testable, refutable hypotheses. Without testable hypotheses, however, there is no role for culture in economics except perhaps as a selection mechanism among multiple equilibria...In recent years, however, better techniques and more data have made it possible to identify systematic differences in people's preferences and beliefs and to relate them to various measures of cultural legacy. These developments suggest an approach to introducing culturally-based explanations into economics that can be tested and may substantially enrich our understanding of economic phenomena."

Hence while sociologists and other social scientists, as well as philosophers, have written about the relationship between culture and economics for decades, modern neoclassical economics has done little in this context until recently. Work by Botticini and Eckstein (2005, 2007) exemplifies this recent interest in a labor market context. They argue that the transition of Jews away from agriculture into crafts and trade in the eighth and ninth centuries was the outcome of their widespread literacy prompted by religious and educational reform in Judaism in the first and second centuries. This gave them a comparative advantage in urban, skilled occupations. The authors then present supporting empirical evidence.

The emerging strand of literature focusing on cultural factors in female

[4]See Fernandez (2007) for a list of references.

labor market participation has found a significant role for such factors. Thus, Antecol (2000) finds evidence for variation in the gender gap in labor force participation across home country groups in the United States, which cannot be attributed to human capital factors. Over half of the overall variation in the gender gap across home country groups within the United States can be attributed to home country labor force participation rates. This finding suggests the importance of cultural factors, such as tastes regarding family structure and women's role in market versus home work. Fogli and Veldkamp (2007) note that the increase in female labor force participation in the post-war period has mostly come from the entry of married women with young children. Accompanying this change has been a rise in cultural acceptance of maternal employment. They argue that the concurrent rise in maternal participation and its cultural acceptance is well explained by generations of women engaged in learning about the effects of maternal employment on children. They use U.S. General Social Surveys (GSS) data, wage data and participation data to provide support for this mechanism and distinguish it from alternative explanations. Fortin (2009) also uses GSS U.S. data and employs an economic identity theory framework based on Benabou and Tirole (2006). She studies the impact of attitudes as factors modulating the impact of economic fundamentals, such as education and income, on the evolution of female labor force participation in the U.S. The key finding is that beliefs about gender roles are an essential element of the analysis of this evolution over the latter part of the twentieth century. The declining traditional gender role attitudes are the missing gender-specific factors that explain the differences in the time trends in male and female labor force participation, after accounting for the usual factors. Fernandez and Fogli (2009) study second-generation American women. They proxy culture with past female labor force participation and total fertility rates from the country of origin. They find that cultural proxies have positive significant explanatory power for female labor participation rates, even after controlling for various individual characteristics. They also show that the results are unlikely to be explained by unobserved human capital.

*Identity and Economic Outcomes.* An important strand of literature for the purposes of the current paper is the literature on economics and identity. In the model below I apply identity concepts of "modernity" and "tradition" to women, identities which influence economic actions and well-being. Akerlof and Kranton (2000) consider how identity affects economic outcomes, using major themes in psychology and sociology. In their work, a person's sense of self is associated with different social categories and how people in these categories should behave. In a world of social difference, this becomes one of the most important economic decisions that an individual makes. Limits on this choice are critical determinants of economic behavior, opportunity, and well-being. Akerlof and Kranton (2002) further developed this model in a schooling context, whereby a student's primary motivation

is his or her identity and the quality of a school depends on how students fit in the school's social setting. The afore-cited paper of Benabou and Tirole (2006) fits into this strand of literature. It offers a dynamic, optimizing model of identity evolution through investment and self-evaluation. It will be revisited below.

## 2.2 Labor Force Participation Patterns of Israeli Arab Women

Israeli Arabs, numbering 1,486,900 people as of the end of 2008, constitute about 20% of the total population and almost 17% of its working age population. The Arabs are Israeli citizens, who are a minority in terms of religion: while 80% of the country's population are Jews, the Arab minority is made up of 82% Moslem, 10% Christian, and 8% Druze. Though belonging to three different religions, they are classified as Arabs on the basis of their language.

Arab women, which constitute about 49% of this group, have a low, 18%, average participation rate. Over the life cycle, the maximum participation rate, is a little over 30% for women aged 25-29. However there is large variation across individuals and over time.

The low level of participation, coupled with the high cross-sectional and time series variation, makes this a case of interest. This is particularly so if cultural factors are indeed major explanatory factors. Figure 1 shows life-cycle participation rates for Israeli Arab women, for women in some Western economies, and for women in some Moslem economies.

**Figure 1**

The figure implies that Israeli Arab women are akin to women in other Moslem economies, participating significantly less than women in the Western economies. This striking difference makes room for a cultural explanation. This view is strengthened when looking at Moslem immigrants in Europe. Dustmann and Fabbri (2005) report (see Table 2 on page 439) that Pakistani and Bangladeshi women in Britain had LFP rates of 23% and 18%, respectively, according to LFS data.

Table 1 shows Arab female participation rates across a number of groups according to age, education, fertility, marital status, usage of modern technology, religious beliefs, attitudes, and welfare support.

**Table 1**

Participation patterns follow well-known findings for the standard variables, but there is great variance across groups. The table points to the following key findings:

*Age.* This female population is relatively young; with the median age in the age group 35-39 and over 30% below the age of 30. As also shown

in Figure 1, the participation rate follows a hump shape over the life cycle with the highest level being 33% in the age group 25-29.

*Education.* This is a population group with relatively low levels of education; the median group for years of schooling is 9-10. Two facts stand out: (i) there is great variability across education levels – while the low educated (below 11 years) have very low participation rates, the highly educated exhibit much higher participation rates: 39% for 13-15 years of schooling and a "Western level" of 75% for 16+ years of schooling. The middle group (11-12 years of schooling) exhibits the average participation rate; (ii) within the low schooling group there is also remarkable variability: 0% for 0 years, 13% for 1-4 years and 7% for 5-10 years of education.

*Fertility.* Almost 50% of women have 4 children or more; in fact, 17% have 7 children and more. These high-fertility women have low participation rates, declining with fertility. On the other hand, women with no children have a participation rate which is double the average (at 39%) and those with 1 or 2 children have a rate of about 30%.

*Marital status.* The marital status statistics show particularly dramatic variance: while married women, which are the large majority at about three quarters of the population, have a LFP of 17%, single women have a LFP of 40% and divorced women a 63% rate.

*Welfare.* I look at binary variables indicating welfare support. Welfare recipients participate less, but the difference is most striking when welfare is received by the individual woman rather than by the household.

For cultural variables the following picture emerges:

*Use of modern technology.* I look at three variables that show the implementation of modern knowledge: usage of English, usage of personal computers and having a driver's license. As panel f shows, there are striking differences in participation rates across the groups of women who use modern knowledge and those who do not.

*Religious Beliefs.* I look at the three religions of the Arab population – Moslem, Christian and Druze, and at the degree of religiosity. Druze women participate almost twice as much as Moslem women and Christian women even more than that. Across all religions, women who defined themselves as very religious or religious – 70% of women – have a LFP rate of 15%; those who self-define as 'not so religious' participate almost twice as much and those who are not religious at all have a 43% LFP rate.

*Attitudes.* Looking at attitudes to work within the couple and the household, I find that women with more "modern" attitudes – those who think that both the male and the female should work, that both should retire at the same age, and that in a family with small children one or both should work less – participate more, often considerably more, than those holding the complementary attitudes.

To give another sense of these results, consider the following arbitrary exercise using some of the above variables. I construct a dummy variable of a

"modern" woman who has 13 years of schooling or more, is not religious, has 2 children or less, and thinks both husband and wife should work. I get that 7% of women satisfy these criteria and their participation rate is 69%. If I define a "traditional" woman as someone with 10 years of schooling or less, is religious, has 4 or more children, and thinks only one spouse should work, then I get that 7% of women satisfy these criteria and their participation rate is 0%.

The participation rate has also changed substantially over time, climbing from around 8% in 1970 to the current 18% level, as can be seen in Figure 2.

**Figure 2**

Figure 2 indicates that, as in many economies, female participation rates have risen over time. But the figure also shows an increase in the gap between Arab and Jewish women indicating that Arab female LFP has risen relatively more slowly.

# 3 The Model

The two key questions I seek to explore are the following: what is the role of modernity in female labor supply? How is modernity determined and how does it affect other labor market outcomes? I explore these questions using a standard, unitary model, incorporating a latent variable of "modernity" to be estimated using a MIMIC/IRT factor methodology.

The following model is a fairly standard model of labor supply; see, for example, Blundell and Macurdy (2008), whose formulations and notation I follow.

*Maximization problem.* Each period the individual $i$ solves the following maximization problem

$$\max_{l} \underset{++}{U(c_i, l_i, \mathbf{v}_i)} \tag{1}$$

s.t.

$$c_i = y_i + w_i h_i \tag{2}$$

where $c$ is consumption, $l$ is leisure, $w$ are wages, $y$ is non-labor income, and $h$ are hours of work. The vector $\mathbf{v}_i$ represents the individual's characteristics. Its elements affect preferences through observed characteristics and unobserved ones. These include both demographic variables and cultural characteristics. These can vary across individuals. Examples of cultural elements here include views on the role of women in society, in the labor market, and in the household, preferences regarding leisure and work effort given these perceptions, views on marriage and the role of the husband in

family income, and religious convictions on these and related matters (for example, contact with men at the place of work). They define the degree of the woman's "modernity."

The F.O.C. are given by:

$$U_c(c_i, l_i, v_i) = \lambda_i; \quad U_l(c_i, l_i, v_i) \geq \lambda_i w_i \tag{3}$$

where $\lambda$, the Lagrange multiplier, is the marginal utility of income. If the inequality in (3) holds strictly, the individual does not work. Hence one can define a reservation wage $w_i^R$ by the equation $U_l(c_i, l_i, v_i) = \lambda_i w_i^R$.

*Optimal hours.* Based on the F.O.C optimal hours can be derived. Define the following functions:

$$\begin{aligned} h_i^* &= h_1(w_i, y_i, \mathbf{v}_i) && (4) \\ h_i^0 &= h_2(w_i^R, y_i, \mathbf{v}_i) && (5) \end{aligned}$$

The individual supplies $h_i^*$ hours of work; the threshold number of hours is defined by the reservation wage.

The functions $h_1$ and $h_2$ are derived from the specification of the utility function $U$. For a listing of some popular functions see Blundell, Macurdy and Meghir (2007, in particular pp. 4672-4676).

*Empirical specification.* I shall adopt the following semi-log empirical specification. This formulation is particular amenable for analysis of unobserved "modernity" factors:

$$\begin{aligned} h_i^* &= \delta_0 + \mathbf{z}_{1i}\boldsymbol{\delta}_1 + \ln w_i \delta_2 + \ln y_i \delta_3 + \zeta_i \\ h_i^0 &= \gamma_0 + \mathbf{z}_{1i}\boldsymbol{\gamma}_1 + \ln w_i \gamma_2 + \ln y_i \gamma_3 + \xi_i \end{aligned} \tag{6}$$

The vector of characteristics $\mathbf{v}_i$ is captured by the constant terms $\delta_0$ and $\gamma_0$, the $\mathbf{z}_{1i}$ vector of observed characteristics, and the unobserved heterogeneity terms $\zeta_i$ and $\xi_i$.The $\delta s$ and $\gamma s$ are parameters. For what follows I shall make the following distinction:

$$\mathbf{z}_{1i} = [\mathbf{z}_{1i}^D, \mathbf{z}_{1i}^C] \tag{7}$$

where the $\mathbf{z}_{1i}^D$ vector includes education and demographic variables and the $\mathbf{z}_{1i}^C$ vector includes cultural variables.

Participation $p_i$ is therefore given by:

$$\begin{aligned} p_i &= 1\{h_i^* > h_i^0\} && (8) \\ &= 1\{\delta_0 + \mathbf{z}_{1i}\boldsymbol{\delta}_1 + \ln w_i \delta_2 + \ln y_i \delta_3 + \zeta_i > \gamma_0 + \mathbf{z}_{1i}\boldsymbol{\gamma}_1 + \ln w_i \gamma_2 + \ln y_i \gamma_3 + \xi_i\} \end{aligned}$$

where $1\{\cdot\}$ is a binary indicator.

Assuming wages are given by:

$$\ln w_i = \theta_0 + \mathbf{z}_{1i}\boldsymbol{\theta}_1 + \mathbf{z}_{2i}\boldsymbol{\theta}_2 + \omega_i \tag{9}$$

where $\mathbf{z}_{2i}$ are variables that determine wages beyond $\mathbf{z}_{1i}, \theta_0$ is a parameter, $\boldsymbol{\theta}_1, \boldsymbol{\theta}_2$ are parameter vectors, and $\omega_i$ captures unobserved heterogeneity.

Other income is given by:

$$\ln y_i = \mathbf{\Pi}(\mathbf{z}_i) + x_i \tag{10}$$

where

$$\mathbf{z}_i = [\mathbf{z}_{1i}, \mathbf{z}_{2i}, \mathbf{z}_{3i}]$$

and $\mathbf{z}_{3i}$ are variables that affect other income but not wages or the individual characteristics, for example benefit income (if the latter indeed does not affect wages). $x_i$ captures unobserved heterogeneity.

Combining (8) with (9) and (10), participation is given by

$$p_i = 1\{\beta_0 + \mathbf{z}_{1i}\boldsymbol{\beta}_1 + \mathbf{z}_{2i}\boldsymbol{\beta}_2 + \mathbf{z}_{3i}\boldsymbol{\beta}_3 + u_i > 0\} \tag{11}$$

where $\beta_0$ is a parameter, $\boldsymbol{\beta}_1, \boldsymbol{\beta}_2$and $\boldsymbol{\beta}_3$ are parameter vectors and $u_i$ captures unobserved heterogeneity.

Different techniques may be used to estimate (11) by running the probability of participation on a constant and on the $\mathbf{z}$ vectors as regressors in a cross-section of individuals.

*A latent factor model of modernity.* One issue to deal with is the specification of the variables in $\mathbf{z}_{1i}^C$ i.e., the cultural variables. I undertake two explorations: in one, I estimate (11). In the other, I use a factor model to estimate the distribution of a latent factor that I call "modernity," to be denoted $m_i^*$. This is intended to capture a cultural identity. Appendix A shows how the model used here fits in the literature on factor models.

For the latter exploration, the basic structure to be estimated is as follows. Suppose there are $k$ variables $\chi$ causing the latent variable $m_i^*$ i.e.:

$$m_i^* = \alpha_1\chi_{1i} + .... + \alpha_k\chi_{ki} + \varsigma_i \tag{12}$$

where the $\alpha$s are parameters and $\varsigma_i$ are unobserved causes.

I then postulate a measurement equation, with the following structure:

(i) There are latent continuous responses $\mathbf{y}^*$to $m_i^*$ given by:

$$\mathbf{y}_i^* = \boldsymbol{\upsilon}_i + \mathbf{\Lambda}m_i^* + \boldsymbol{\epsilon}_i \tag{13}$$

I assume

$$\boldsymbol{\epsilon}_i \ \sim \ N(0, \sum)$$

(ii) Each observed measurement $j$ is related to a latent continuous response in the vector $\mathbf{y}_i^*$ as follows:

$$m_{ij} = \begin{cases} 0 & \text{if} \quad -\infty < y^*_{ij} < \kappa_{1i} \\ 1 & \text{if} \quad \kappa_{1i} < y^*_{ij} < \kappa_{2i} \\ . & . \qquad . \\ . & . \qquad . \\ . & . \qquad . \\ \text{S} & \text{if} \quad \kappa_{Si} < y^*_{ij} < \infty \end{cases} \tag{14}$$

where $j = 1...n$, $\mathbf{y}^*_i = (\mathbf{y}^*_{1i}, ..., \mathbf{y}^*_{ni})$, the factor loadings are $\mathbf{\Lambda} = (\mathbf{\Lambda}_1, ..., \mathbf{\Lambda}_n)$ and the diagonal elements of $\sum$ are the measurement error variance.

I assume the following for the errors variance-co-variance structure:

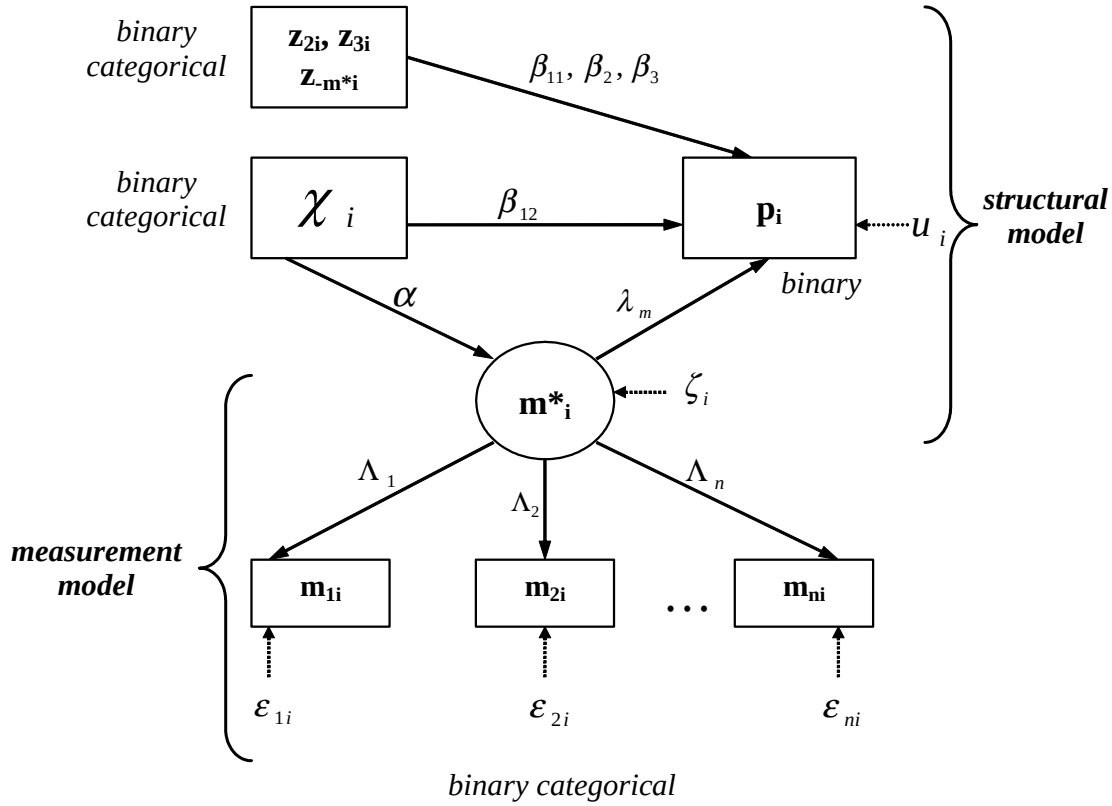
$$\begin{aligned} E(\varsigma_i, \boldsymbol{\epsilon}'_i) &= 0;\ E(\varsigma^2_i) = \sigma^2;\ E(\boldsymbol{\epsilon}_i, \boldsymbol{\epsilon}'_i) = \mathbf{\Theta}^2 \\ \mathbf{\Theta}^2 &= (\theta^2_1, ...., \theta^2_n) \end{aligned} \tag{15}$$

where $\mathbf{\Theta}^2$ is a diagonal matrix with the vector of variances on its diagonal.

Hence participation is given by:

$$\text{probit}(p_i) = [\beta_0 + \mathbf{z}_{-m^*i}\boldsymbol{\beta}_{11} + \mathbf{z}_{2i}\boldsymbol{\beta}_2 + \mathbf{z}_{3i}\boldsymbol{\beta}_3] + (\boldsymbol{\beta}_{12} + \boldsymbol{\alpha}'\lambda_m)\boldsymbol{\chi}_i + \varsigma_i\lambda_m + u_i \tag{16}$$

The effects of observed variables unrelated to modernity on participation is captured by $[\beta_0 + \mathbf{z}_{-m^*i}\boldsymbol{\beta}_{11} + \mathbf{z}_{2i}\boldsymbol{\beta}_2 + \mathbf{z}_{3i}\boldsymbol{\beta}_3]$. The effects of the vector $\boldsymbol{\chi}_i$ of observed variables on participation are $\boldsymbol{\beta}_{12}$ directly, and $\boldsymbol{\alpha}'\lambda_m$ indirectly via the modernity latent variable. Finally the error term $\varsigma_i$ has an effect $\varsigma_i\lambda_m$. The following figure illustrates the model:




# 4 The Data

I use data on Arab women in the Israeli labor market from two main sources:

a. **The 2005 Social Survey.** The Israeli Central Bureau of Statistics has conducted this survey since 2002. It is made up of a regular core of 100 questions about health, living conditions, employment, and economic status, and a special section, that each year examines a different topic. In 2005 the topic was labor force participation. This section contains information on labor market status, income, education, demographics, religion, family ties, use of technology, attitudes to the family and to the labor market, and more. The sample included 7,647 people representing about 4.3 million people aged 20 and above.

b. **The 2005 Labor Force Survey.** The Israeli Central Bureau of Statistics, conducting this survey since 1954, uses four rotating panels per quarter, so that each year contains nine different panels from three sampling years, seven of which are investigated twice. Each panel samples about 2,700 households, so in a quarter 10,800 interviews of households are conducted. It provides individual information on work hours, part-time work, absence from

work, place of work, geographical mobility, industry and occupation, status at work, search for work, mode and length of time of search, and reasons for unemployment. Apart from labor market status, demographic information is also collected: age, sex, marital status, country of birth, length of time in Israel, number of years of schooling, and type of last school attended. Household information includes the size of the household, the number of rooms, and the number of children. I use the 2005 LFS for consistency with the Social Survey data.

Table 2 lists the variables used in estimation, using the notation of the model presented above.

**Table 2**

# 5 Results

I estimate the model described by equation (11) by running a Probit regression and the model described by equation (16) by running a factor model with structural and measurement models. Appendices A and B elaborate on the methodology of the latter.

## 5.1 Probit Model

Results of the Probit analysis of equation (11) are reported in Tables 3 – 6. Table 3 reports regressors using just the cultural ($\mathbf{z}_{1i}^{C}$ type) variables – religion, degree of religious belief, usage of modern technology, and attitudes towards work, with the 2005 Social Survey data. Table 4 has regressions including only non-cultural variables – age, education, marital status, number of children, city or village size, number of additional earners in the household, and satisfaction with transportation. Table 5 does likewise but this time using 2005 Labor Force Survey data. Table 6 looks at a combined regression of both types of variables, once more using the Social Survey data. It has two panels – a full regression and a parsimonious specification.

**Tables 3 – 6**

Table 3 indicates that on the religion dimension the only variable with a significant (positive) coefficient is being of the Druze religion. Being Christian or the level of religiosity (in any religion) are not significant. Variables indicating the use of modern technology – using a PC, having a driver's license, and being knowledgeable in English – have a positive and highly significant effect. Modern attitudes to work also have a positive and significant effect: thinking that it important that both men and women should work, that both should retire at the same age, and that in a family with small children both should still be working. When I added other responses

on attitudes – stating views on the motivation for work or whether there should be a mandatory retirement age – the additional variables were not significant. Note that the goodness of fit statistics for this regression are relatively high, even though no typical variable for such regressions (like education or age) is included in this table.

Table 4 reports the results using the "standard" variables ($\mathbf{z}_{1i}^{D}$ , $\mathbf{z}_{12i}$ and $\mathbf{z}_{13i}$). The results of this table have better goodness of fit statistics than those of Table 3, but only marginally so, and are in line with what is typically found in the literature. The variables which have a significant positive effect on participation are education, being divorced or single, and having one more person in the household working. The latter reflects a complementarity effect, which makes the collective labor supply model a pertinent endeavor. Variables which have a significant negative effect on participation are young age (20-24), having more children, and being unsatisfied with the means of transport. The latter variable may reflect accessibility problems (going to work), such as lack of adequate public transportation. When I include the binary indicator of 'receiving welfare' it is also significant and negative; as it may be simultaneously determined with participation, I have dropped it from Table 4. The indicator variable 'other household members get welfare' is not significant. The size of the city of residence has a significant effect in two cases.

To gauge the effect of potential simultaneity in education and labor force participation, I re-ran Tables 3 and 4 only with individuals who have terminated their studies before the survey (or have never studied). Tables A-1 and A-2 report the results for this sub-sample. Table A-1 almost replicates the results of Table 3. Table A-2 has the following differences with Table 4: now two more age coefficients are significant, the positive coefficients on the high schooling groups (13-15 and 16+), on divorced and single, and on other providers become stronger, the negative coefficients on number of children weaken, and the one significant coefficient on dissatisfaction with transportation strengthens in absolute value. There is no substantial difference between these runs and Tables 3 and 4.

Table 5 repeats the runs of Table 4 with LFS data, where the sample size is considerably bigger. The results are similar but the standard errors of the coefficients are lower, so many more are significant. Hence there emerges a clear hump shape for the age groups and there are more significant coefficients for the size of the city of residence. It emerges that living in bigger or more modern cities (Tel Aviv, Haifa and other big cities) has a positive effect on participation, living in smaller or more traditional cities (Jerusalem) has a negative effect.

Table 6 combines all types of variables. The inclusion of many variables turns insignificant some of the coefficients (that were significant previously). This may indicate co-linearity between the cultural variables and the other variables. Hence I use a parsimonious specification in panel b of the table.

The results are in line with the preceding tables.

The picture which emerges across all tables is the following: education and age have the regular effects; there are many indications that modernity plays a role, both in terms of standard variables and in terms of cultural variables. For the former set of variables, when a woman has less children or is not married and when she lives in a bigger or more modern city, she is more likely to participate. For the latter set of variables, usage of modern technology and modern attitudes to work increase the probability of participation. However, the degree of religious beliefs does not seem to play a role.

### 5.2 Latent Factor Analysis

Results of the latent factor analysis of equation (16) are reported in Table 7. I report four specifications: in the first, there are no causes for modernity (just indicators) and the explanatory variables for participation, apart from the latent modernity, are those of Tables 4 and 5, i.e., the standard variables. In the second specification (column 2) I include religion and the degree of religion as causal variables for modernity with the same Probit regression for participation. In column 3 I add education to the causes of modernity (and have the same Probit regression for participation). In column 4 I re-run column 3, allowing religion and the degree of religiosity to affect participation directly, in addition to the latent modernity effect. Across all specifications, the indicators for modernity are English proficiency, using the PC, having a driver's license, and having modern attitudes to work (thinking that it important that both men and women should work and that both should retire at the same age). I report the relevant coefficients and their standard errors, as well as the estimates for the variance of the residuals of the latent variable equation. The first panel reports the indicators, the second panel reports the causal variables for modernity, and the subsequent panels report the results of the Probit equation, including the effect of the latent modernity and its variance.

**Table 7**

The following conclusions emerge:

(i) The latent modernity variable has a positive effect on participation. It is significant in columns (1) and (2) and turns insignificant in columns (3) and (4), when education is included as a causal variable for modernity.

(ii) The indicators are significant and with the correct sign, except for one attitude which is insignificant.

(iii) Being Christian has a positive effect on modernity and an insignificant direct effect on participation. Being Druze has a negative effect on modernity (though in column 2 it is insignificant) and an insignificant direct effect on participation.

(iv) The degree of religiosity has a significant effect on modernity in one of three specifications , i.e., being more religious has a negative effect. It has an insignificant direct effect on participation.

(v) Higher levels of education have positive, very significant effects on modernity and directly on participation.

(vi) In the Probit participation regressions, age effects and satisfaction with transportation are mostly insignificant, children effects are negative, additional earners and being divorced are positive and significant and there is a significant effect of place of residence. Most of these results are consistent with the results of Tables 4-6.

The implications of these results are that I are able to characterize a latent modernity variable, which has a positive effect on participation. There are two reservations, however: it is not clear to what extent there is an effect of religion on this latent variable; inclusion of education as a variable causing modernity renders its effects insignificant, raising the question of how to differentiate between educational levels and modernity.

# 6 Conclusions

The results point to a significant role played by cultural factors in female labor market participation for Israeli Arab data. In particular, the descriptive analysis, the standard Probit model, and the latent factor model (with modernity as a latent factor) all indicate that a woman who is more modern participates more. Modernity is defined by usage of modern technology, modern views on the roles of men and women in the labor market, life in a modern city, and by status in terms of marriage and number of children. These cultural elements explain participation almost as well as the traditional variables of age, education and demographics.

# 7 Appendix A: Latent Variables Modelling and Identification

In this appendix, I relate the model presented in Section 3.1.1 to well-known latent variables models. Skrondal and Rabe-Hesketh (2007) provide an overview and survey of these models and in what follows I draw upon their exposition. Subsequently I discuss identification issues of that model and of the model of Section 3.2.

*Latent Variable Modelling*

The model in question here fits in the category of models called Item–Response Theory (IRT). This is a case where a latent continuous variable or 'latent trait' $\theta_i$ is measured with error by a set of categorical variables usually called items. The canonical example is from educational testing where the items are exam questions, $y_{ij}$ is '1' if examinee $i$ answered item $j$ correctly and '0' otherwise, and $\theta_i$ represents the ability of the examinee. In this paper the latent variable is "modernity" $m_i^*$ and the "items" are the $\mathbf{m}_i$ variables.

A two-parameter Probit IRT model implemented for the current question would be formulated as follows:

$$\Pr(m_{ij} = 1 \mid m_i^*) = \Phi(a_j(m_i^* - b_j))$$

where $i$ is the individual, $j$ is the index of the $j$-th variable in $\mathbf{m}_i$, $a_j$ and $b_j$ are parameters and $\Phi$ is the cumulative standard normal distribution function.

This formulation can also be written as a traditional common factor model:

$$\begin{aligned} y_{ij}^* &= \beta_j + \lambda_j m_i^* + \epsilon_{ij} \\ m_i^* &\sim N(0, \psi) \\ \epsilon_{ij} &\sim N(0, 1) \\ cov(m_i^*, \epsilon_{ij}) &= 0 \\ \lambda_1 &= 1 \end{aligned}$$

and

$$m_{ij} = \begin{cases} 1 & \text{if} \quad y_{ij}^* > 0 \\ 0 & \text{if} \quad \text{otherwise} \end{cases}$$

When $m_{ij} = 1$ this implies:

$$\Pr(m_{ij} = 1 \mid m_i^*) = \Phi(\beta_j + \lambda_j m_i^*) = \Phi(a_j(m_i^* - b_j))$$

and the models are equivalent when $a_j = \lambda_j$ and $b_j = -\beta_j/\lambda_j$.

Typically these models are identified by restrictions placed on the factor loadings ($\lambda_j$, in the above example setting $\lambda_1 = 1$) and on the variance-covariance matrices of the error terms (in the above example $\sigma^2_\epsilon = 1$).

These formulations can also be cast in terms of MIMIC models,[5] adding exogenous variables $\boldsymbol{\chi}_i$ causing the latent variable $m^*_i$ and in terms of the more general LISREL models defined by a response model and a structural model. Substituting the structural model into the response model, one gets a reduced form model (which is nonlinear in the parameters). The structural model here is given by equation (16) in Section 3 while the response model is given by equations (13) and (14) in the same section.

*Identification of the Model*

The identification of the model involves the following:

a. The mean of the modernity latent variable $m^*$ is set at zero.

b. The loading factor of the first indicator is set at 1 (i.e. $\Lambda_1 = 1$).

c. Co-variances among the indicators of the latent are variable $m^*$ are set at zero i.e., $E(\boldsymbol{\epsilon}_i, \boldsymbol{\epsilon}_j) = 0$ for $i \neq j$.

# 8 Appendix B: The Estimation Methodology

The maximum likelihood technique used to estimate this system is one based on Gaussian quadrature. In this model maximum likelihood estimation cannot be based on sufficient statistics such as the empirical covariance matrix (and possibly mean vector) of the observed indicators. Instead, the likelihood must be obtained by 'integrating out' the latent variable. This is achieved through a numerical procedure designed to approximate integrals in the likelihood function that have no analytical solution**.** It seeks to obtain the best numerical estimate of the integral by picking optimal abscissas at which to evaluate the function. The fundamental theorem of Gaussian quadrature states that the optimal abscissas of the $m$-point Gaussian quadrature formulas are precisely the roots of the orthogonal polynomial for the same interval and weighting function.[6] Gaussian quadrature is optimal because it fits all polynomials up to degree $m - 1$ exactly. Here more specifically, a Gaussian Hermite quadrature is used. This is a Gaussian quadrature over the interval $(-\infty, \infty)$ with weighting function $w(x) = e^{-x^2}$.

[5] The MIMIC model was suggested by Joreskog and Goldberger (1975).

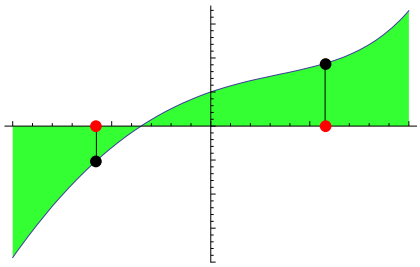
[6] Orthogonal polynomials are classes of polynomials $[p_n(x)]$ defined over a range $[a, b]$ that obey an orthogonality relation

$$\int_a^b w(x)p_m(x)p_n(x)dx = \delta_{mn}c_n$$

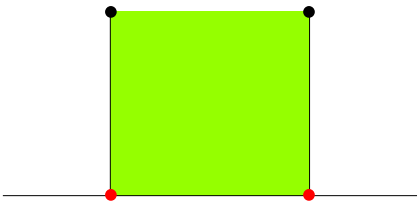
where $w(x)$ is a weighting function and $\delta_{mn}$ is the Kronecker delta. In the Gausssian quadrature case $c_n = n^{0.5}2^n n!$

The abscissas for quadrature order are given by the roots of the Hermite polynomials[7], which occur symmetrically about 0. As an example, the integral $\int_{-2}^{2} (e^x - x^2)dx$ is approximated by $\sum_{i=1}^{m} (e^{x_i} - x_i^2)w_i$. The $x_i$ are determined by the roots of the Hermite polynomials with weighting function $w(x) = e^{-x^2}$. The true value of the integral is 1.920. With an approximation using $m = 2$ one obtains 1.643, while with $m = 4$ one obtains 1.920. The following graphs illustrate, with the green, shaded areas denoting the integral.

With $m = 2$ the $x_i$ are given by the points:



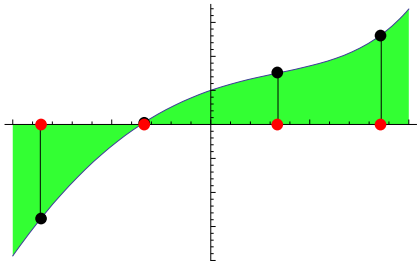
the weights $w_i$ are given by:



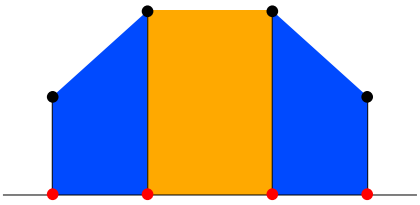
with $m = 4$ the $x_i$ are given by the points

[7] The Hermite polynomials $H_n(x)$ are a set of orthogonal polynomials over the domain $(-\infty, \infty)$ with weighting function, $w(x) = e^{-x^2}$. Examples are:

$$\begin{aligned} H_0(x) &= 1 \\ H_1(x) &= 2x \\ H_2(x) &= 4x^2 - 2 \\ H_3(x) &= 8x^3 - 12x \end{aligned}$$



the weights $w_i$ are given by:



Estimation of the above model was carried out using the MPlus Version 5 code. For details of the estimation technique and the set-up of the code, see Muthen and Muthen (2007).

## References


[1] Akerlof, George A., and Rachel E. Kranton, 2000. "Economics and Identity," **Quarterly Journal of Economics** 115, 3, 716-753.

[2] Akerlof, George A., and Rachel E. Kranton, 2002."Identity and Schooling: Some Lessons for the Economics of Education," **Journal of Economic Literature** 40,4, 1167-1201.

[3] Antecol, Heather, 2000. "An Examination of Cross-Country Differences in the Gender Gap in Labor Force Participation Rates" **Labour Economics,** 7, 409–426.

[4] Attanasio, Orazio, Hamish Low, and Virginia Sánchez-Marcos, 2008. "Explaining Changes in Female Labor Supply in a Life-Cycle Model," **American Economic Review** 98,4, 1517–1552.

[5] Blundell, Richard W. and Thomas, Macurdy, 1999, "Labor Supply: A Review of Alternative Approaches" Chapter 27 in O.Ashenfelter and D. Card (eds). **Handbook of Labor Economics,** 3A, 1560–1695, North Holland.

[6] Blundell, Richard W. and Thomas MaCurdy, 2008. "Labour Supply" in S.N. Durlauf and L.E. Blume. (eds.) **The New Palgrave Dictionary of Economics. Second Edition,** Palgrave Macmillan.

[7] Blundell, Richard W., Thomas Macurdy, and Costas Meghir, 2007. "Labor Supply Models: Unobserved Heterogeneity, Non Participation and Dynamics," Chapter 69 in J. Heckman and E. Leamer (eds.) **Handbook of Econometrics**, 6A, 4667-4775, North-Holland.

[8] Botticini, Maristella and Zvi Eckstein, 2005. "Jewish Occupational Selection: Education, Restrictions, or Minorities?" **Journal of Economic History** 65, 922–48.

[9] Botticini, Maristella and Zvi Eckstein, 2007. "From Farmers to Merchants, Conversions and Diaspora: Human Capital and Jewish History," **Journal of the European Economic Association** 5, 5, 885-926.

[10] Costa, Dora L., 2000. "From Mill Town to Board Room: The Rise of Women's Paid Labor," **Journal of Economic Perspectives** 14,4,101-122.

[11] Dustmann, Christian and Franceasca Fabbri, 2005. "Immigrants in the British Labour Market," **Fiscal Studies** 26,4, 423–470.

[12] Eckstein, Zvi and Osnat Lifshitz, 2009. "Dynamic Female Labor Supply," The Walras-Bowely Lecture, The Econometric Society North America Summer Meetings, Pittsburgh, U.S., **Econometrica** forthcoming.

[13] Fernandez, Raquel, 2007. "Women, Work and Culture," **Journal of the European Economic Association** 5(2–3),305–332.

[14] Fernandez, Raquel, and Alessandra Fogli, 2009. "Culture: An Empirical Investigation of Beliefs, Work, and Fertility." **American Economic Journal: Macroeconomics** 1(1): 146–77.

[15] Fogli, Alessandra and Laura Veldkamp, 2007. "Nature or Nurture? Learning and Female Labor Force Dynamics," Leonard N. Stern Economics Working Paper

[16] Fortin, Nicole M., 2009. "Gender Role Attitudes and Women's Labor Market Participation: Opting-Out, AIDS, and the Persistent Appeal of Housewifery," working paper, available at http://www.econ.ubc.ca/nfortin/Fortin_Gender.pdf

[17] Goldin, Claudia, 1990. **Understanding the Gender Gap: An Economic History of American Women**, New York: Oxford University Press.

[18] Goldin, Claudia, 2006. "The Quiet Revolution That Transformed Women's Employment, Education, and Family," Richard T. Ely Lecture, **AEA Papers and Proceedings**, 96,2,1-21

[19] Guiso, Luigi, Paola Sapienza and Luigi Zingales, 2006. "Does Culture Affect Economic Outcomes?" **Journal of Economic Perspectives**, 20, 2, 23–48.

[20] Heckman, James J., 2000. "Microdata, Heterogeneity and the Evaluation of Public Policy," Nobel Prize Lecture, **Journal of Political Economy** 109, 4, 673-748.

[21] Joreskog, K.G. and Arthur S. Goldberger, 1975. "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable," **Journal of the American Statistical Association** 70, 631-639.

[22] Kasir, Nitsa and Eran Yashiv, 2009. Patterns of Labour Force Participation of Israeli Arabs, Bank of Israel Discussion Paper no. 2009.11

[23] Killingsworth, M.R. and James J. Heckman, 1986. "Female Labor Supply: a Survey" in Orley Ashenfelter and Richard Layard (eds.) **Handbook of Labor Economics,** vol. 1, North-Holland, Amsterdam.

[24] Krueger, Alan B. and Jitka Maleckova, 2003. "Education, Poverty, and Terrorism: Is There a Causal Connection?" **Journal of Economic Perspectives** 17, 4, 119-44.

[25] Muthen, Linda K. and Bengt O. Muthen, 2007. **Mplus User's Guide**, Muthen and Muthen, Los Angeles.

[26] Skrondal, A. and Rabe-Hesketh, S, 2007. "Latent Variable Modelling: A Survey," **Scandinavian Journal of Statistics** 34, 712-745.

**Table 1**
**Sample LFP Rates**

**a. Age**

| age | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| 20-24 | 23 | 17 |
| 25-29 | 33 | 14 |
| 30-34 | 20 | 16 |
| 35-39 | 24 | 12 |
| 40-44 | 22 | 10 |
| 45-49 | 21 | 7 |
| 50-54 | 13 | 7 |
| 55-59 | 7 | 5 |
| 60-64 | 3 | 3 |
| 65-74 | 1 | 6 |
| 75+ | 0 | 2 |

**b. Education**

| years of schooling | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| 0 | 0 | 11 |
| 1–4 | 13 | 4 |
| 5–8 | 7 | 24 |
| 9–10 | 7 | 17 |
| 11–12 | 20 | 21 |
| 13–15 | 39 | 15 |
| 16+ | 75 | 8 |

**c. Fertility**

| number of children | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| 0 | 39 | 21 |
| 1 | 31 | 7 |
| 2 | 30 | 10 |
| 3 | 21 | 15 |
| 4 | 11 | 13 |
| 5 | 9 | 11 |
| 6 | 8 | 6 |
| 7 and more | 2 | 17 |

**d. Marital Status**

| marital status | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| married | 17 | 76 |
| separated | 0 | 0.6 |
| divorced | 63 | 1 |
| widowed | 4 | 7 |
| single | 40 | 16 |

**e. Welfare Support**

| welfare | participation rate (%) | share in Arab female pop. (%) |
|---|---|---|
| receives benefits | 5 | 23 |
| does not receive | 24 | 77 |
| | | |
| receives child support | 18 | 70 |
| does not receive | 23 | 30 |
| | | |
| others in houshold receive benefits | 18 | 35 |
| do not receive | 21 | 65 |

**f. Use of Modern Technology**

| modern knowledge | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| English | 31 | 50 |
| No English | 9 | 50 |
| | | |
| PC usage | 45 | 24 |
| No PC usage | 12 | 76 |
| | | |
| driver's license | 49 | 26 |
| no driver's license | 9 | 74 |

**g. Religious Beliefs**

| religion | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| Moslem | 16 | 82 |
| Christian | 41 | 9 |
| Druze | 29 | 9 |
| | | |
| very religious | 15 | 11 |
| religious | 15 | 59 |
| not so religious | 26 | 20 |
| not religious | 43 | 10 |

**h. Attitudes**

| attitude | participation rate (%) | share in Arab female population (%) |
|---|---|---|
| husband and wife – | | |
| both should work | 24 | 78 |
| only one should work | 7 | 22 |
| | | |
| same retirement age | 26 | 21 |
| not same age | 18 | 79 |
| | | |
| in a family w.small children: | | |
| one should not work | 10 | 55 |
| one should work less | 41 | 24 |
| both should work less | 44 | 2 |
| both should work normally | 21 | 19 |

**Notes:**
Data are from the 2005 Social Survey.

**Table 2**
**Variables Used in Estimation**

**Explanatory Variables I**

| symbol | variable | Social Survey name | type |
|---|---|---|---|
| $\mathbf{z}_{2i}$ | size of city of residence | zurat_yishuv | categorical |
| | satisfaction with transportation | tachburamrtz | categorical |
| $\mathbf{z}_{3i}$ | other providers (no.) | earners | categorical |
| | number of people in household | ms_nefashot | categorical |
| | | | |
| | child benefits recipient | kitzvatyealdim | binary |
| | welfare recipient | mekabelkitzva | binary |
| | other household member gets welfare | kitzvamb | binary |

**Explanataory Variables II** $z_{1i}^{D}$

| symbol | variable | Social Survey name | type |
|---|---|---|---|
| $\mathbf{z}_{-m^*i}$ | health status | matzavbriut | categorical |
| | | | |
| $\boldsymbol{\chi}_i$ | religion | dat | categorical |
| | religiosity | datiyutloyehudi | categorical |
| | education | shnotlimud | categorical |
| | age | gil | categorical |

**Indicators $z_{1i}^C$**

| **symbol** | **variable** | **Social Survey name** | **type** |
|---|---|---|---|
| $\mathbf{m}_i$ | has knowledge of English | anglit | binary |
| | uses a PC | machshev | binary |
| | has driver's license | RisahyonNehiga | binary |
| | | | |
| | both should work | bneayzugovdim | binary |
| | in a family with small children | | |
| | who should work | HoreMetapelYeladim | categorical |
| | same retirement age | gilzehe | binary |
| | for men and women | | |
| | | | |
| | marital status | matzavmishp | categorical |
| | number of children | mispyeladim | continuous |

**Table 3: Probit Regression**
**Dependent Variable: Participation, Israeli Arab Female**
**Cultural regressors only**

| | |
|---|---|
| *Religion (Moslem)* | |
| Christian | -0.11 |
| | (0.23) |
| Druze | 0.50* |
| | (0.24) |
| *Degree of Religious Belief (not religious)* | |
| Very Religious | -0.31 |
| | (0.30) |
| Religious | -0.34 |
| | (0.24) |
| Not So Religious | -0.06 |
| | (0.26) |
| *Proficient in English* | 0.54* |
| | (0.16) |
| *Has a Driver's License* | 0.93* |
| | (0.15) |
| *Uses the Computer* | 0.44* |
| | (0.16) |
| *Attitudes* | |
| same retirement age for men and women | 0.27 |
| | (0.16) |
| both should work | 0.36* |
| | (0.20) |
| in a family with small children | |
| one parent should work less | 0.68* |
| | (0.17) |
| both parents should work less | 0.96* |
| | (0.42) |
| both should work normally | 0.40* |
| | (0.18) |
| *constant* | -1.78* |
| | (0.31) |

Goodness of Fit

| | |
|---|---|
| n | 522 |
| LR $\chi^2$ | 200 |
| p value | 0.00 |
| pseudo $R^2$ | 0.31 |
| area under ROC curve | 0.85 |
| correctly classified | 81% |
| sensitivity | 64% |
| specificity | 89% |

**Notes:**

1. For regressors in groups, omitted groups are indicated in parantheses.

2. For binary variables the omitted group is the complement of the included group.

3. Standard errors are given in parantheses below the point estimates. Starred coefficients are significant at 10%.

4. All data are taken from Social Survey 2005.

5. Denote $L_0$ and $L$ the constant-only and full model log-likelihoods, respectively. LR is the likelihood-ratio $\chi^2$ testfor the null hypothesis that the model is constant only; pseudo $R^2$ is given by $1 - \frac{\ln L}{\ln L_0}$.

6. Sensitivity is the percentage reported as participating in the labor force when the person actually participates; specificity is the percentage reported as not participating in the labor force when the person actually does not participate. The prediction uses a cutoff of 0.5. The ROC curve plots the fraction of $p = 1$ values correctly classified (sensitivity) against the fraction of $p = 0 =$ incorrectly classified (1-specificity) as the cutoff varies. The more area under the curve, the better the predictive power of the model.

**Table 4: Probit Regression**
**Dependent Variable: Participation, Israeli Arab Female**
**Standard regressors only**

| | | | |
|---|---|---|---|
| *Age group (35-39)* | | *Education (11-12)* | |
| 20-24 | -0.89* | 0-8 | -1.29* |
| | (0.29) | | (0.26) |
| 25-29 | -0.14 | 9-10 | -0.99* |
| | (0.29) | | (0.27) |
| 30-34 | -0.46 | 13-15 | 0.41* |
| | (0.28) | | (0.20) |
| 40-44 | 0.21 | 16+ | 1.47* |
| | (0.32) | | (0.29) |
| 45-49 | 0.32 | | |
| | (0.34) | *constant* | -0.02 |
| 50-54 | 0.51 | | (0.53) |
| | (0.40) | | |
| 55-59 | 0.13 | | |
| | (0.46) | | |
| 60-64 | -1.35 | | |
| | (0.90) | | |
| 65-74 | -0.16 | | |
| | (0.68) | | |

| | | | |
|---|---|---|---|
| *Marital Status (married)* | | *City of Residence Size (50-100K)* | |
| Divorced | 1.25* | Jerusalem | -0.63* |
| | (0.61) | | (0.36) |
| Widowed | 0.11 | Haifa | 1.03* |
| | (0.42) | | (0.58) |
| Single | 0.61* | Tel Aviv | -0.38 |
| | (0.35) | | (0.64) |
| *No of children (0)* | | 2-50 K | 0.11 |
| 1 | -0.15 | | (0.28) |
| | (0.38) | village | 0.02 |
| 2 | -0.26 | | (0.44) |
| | (0.35) | | |
| 3 | -0.68* | *Satisfaction with Transportation* | |
| | (0.36) | *(no use of trans.)* | |
| 4 | -0.93* | very satisfied | 0.11 |
| | (0.38) | | (0.35) |
| 5 | -1.00* | satisfied | 0.14 |
| | (0.40) | | (0.28) |
| 6 | -1.02* | not so satisified | -0.57* |
| | (0.48) | | (0.33) |
| 7+ | -1.14* | not at all satisified | 0.17 |
| | (0.46) | | (0.29) |
| *Addiitonal earners (0)* | | | |
| 1 | 0.41* | | |
| | (0.21) | | |
| 2+ | 0.14 | | |
| | (0.26) | | |

Goodness of Fit

| | |
|---|---|
| n | 509 |
| LR $\chi^2$ | 267 |
| p value | 0.00 |
| pseudo $R^2$ | 0.42 |
| area under ROC curve | 0.90 |
| correctly classified | 84% |
| sensitivity | 67% |
| specificity | 91% |

**Notes:** see Table 3.

**Table 5: Probit Regression**
**Dependent Variable: Participation, Israeli Arab Female**
**Standard regressors only, LFS data**

| | | | |
|---|---|---|---|
| *Age group (35-39)* | | *Education (11-12)* | |
| 20-24 | -1.10* | 0-8 | -0.77* |
| | (0.08) | | (0.06) |
| 25-29 | -0.38* | 9-10 | -0.54* |
| | (0.08) | | (0.07) |
| 30-34 | -0.28* | 13-15 | 0.47* |
| | (0.08) | | (0.06) |
| 40-44 | -0.10 | 16+ | 1.23* |
| | (0.08) | | (0.07) |
| 45-49 | -0.02 | | |
| | (0.09) | *constant* | -0.68* |
| 50-54 | -0.38* | | (0.11) |
| | (0.10) | | |
| 55-59 | -0.79* | | |
| | (0.14) | | |
| 60-64 | -0.92* | | |
| | (0.16) | | |
| 65-69 | -1.24* | | |
| | (0.22) | | |
| 75+ | -0.90 | | |
| | (0.19) | | |

| | | | |
|---|---|---|---|
| *Marital Status (married)* | | *City of Residence Size (50-100K)* | |
| Divorced | 1.10* | Jerusalem | -0.52* |
| | (0.12) | | (0.09) |
| Widowed | -0.01 | Haifa | 0.50* |
| | (0.12) | | (0.13) |
| Single | 0.61* | Tel Aviv | 0.61* |
| | (0.06) | | (0.17) |
| Separated | 0.56* | 100-200 K | 0.77* |
| | (0.32) | | (0.23) |
| *No of children (0)* | | small town | -0.03 |
| | | | (0.07) |
| 1 | -0.15* | village | -0.13 |
| | (0.07) | | (0.10) |
| 2 | -0.13* | | |
| | (0.07) | | |
| 3 | -0.41* | | |
| | (0.08) | | |
| 4+ | -0.50* | | |
| | (0.07) | | |
| | (0.46) | | |
| *Addiitonal earners (0)* | | | |
| 1 | 0.51* | | |
| | (0.06) | | |
| 2+ | 0.73* | | |
| | (0.06) | | |

Goodness of Fit

| | |
|---|---|
| n | 7120 |
| LR $\chi^2$ | 2099 |
| p value | 0.00 |
| pseudo $R^2$ | 0.30 |
| area under ROC curve | 0.86 |
| correctly classified | 85% |
| sensitivity | 41% |
| specificity | 96% |

**Notes:** see Table 3, except for note 4, as data are from the LFS.

**Table 6: Probit Regression**
**Dependent Variable: Participation, Israeli Arab Female**

**a. all regressors**

| $z_{1i}^D$ **regressors** | | $z_{1i}^D$ **regressors** | |
|---|---|---|---|
| *Age group (35-39)* | | *Education (11-12)* | |
| 20-24 | -0.68* | 0-8 | -1.24* |
| | (0.33) | | (0.35) |
| 25-29 | 0.07 | 9-10 | -1.01* |
| | (0.31) | | (0.33) |
| 30-34 | -0.54* | 13-15 | 0.12 |
| | (0.30) | | (0.23) |
| 40-44 | 0.23 | 16+ | 1.10* |
| | (0.35) | | (0.33) |
| 45-49 | 0.37 | | |
| | (0.39) | *constant* | -0.89 |
| 50-54 | 0.55 | | (0.73) |
| | (0.44) | | |
| 55-59 | -0.04 | | |
| | (0.49) | | |
| 60-64 | -1.38 | | |
| | (0.94) | | |
| 65-74 | -0.10 | | |
| | (0.76) | | |

| $z_{1i}^D$ **regressors** | | $z_{1i}^D$ **regressors** | |
|---|---|---|---|
| *Marital Status (married)* | | *City of Residence Size (50-100K)* | |
| Divorced | 1.72* | Jerusalem | -0.50 |
| | (0.72) | | (0.42) |
| Widowed | 0.24 | Haifa | 1.03 |
| | (0.46) | | (0.64) |
| Single | 0.51 | Tel Aviv | -0.58 |
| | (0.40) | | (0.72) |
| *No of children (0)* | | 2-50 K | 0.20 |
| 1 | -0.27* | | (0.31) |
| | (0.42) | village | 0.46 |
| 2 | -0.42 | | (0.48) |
| | (0.38) | | |
| 3 | -0.81* | *Satisfaction with Transportation* | |
| | (0.40) | *(no use of trans.)* | |
| 4 | -1.02* | very satisfied | 0.19 |
| | (0.42) | | (0.37) |
| 5 | -0.92* | satisfied | 0.20 |
| | (0.44) | | (0.30) |
| 6 | -1.02* | not so satisified | -0.66* |
| | (0.54) | | (0.36) |
| 7+ | -1.18* | not at all satisified | 0.19 |
| | (0.51) | | (0.31) |
| *Addiitonal earners (0)* | | | |
| 1 | 0.26 | | |
| | (0.23) | | |
| 2+ | -0.04 | | |
| | (0.29) | | |

| | |
|---|---|
| *Religion (Moslem)* | |
| Christian | -0.27 |
| | (0.32) |
| Druze | 0.18 |
| | (0.29) |
| *Degree of Religious Belief (not religious)* | |
| Very Religious | 0.09 |
| | (0.37) |
| Religious | -0.14 |
| | (0.29) |
| Not So Religious | 0.10 |
| | (0.32) |
| *Proficient in English* | -0.22 |
| | (0.28) |
| *Has a Driver's License* | 0.69* |
| | (0.20) |
| *Uses the Computer* | 0.34 |
| | (0.22) |
| *Attitudes* | |
| same retirement age for men and women | 0.23 |
| | (0.21) |
| both should work | 0.65* |
| | (0.25) |
| in a family with small children | |
| one parent should work less | 0.35* |
| | (0.21) |
| both parents should work less | 0.77 |
| | (0.51) |
| both should work normally | 0.17 |
| | (0.23) |

Goodness of Fit

| | |
|---|---|
| n | 502 |
| LR $\chi^2$ | 304 |
| p value | 0.00 |
| pseudo $R^2$ | 0.48 |
| area under ROC curve | 0.92 |
| correctly classified | 85% |
| sensitivity | 71% |
| specificity | 92% |

**Notes:** see Table 3.

**b. parsimonious specification**

| | | | |
|---|---|---|---|
| *Age group (35-39)* | | *Marital Status (married)* | |
| 20-24 | -0.79* | Divorced | 2.26* |
| | (0.32) | | (0.71) |
| 25-29 | 0.18 | Widowed | 0.21 |
| | (0.29) | | (0.48) |
| 30-34 | -0.21* | Single | 0.29 |
| | (0.27) | | (0.35) |
| 40-44 | 0.27 | *No of children (0)* | |
| | (0.32) | | |
| 45-49 | 0.15 | 1 | -0.48 |
| | (0.34) | | (0.40) |
| 50-54 | 0.44 | 2 | -0.71* |
| | (0.40) | | (0.36) |
| 55-59 | -0.42 | 3 | -1.21* |
| | (0.46) | | (0.38) |
| 60-64 | -1.68* | 4 | -1.38* |
| | (0.96) | | (0.39) |
| 65-74 | 0.49 | 5 | -1.50 |
| | (0.74) | | (0.42) |
| | | 6 | -1.43 |
| *Gets welfare* | -1.43* | | (0.48) |
| | (0.30) | 7+ | -1.58 |
| | | | (0.46) |

| | |
|---|---|
| *Religion (Moslem)* | |
| Christian | 0.12 |
| | (0.26) |
| Druze | 0.48* |
| | (0.25) |
| *Proficient in English* | 0.49* |
| | (0.20) |
| *Has a Driver's License* | 0.86* |
| | (0.17) |
| *Uses the Computer* | 0.34* |
| | (0.20) |
| *Attitudes* | |
| same retirement age for men and women | 0.18 |
| | (0.19) |
| both should work | 0.64* |
| | (0.24) |
| in a family with small children | |
| one parent should work less | 0.62* |
| | (0.19) |
| both parents should work less | 0.71 |
| | (0.46) |
| both should work normally | 0.31 |
| | (0.20) |
| *constant* | -1.07* |
| | (0.45) |

Goodness of Fit

| | |
|---|---|
| n | 503 |
| LR $\chi^2$ | 277 |
| p value | 0.00 |
| pseudo $R^2$ | 0.44 |
| area under ROC curve | 0.91 |
| correctly classified | 84% |
| sensitivity | 70% |
| specificity | 91% |

**Notes:** see Table 3

**Table 7**
**Latent Modernity Model**

| **indicators for modernity $\Lambda$** | **1** | **2** | 3 | 4 |
|---|---|---|---|---|
| *Proficient in English* | 1 | 1 | 1 | 1 |
| *Uses the Computer* | 1.82* | 1.24* | 0.47* | 0.49* |
| | (0.83) | (0.38) | (0.11) | (0.11) |
| *Has a Driver's License* | 0.58* | 0.64* | 0.37* | 0.41* |
| | (0.15) | (0.21) | (0.11) | (0.12) |
| *Attitudes* | | | | |
| same retirement age for men and women | -0.06 | -0.04* | -0.05 | -0.05 |
| | (0.06) | (0.06) | (0.03) | (0.03) |
| both should work | 0.22* | 0.23* | 0.12* | 0.13* |
| | (0.09) | (0.10) | (0.04) | (0.05) |

| **causes of modernity $\alpha$** | **2** | **3** | **4** |
|---|---|---|---|
| *Religion (Moslem)* | | | |
| Christian | 1.07* | 0.72* | 0.72* |
| | (0.36) | (0.36) | (0.32) |
| Druze | -0.41 | -0.72* | -0.69* |
| | (0.33) | (0.37) | (0.34) |
| *Degree of Religious Belief (not religious)* | | | |
| Very Religious | -1.22* | -0.07 | -0.07 |
| | (0.43) | (0.45) | (0.41) |
| Religious | -0.83* | 0.04 | 0.05 |
| | (0.34) | (0.40) | (0.34) |
| Not So Religious | -0.69* | 0.15 | 0.15 |
| | (0.34) | (0.45) | (0.39) |
| *Education (0)* | | | |
| 1-4 | | 3.71* | 3.37* |
| | | (1.79) | (1.59) |
| 5-8 | | 3.22* | 2.89* |
| | | (1.60) | (1.39) |
| 9-10 | | 4.65* | 4.23* |
| | | (1.78) | (1.57) |
| 11-12 | | 5.89* | 5.40* |
| | | (1.95) | (1.72) |
| 13-15 | | 7.34* | 6.75* |
| | | (2.20) | (1.94) |
| 16+ | | 9.26* | 8.51* |
| | | (2.70) | (2.38) |

**Participation Probit**

$\beta_{12}$

| $z_{1i}^D$ **regressors** | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| *Age group (55+)* | | | | |
| 20-24 | -1.72* | -1.65* | -1.59* | -1.83* |
| | (0.59) | (0.59) | (0.56) | (0.65) |
| 25-29 | -0.69 | -0.64 | -0.67 | -0.85 |
| | (0.57) | (0.57) | (0.55) | (0.62) |
| 30-34 | -0.88 | -0.85 | -0.80 | -1.06 |
| | (0.59) | (0.59) | (0.57) | (0.65) |
| 35-39 | -0.44 | -0.42 | -0.42 | -0.54 |
| | (0.58) | (0.58) | (0.56) | (0.62) |
| 40-44 | -0.33 | -0.31 | -0.34 | -0.41 |
| | (0.60) | (0.60) | (0.57) | (0.63) |
| 45-49 | -0.68 | -0.70 | -0.64 | -0.76 |
| | (0.59) | (0.60) | (0.58) | (0.63) |
| 50-54 | -0.24 | -0.23 | -0.26 | -0.27 |
| | (0.61) | (0.61) | (0.59) | (0.63) |
| $z_{1i}^D$ **regressors** | **1** | **2** | **3** | **4** |
| *Education (0)* | | | | |
| 1-4 | 7.15* | 7.09* | 6.28* | 5.40* |
| | (0.81) | (0.84) | (1.08) | (1.61) |
| 5-8 | 6.54* | 6.46* | 5.72* | 4.96* |
| | (0.79) | (0.82) | (1.04) | (1.55) |
| 9-10 | 6.72* | 6.63* | 5.77* | 4.62* |
| | (0.83) | (0.85) | (1.25) | (1.91) |
| 11-12 | 7.50* | 7.38* | 6.51* | 5.04* |
| | (0.81) | (0.83) | (1.41) | (2.17) |
| 13-15 | 7.60* | 7.47* | 6.54* | 4.64* |
| | (0.82) | (0.83) | (1.65) | (2.57) |
| 16+ | 8.39* | 8.27* | 7.12* | 4.77 |
| | (0.90) | (0.90) | (1.97) | (3.08) |

| $z_{1i}^D$ **regressors** | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| *Marital Status (married)* | | | | |
| Divorced | 1.97* | 1.98* | 1.86* | 2.12* |
| | (1.04) | (1.05) | (1.00) | (1.10) |
| Widowed | -0.36 | -0.35 | -0.25 | -0.34 |
| | (0.54) | (0.54) | (0.51) | (0.55) |
| Single | -0.16 | -0.18 | -0.12 | -0.19 |
| | (0.44) | (0.45) | (0.46) | (0.45) |
| *No of children (0)* | | | | |
| 1 | -0.02 | -0.04 | -0.04 | -0.10 |
| | (0.45) | (0.46) | (0.46) | (0.47) |
| 2 | -0.43 | -0.45 | -0.37 | -0.47 |
| | (0.43) | (0.44) | (0.44) | (0.45) |
| 3 | -0.99* | -1.01* | -0.95* | -0.96* |
| | (0.44) | (0.46) | (0.46) | (0.47) |
| 4 | -1.21* | -1.19* | -1.11* | -1.22* |
| | (0.49) | (0.50) | (0.49) | (0.50) |
| 5 | -1.56* | -1.56* | -1.52* | -1.67* |
| | (0.52) | (0.53) | (0.53) | (0.56) |
| 6 | -1.15* | -1.12* | -1.11* | -1.23* |
| | (0.53) | (0.54) | (0.53) | (0.56) |
| 7+ | -1.85* | -1.83* | -1.83* | -1.95* |
| | (0.60) | (0.61) | (0.61) | (0.63) |
| *Addiitonal earners (0)* | | | | |
| 1 | 0.35 | 0.35 | 0.36 | 0.39 |
| | (0.26) | (0.26) | (0.25) | (0.28) |
| 2 | 1.88* | 1.89* | 1.88* | 1.99* |
| | (0.28) | (0.28) | (0.28) | (0.32) |
| 3 | 1.66* | 1.65* | 1.72* | 1.78* |
| | (0.41) | (0.41) | (0.39) | (0.44) |
| 4 | 2.78* | 2.77* | 2.70* | 2.85* |
| | (0.52) | (0.51) | (0.49) | (0.61) |
| 5+ | 2.78* | 2.81* | 2.64* | 2.99* |
| | (0.84) | (0.84) | (0.82) | (0.94) |

| $z_{1i}^D$ **regressors** | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| *City of Residence Size (100-199K)* | | | | |
| Jerusalem | -6.11* | -5.91* | -5.75* | -5.62* |
| | (0.40) | (0.40) | (0.39) | (0.46) |
| Tel Aviv | -5.97* | -5.84* | -5.59* | -5.48* |
| | (0.64) | (0.65) | (0.64) | (0.76) |
| Haifa | -4.34* | -4.21* | -4.08* | -3.42* |
| | (0.72) | (0.65) | (0.68) | (0.76) |
| 50-99 K | -5.67* | -5.50* | -5.28* | -5.04* |
| | (0.43) | (0.44) | (0.42) | (0.46) |
| 2-49K | -5.39* | -5.19* | -5.07* | -4.81* |
| | (0.33) | (0.33) | (0.33) | (0.34) |
| *Satisfaction with Transportation (very satisfied)* | | | | |
| satisfied | 0.18 | 0.21 | 0.16 | 0.21 |
| | (0.36) | (0.37) | (0.36) | (0.38) |
| not so satisified | -0.16 | -0.11 | -0.12 | -0.16 |
| | (0.44) | (0.44) | (0.44) | (0.45) |
| not at all satisified | 0.36 | 0.39 | 0.37 | 0.40 |
| | (0.36) | (0.37) | (0.37) | (0.38) |
| does not use | 0.06 | 0.08 | 0.08 | 0.06 |
| | (0.41) | (0.41) | (0.39) | (0.42) |

| $z_{1i}^{C}$ **regressors** | **4** |
|---|---|
| *Religion (Moslem)* | |
| Christian | -0.58 |
| | (0.48) |
| Druze | 0.40 |
| | (0.41) |
| *Degree of Religious Belief (not religious)* | |
| Very Religious | -0.18 |
| | (0.40) |
| Religious | -0.43 |
| | (0.30) |
| Not So Religious | -0.41 |
| | (0.34) |

| modernity $m^*$ | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| $\lambda_m$ | 0.30* | 0.31* | 0.16 | 0.52 |
| | (0.15) | (0.17) | (0.21) | (0.45) |
| $\varsigma_i$ | 1.93* | 1.87* | 0.90 | 0.71 |
| | (0.74) | (0.82) | (0.58) | (0.50) |

**Notes:**

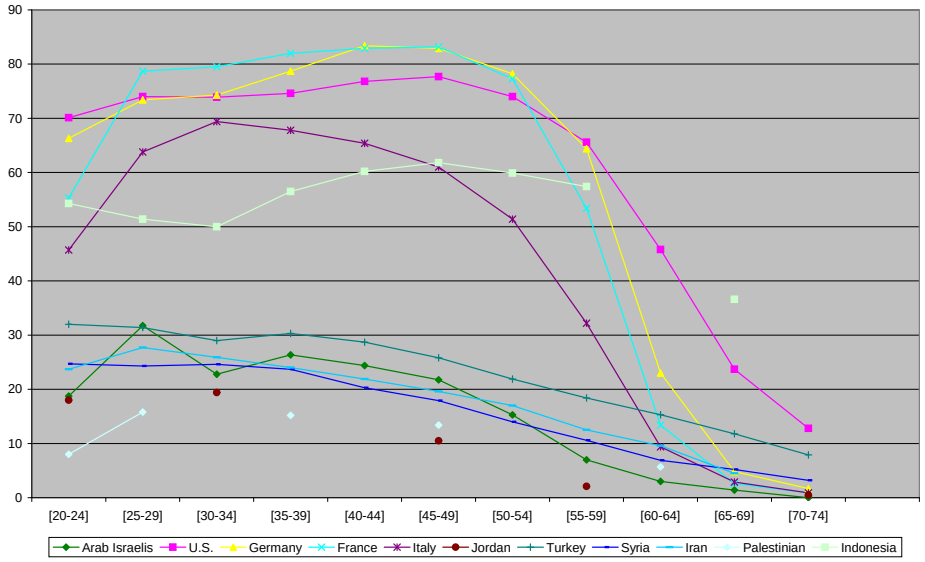
1. Standard errors in parantheses below the point estimates of coefficients.

2. Starred coefficients are significant at 10%.

3. Basline group indicated in parantheses.

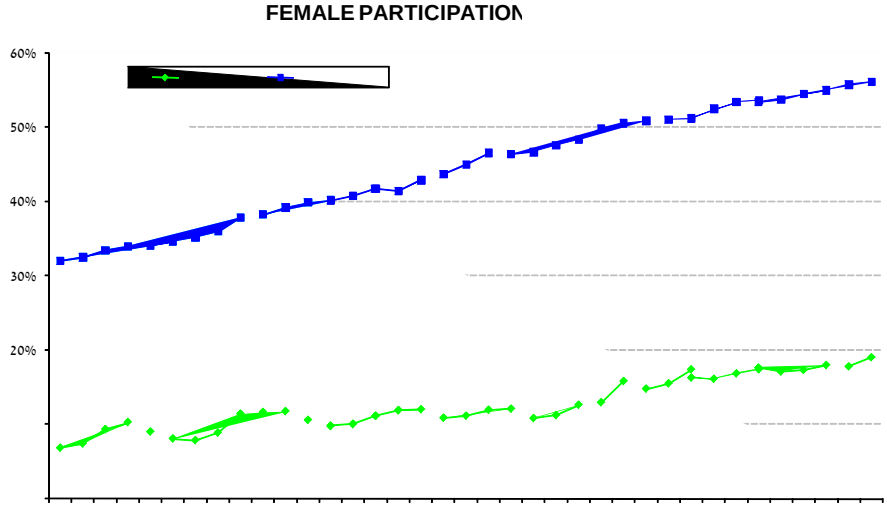
4. Residual latent variance $\varsigma_i$ row is the estimate of the variance of the latent variable equation.

**Figure1: Life Cycle Participation Rates**




Source: National Labor Force Surveys.

**Figure 2: Time Series of Arab and Jewish Female Participation Rates**




Source: Labor Force Surveys.

**Appendix Tables**

**Table A-1**
**Dependent Variable: Participation, Israeli Arab Female**
**Cultural regressors only**
**Sub-sample of individuals who have completed education**

| | |
|---|---|
| *Religion (Moslem)* | |
| Christian | -0.22 |
| | (0.25) |
| Druze | 0.41 |
| | (0.25) |
| *Degree of Religious Belief (not religious)* | |
| Very Religious | -0.33 |
| | (0.34) |
| Religious | -0.29 |
| | (0.27) |
| Not So Religious | 0.04 |
| | (0.29) |
| *Proficient in English* | 0.55* |
| | (0.17) |
| *Has a Driver's License* | 0.96* |
| | (0.16) |
| *Uses the Computer* | 0.66* |
| | (0.18) |
| *Attitudes* | |
| same retirement age for men and women | 0.30* |
| | (0.17) |
| both should work | 0.34* |
| | (0.21) |
| in a family with small children | |
| one parent should work less | 0.73* |
| | (0.18) |
| both parents should work less | 0.95* |
| | (0.42) |
| both should work normally | 0.53* |
| | (0.20) |
| *constant* | -1.87* |
| | (0.33) |

Goodness of Fit

| | |
|---|---|
| n | 485 |
| LR $\chi^2$ | 195 |
| p value | 0.00 |
| pseudo $R^2$ | 0.33 |
| area under ROC curve | 0.86 |
| correctly classified | 82% |
| sensitivity | 60% |
| specificity | 91% |

**Notes:**

1. For regressors in groups, omitted groups are indicated in parantheses.

2. For binary variables the omitted group is the complement of the included group.

3. Standard errors are given in parantheses below the point estimates. Starred coefficients are significant at 10%.

4. All data are taken from Social Survey 2005.

5. Denote $L_0$ and $L$ the constant-only and full model log-likelihoods, respectively. LR is the likelihood-ratio $\chi^2$ testfor the null hypothesis that the model is constant only; pseudo $R^2$ is given by $1 - \frac{\ln L}{\ln L_0}$.

6. Sensitivity is the percentage reported as participating in the labor force when the person actually participates; specificity is the percentage reported as not participating in the labor force when the person actually does not participate. The prediction uses a cutoff of 0.5. The ROC curve plots the fraction of $p = 1$ values correctly classified (sensitivity) against the fraction of $p = 0 =$ incorrectly classified (1-specificity) as the cutoff varies. The more area under the curve, the better the predictive power of the model.

**Table A-2: Probit Regression**
**Dependent Variable: Participation, Israeli Arab Female**
**Standard regressors only**
**Sub-sample of individuals who have completed education**

| | | | |
|---|---|---|---|
| *Age group (35-39)* | | *Education (11-12)* | |
| 20-24 | -0.69* | 0-8 | -1.33* |
| | (0.32) | | (0.27) |
| 25-29 | -0.23 | 9-10 | -1.00* |
| | (0.30) | | (0.28) |
| 30-34 | -0.50* | 13-15 | 0.64* |
| | (0.30) | | (0.23) |
| 40-44 | 0.14 | 16+ | 1.88* |
| | (0.34) | | (0.38) |
| 45-49 | 0.27 | | |
| | (0.35) | *constant* | -0.24 |
| 50-54 | 0.60 | | (0.56) |
| | (0.42) | | |
| 55-59 | 0.34 | | |
| | (0.49) | | |
| 60-64 | -1.75* | | |
| | (1.03) | | |
| 65-74 | -0.04 | | |
| | (0.71) | | |

| | | | |
|---|---|---|---|
| *Marital Status (married)* | | *City of Residence Size (50-100K)* | |
| Divorced | 1.54* | Jerusalem | -0.63 |
| | (0.63) | | (0.42) |
| Widowed | 0.19 | Haifa | 1.01* |
| | (0.43) | | (0.61) |
| Single | 1.10* | Tel Aviv | -0.35 |
| | (0.39) | | (0.70) |
| *No of children (0)* | | 2-50 K | 0.20 |
| 1 | -0.12 | | (0.31) |
| | (0.40) | village | 0.00 |
| 2 | -0.08 | | (0.46) |
| | (0.36) | | |
| 3 | -0.53 | *Satisfaction with Transportation* | |
| | (0.38) | *(no use of trans.)* | |
| 4 | -0.74* | very satisfied | 0.08 |
| | (0.39) | | (0.39) |
| 5 | -0.90* | satisfied | 0.05 |
| | (0.42) | | (0.31) |
| 6 | -0.83* | not so satisified | -0.67* |
| | (0.49) | | (0.38) |
| 7+ | -1.09* | not at all satisified | 0.03 |
| | (0.51) | | (0.32) |
| *Addiitonal earners (0)* | | | |
| 1 | 0.46* | | |
| | (0.23) | | |
| 2+ | 0.10 | | |
| | (0.29) | | |

Goodness of Fit

| | |
|---|---|
| n | 471 |
| LR $\chi^2$ | 263 |
| p value | 0.00 |
| pseudo $R^2$ | 0.45 |
| area under ROC curve | 0.91 |
| correctly classified | 84% |
| sensitivity | 67% |
| specificity | 91% |

**Notes:** see Table A-1.