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Normative or Economic Behavior ? Religiosity, Fertility and Women's Employment in Israel

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The relationship between fertility and women's employment attracted the interest of social scientists from a variety of fields – Demography, Economic, Sociology. Empirically, it was found that women who participated in paid employment, and especially those who pursued a demanding career, limited their fertility and either had relatively few children or no children at all (Spain and Bianchi 1996; Brewster and Rinfduss 2000; Ekert-Jaffé 1986). The economic theory emphasizes the opportunity costs of women, pointing out to rational calculations of the costs of having children against opportunities in the labor market. Sociologists, from a similar standpoint, focus on the incompatibility between women's employment and their role in rearing and caring for children (Spain and Bianchi 1996). Recently, however, more emphasis is given to the role of culture in affecting fertility goals (e.g., Pollak and Cotts-Watkins 1993), on the one hand, and women's economic activity, on the other hand. For example, religiosity often implies high fertility and low labor force participation rate of women. Our paper focuses on the inter-relationship between fertility and work behaviors emphasizing the role social norms and group practices, rather than economic considerations, play in determining the relationship between women's work and their fertility. Our study concentrates on Israel, a socially diverse country, characterized by high levels of fertility and female employment.

Economic theory emphasizes the impact of education on both fertility and women's labor force participation. Explaining fertility decisions, economic theory suggests two major explanations for understanding the effect of education, through its relationship to private income. The first explanation centers on the "income vs. substitution" considerations, according to which higher wages release budget constrains and allow a rise in the number or quality of children (income effect). Women's work, however, have a negative impact on fertility, because childcare is time costly, and, while rearing children, women cannot earn money at the same time (substitution effect). In such a case, the substitution effect dominates the income effect, especially among women with higher wages who bear the higher opportunity

cost. But, in a presence of a very low or inexistent man's support, the income effect may dominate.

Second, economists concentrate on the issue of quantity versus quality of children. For man, income has a U curve effect on fertility because rising income increases the demand for quality and the relative price of quantity becomes higher. Fertility, then, will be lower for the middle class, but for the upper classes, where all the children are expected to achieve high education, the level and demand for children rises with income as income effect dominates. For women, rising education (and income) level lowers the price of quality, and depresses the quantity of children. This effect is apparent in all classes since women are the main care takers of the children. Consequently, we expect a negative effect of both education (as a proxy for income) and women's work activity on their fertility. However, this impact may be weakened or even become positive for the highest educational level (Ekert-Jaffe , 1986). ; Women's work decisions depend on their educational level because women take into account their potential market wage and compared it to the shadow wage they get while staying home. Accordingly, higher education, and thus higher reservation wages, is expected to have a strong positive effect on women's labor force participation, while fertility is expected to have a negative effect.

Yet, this general pattern may not apply to all social groups. Factors other than economic considerations, may affect fertility decisions and the relationship between employment (and thus, income) and fertility (Pollak and Cotts-Watkins 1993; Hammel 1990). In particular, cultural norms may affect fertility aspirations; institutional arrangement and structural attributes of the labor market may facilitate mothers' employment and thus weakening the relationship between fertility and work; and family (mainly pronatalist) policy may enhance the desirability for children (Ekert-Jaffé, 1986). Our paper focuses on the extent to which the economic logic of the work-fertility considerations holds in the presence of strong cultural forces that encourage both high women labor force participation and large families.

The case of Israel is interesting in this respect, because fertility is relatively high, compared to most industrialized societies (total fertility is 2.9 with high variation among different social groups, especially on the basis of nationality, ethnicity and religiosity, while in terms of education and female labor force participation Israel

resembles most of the western world (see figure 1 & 2) These unique characteristics of Israel are partly a product of the ethnic and religious composition of the country, and partly of cultural norms that, as we argue in this paper, may affect fertility goals, women's economic activity and the relationship between them. We expect observant women to have higher fertility than non-observant. Religiosity is usually associated with more traditional attitude and with lower labor market participation of women.
In addition to religiosity we also make a distinction, based on women's country of origin, between those born in or originated from Asian or African countries and those originated from European countries (or second generation Israeli Jew) . The former groups is more traditional than the latter and thus, is expected to have higher fertility and lower market activity.

In addition to group norms, as reflected by religiosity and ethnic origin, other factors may mediate the relationship between women's employment and their fertility: the extent to which women's jobs provide compatibility with their maternal roles. For example, they can take care of the children while at work; they have flexible hours or can work at home; they can work part-time' their hours of work are compatible with the children's school day (Stier 1998); their ability to exit and re-enter the job with relatively low costs (Stier et al. 2001); or the availability of specific child care arrangements. Studies show that fertility decisions are less affected by employment when there is access to acceptable child care arrangements, especially the care of relatives which reduces the costs of joining the labor force (Rindfuss and Brewster 1996; Ekert-Jaffé et al. 2002).

1. In the Israeli context of high fertility, the rate of childlessness is close to its biological bottom limit and the vast majority of women have at least two children. Therefore, our study focuses on the relationship between women's decision to have a third child and the decision to work, following the birth of their second child. Our study, then, raises three research questions regarding the relationship between work and fertility among women who already had two children:To what extent does women's employment affect their decision to have an additional child, and what is the effect of their fertility on their labor force participation? We try to asses whether there is a caual relationship from one decision to the other or rather, the two decisions are simultaneously determined.

2. How employment and fertility are affected by other socio-demographic characteristics (e.g., religiosity, education, age, cohort,)?
3. What is the effect of previous work and fertility choices (e.g., employment experience , the spacing of the two first births)?

Data and Method:

We use data obtained from a national survey that was carried out in the first half of the year 2001, and studies persons aged 16 or over in a sample of 1203 households, including 1053 Jewish households and 150 non-Jewish households. In each household a single adult informant reported her or his own socio-demographic characteristics, current labor force and employment details, and complete marriage, fertility and employment history as well as parental educational and employment details. For the present analysis we selected only Jewish women who mothered at least two children. We excluded Arab women since their cultural context differ considerably from that of the Jews, especially regarding the relationship between work and fertility. We constructed a person-year file, beginning at the time the woman had her second child up until she gave birth to her third child or censored, at age 46 or at the time of the survey.

The analysis is based on bivariate probit in a person-year file. Our dependent variables are the probability of mothers who have had two children to give birth to a third child and the probability that they work. Our models, then, take into considerations the negative and significant relationship between employment and fertility. The diversity of behavior of different social groups is tested by the main and interaction effects on the fertility and work decision.

The model's specification :

1.The problem of endogeneity of work on fertility

When modeling fertility and work decisions, if one decision (say work) is endogeneous to the other (say fertility), -in other words, if *work*, which enters as a regressor in the fertility equation, by itself depends on fertility,- the coefficient of a univariate model of fertility can be seriously biased .In this paragraph, we explain the endogeneity problem and provide a test of the simultaneity of work in the fertility decision. For simplicity purposes we do not consider the time process and refer to the decision taken at a fixed time t;

The relationship between fertility and women's labor force participation can be viewed as a general model where fertility decision is jointly determined with the decision to participate in the labor force. Fertility decision of a mother of n-1 children, *i*, is modeled as a continuous implicit variable y_{i1}^* that expresses her desire and possibility to have one more child at time t; this implicit unobservable desire is translated into the observable variable y_{i1}.that takes the value 1 if the woman has a child[1] .

Among the variables that influence fertility, we particularly focus on the desire – or necessity- to work in the market the year t. The latent variable y_{i2}^* models the decision to work, which is studied in relations to the fertility decision

The general model of the joint decision can be written

$$\begin{cases} y_{i1}^* = x_{i1}\beta_1 + \alpha d_i + u_{i1} & (1) \\ y_{i2}^* = x_{i2}\beta_2 + u_{i2} & (2) \end{cases}$$

With

$$\begin{pmatrix} u_{i1} \\ u_{i2} \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_{1i}^2 & \rho\sigma_{1i}\sigma_{2i} \\ \rho\sigma_{1i}\sigma_{2i} & \sigma_{2i}^2 \end{pmatrix} \right]$$ the error terms

We only observe the signs y_{i1} and $y_{i2}= d_i$ of the variables y_{i1}^* and y_{i2}^*.and the actual decisions can be written as

$$y_{i1} = \begin{cases} 0 \; si \; y_{i1}^* \le 0 \\ 1 \; si \; y_{i1}^* > 0 \end{cases} \qquad y_{i2} = \begin{cases} 0 \; si \; y_{i2}^* \le 0 \\ 1 \; si \; y_{i2}^* > 0 \end{cases}$$

Fertility is equal to zero if the women has no child a time t and 1 if she gives birth to the n^{th} child . Work is equal to 0 if the woman is out of the labor force and 1 if she is working at time t.

Given equation (2), equation (1) can be written:

$$y_{i1}^* = x_{i1}\beta_1 + \alpha d_i + \rho\frac{\sigma_1}{\sigma_2}(y_{i2}^* - x_{i2}\beta_2) + w_{1i}$$

where the distribution of w_{1i} is normal with a mean of zero and variance equal to $\sigma_1^2(1-\rho^2)$.

[1] In our example, for reasons of simplicity, we do not note the time variable t and the birth order variable n.

and thus $E(u_{i1} / x_{i1}, y_{i2}) = \rho \frac{\sigma_1}{\sigma_2}(y^*_{i2} - x_{i2}\beta_2) + w_{1i}$.

when $\rho \neq 0$, $E(u_{i1} / x_{i1}, y_{i2}) \neq 0$ and estimating the equation 1 without taking into account of the equation 2, may lead to biased coefficients. ($\alpha + \rho \frac{\sigma_1}{\sigma_{2\ 1i}}$ instead of α).

Modeling y_{i1} and y_{i2} as bivariate probit , we obtain the test of H0 $\rho = 0$ which enables us to test the endogeneity of activity on fertility –activity is endogeneous if ρ is significantly different from zero. In this bivariate model, the coefficient α of work in the fertility equation measures the causal impact of work on fertility.

The person–year file allows us to model the instant (annual) risk of giving birth as equivalent of risk proportional duration model, taking into account the duration structure and the right censure bias (see Courgeau and Lelièvre, 1992). The procedure allows for clustering all observations which belong to the same women, in order to account for the duration model's error structure.

To show the magnitude of the endogeneity bias, we estimate successively separate simple probit models for the probability of mothers who already have two children to give birth to a third child, and bivariate probit models of this probability jointly estimated with the probability that they work.

The independent variables

The main explanatyory variable for the work decision is the educational level. *Education* is measured as a time-varying covariate taking into account the years of schooling completed at each year. We constructed a three-category variable which differentiates between those with less than high school, those who completed high school (as a reference category) and those who obtained more than high school education.

To control for cultural diversity we introduce a variable which accounts for self declared *religiosity*: we distinguish observant or very observant (which includes all

strictly observant persons), from traditional or non religious respondents. We expect observant women to have higher fertility than non-observant In addition to religiosity we also make a distinction, based on women's country of origin, between those born in or originated from Asian or African countries and those originated from European countries. The former are expected to have a higher likelihood to giving birth to a third child but lower likelihood to work[2].

The models control also for *demographic determinants*: mother's age at the birth of her second child (age at 2nd birth), the spacing between and first and second child , and mother's birth cohort (1=women born before 1967).

The *Base line duration* variables: in the work equation we use the mother's age at each year. Controlled for mother's age at the birth of her second child, this variable has an equivalent effect on work decision as the effect of the age of the second child. In alternative models, and in accordance with economic theory, we added work experience accumulated by year t-1 (zero for women that never worked) as a dynamic regressor explaining the work decision. For women that ever worked, we also added the socio-economic status of their last occupation.

In the fertility model, we introduce a non parametric measure of the duration from second to third birth because the distribution shows a very sharp increase in the probability to have a third birth up until the the third year after the second birth , and a subsequent sharp decrease thereafter. Thus the duration base line of the instant risk of a third birth is *modeled by two splines* "short duration" and "long duration" - the former takes negative values from the year following the second birth (Y2nd) to (Y2nd)+ 3 and is equal to 3 minus the age of the second child, and the latter equals to the age of second child-3.

To capture a direct causal influence of work on fertility, we successively introduce the employment status in previous year, or work experience accumulated by year t-1, and occupational socio-economic status (for those ever worked). Influence of fertility on work is captured through the demographic variables and work experience – controlling for age, work experience indicates whether the women interrupted her career.

[2] About 25% of the sample is observant, who are similar to non-observant in their ethnic origin and their general attitudes toward work (figures not shown here). They are, however, slightly younger and have higher educational level.

The Results

Table 1 presents the test for *endogeneity of work on fertility* we estimate successively a simple probit model for the probability of mothers who have had two children to give birth to a third child (column 1) and bivariate probit models of this probability jointly estimated with the probability that they work. (column 2 and 3) .

Column 4 presents the simple probit for the work equation. For testing purposes, the explanatory variables of column 3 and 4 are exogenous to fertility[3].

Three main conclusion can be drawn from this table:

First, in accordance with the theory, we find a strong impact of education on the probability to participate in the labor force (column 3 and 4) . Lower education is associated with a lower probability to work as those with less than high school are significantly less likely to work compared to those with high school education (the effect is significant at 0.01 level). Those with higher education are more likely to work than those with only high school (although the significance level is 0.07).

As opposed to work, education had no effect on fertility and therefore was dropped from subsequent analyses. This is a well known feature of Israeli context (Peritz and Baras 1992). These findings indicate that Becker's economic theory regarding fertility does not apply to Israel. The findings show that fertility depends on cultural determinants – religiosity and ethnicity. Observant women and those originated from Asian-African countries have a significantly higher probability of having a third child. Moreover, the interaction between religiosity and duration indicates that being observant speeds the timing of the third birth -- the decrease in the "long duration" spline is significantly steeper for more religious women. These key roles of education in the work sphere and of the religion in the fertility sphere are a permanent features that hold in all of the 36 models we estimated with various specifications.

[3] We tested for all interactions and we kept only the significant ones.

This model provides a nice exemple of the biased results obtained by introducing work as a regressor in a univariate fertility model- without taking into account the simultaneity of work and fertility decisions. The corresponding results in column 1 shows a negative effect of work on fertility. It would seem that working in the labor market postpones or hinders having a third birth. However, the bivariate probit analysis shows that the correlation between fertility and work decision, ρ, is statistically significant at 2% level, and equals to -0.18 (column2 and 3). This means that work is endogenous to fertility, that is, the fertility decision is joinly taken with the work decision- As Column 2 shows that working during the year of conception (t-1) has no significant effect on the transition to a third child, the work decision alone does not *cause* fertility decision.

Table 2 further suggests that, fertility have a causal impact on the work decision, in addition to the simultaneity of fertility and work. Indeed, fertility is also endogenous on work decision the correlation ρ is equal to –0.14 and significant at 0.01 level indicating that work and fertility decisions are taken simultaneously; however ,in the bivariate probit, that takes into account this simultaneity , the fertility variables are significant. The causality from fertility to work is more straightforward than the opposite. The work decision is explained by education, country of origin, religious observance, spacing between previous births, and the age of the mother when she gave birth to her second child. The explanatory variables in column 1 (simple probit) and 3 (bivariate probit) have the same coefficients, both in magnitude and in statistical significance. In other words, introducing fertility features as regressors in the univariate regression of the work decision did not lead to any biased estimates. All in all we find that all the features associated with an increase in the birth risk -- having a shorter space between the birth of the first and second child and giving birth at a younger age -increase the risk of labor force participation. Furthermore, as the second child grows older the risk of labor force participation increases.

We now turn to answering our two additional research questions: (1) how employment and fertility are affected by other socio-demographic characteristics and (2) what is the effect of previous work and fertility choices? Table3 shows estimates from the bivariate probit models: in column 1, work is explained by education, cultural and demographic indicators, the age of the younger child (i.e; age of the

women at time *t* controlling for her age at the second birth) ,and whether the woman worked at time t-1, in the fertility equation. We add successively past labor market experience (null for women who never worked). We test particular behaviour for women selected by having ever worked before their second birth in columns 3 and 4.

The instant risk of third birth equation

The results concerning fertility do not vary with model specification regarding the commitment to the labor force. Ethnic background and religiosity play a major role in explaining the instant risk of havig a third birth. Women originated from Asian-African countries have a significantly higher risk of having a third child, and the coefficient is significant at less than 0.001 level. Observant women have even higher probability of having a third birth : the magnitude of the coefficient is twice as that of ethnicity . Moreover, the interaction between religiosity and duration indicates that being observant speeds the timing of the third birth -- the decrease in the "long duration" spline is significantly steeper for more religious women.

Demographic features have expected effects on fertility. As well known by demographers, being younger at when giving the second birth increases the risk of having a subsequent child. We can also notice that women born before 1967 have slightly more children, this effect however becomes non significant when the sample is restricted to women who have ever worked. This effect of older cohort, then, can be attributed to the traditional attitudes of women that have never participated in the labor force.

We have seen previously that labor force participation has no causal impact on fertility; the second column of the table shows that this is true also for work experience. This lack of effect of work behavior on fertility remains when we restrict our sample to women who have ever worked. Similarly, there is no significant effect of occupational status on fertility.

***T*he labor force Participation equation**

-As emphasized before, concerning their labor force participation, women have eager economic preoccupations, in accordance with economic theory. Higher Education (column 1 , 2 , 3,) labor force experience and higher occupational SES increase the risk of their participation in the labor force.

-Incompatibility of work and fertility appears in the sense that variables that traditionally enhance fertility have a negative impact on labor force participation. (i) Being younger at the birth of the second child, significantly lowers the propensity to work. (ii) The woman's age at time t., which after controlling for her age at second birth, is identical to the age of the younger child, have a strong positive effect on the propensity towork. (iii) While the spacing between the first and second child had no direct impact on fertility, shorter spaces between births are associated frequently with higher fertility (Rodriguez and al., 1984 , Ekert- Jaffe Mougin 2006). In our model, it significantly decreases the probability of working. This impact, however, depends on model specification. When we introduce labor force experience as a regressor, the spacing variable becomes non-significant. This can result from the fact that labor force experience is affected by previous fertility behavior (the correlation between the spacing variable and labor force experience is 0.336) It accounts for past interruptions: women that have interrupted their career (or(have never worked before) have accumulated fewer years of work experience and perhaps shorter spaces between first and second birth.(Cigno, Ni Brochain, Ekert-Jaffé and al) However, even in the presence of labor force experience, past spacing becomes significant for women having ever worked. (see later).

The third group of variables is related to ethnicity and religiosity. We expected more traditional women (religious, those from Asian or African origin) to have higher fertility and lower market activity. However, this is not the case here. Religiosity has a positive impact on work participation; In other words the necessity of co -providing income in order to insure the minimum standard of living for the family is overcoming the traditional reluctance of observant women to participate in the labor market. This effect was not significant in table 1,when we did not introduce the fertility indicators in the work equation. However, it became significant when the higher fertility of these women is being accounted for. This positive impact is higher when we control for labor force experience of the entire sample (table 3 ,column 2), it is also higher in the sample of women that have ever worked(column 3 and 4) . Previous behaviour in the labor market is a sign of attachment to work. Modern religious observant women that are attached to the labor market are more often working in spite of their higher propensity to have children and the lower spacing between them.

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Table 1 : Test of Endogneneity of Work on Fertility.

	3rd Birth transition		Work	
	Simple probit (ρ =0)	Bivariate probit (ρ =-.183**)		Simple probit (ρ =0)
Less than High School	ns	ns	-.498***	-.450***
High School completed			(ref)	
Tertiary education	ns	ns	**.4822**	**.478**
Observant	**.677**	**.640**	.240	.240
Asian-African origin	**.324**	**.350**	-.132	-.1314
Age at year t			**.0337**	**.0337**
Older cohort	.141	.1363*		
Age at 2nd birth	**-.0355**	**-.0398**		
Short duration	**-.386**	**-.378**		
Long duration	**-.0834**	**-.0852**		
Observant x long duration	**-.894**	-.0853**		
Spacing between child 1 and 2	-.0315	-.0296		
In the LF at year t-1	-.1727**	.0738		
CST	-.0334	-.0859	-.5309	-.527
Log Pseudo -Likelihood	-608	-1812		-1210
PseudoR2	0.11			0.08
N	2189	2182		2182
ρ		-.183**		

Bold meansP value<0.01; ** meansPvalue<0.05; * meansPvalue<0.10

Table 2 : Test of endogeneity of fertility on work.

Statistical specification of the models :	Simple probits (ρ =0)		Bivariate probit	
	Coefficient	Pvalue	Coefficient	Pvalue
Work				
Less than High School	**-.572**	0.006	**-.571**	0.006
Tertiary education	**.448**	0.008	**.452**	0.008
Observant	.315*	0.090	.315*	0.091
Asian or African origin	-.119	0.507	-.119	0.506
Age at spell beginning	**.0472**	0.004	**.0471**	0.004
Age at 2nd birth	-.0545**	0.036	-.0540**	0.037
Spacing between child 1 and 2	**.101**	0.007	**.101**	0.008
Constant	.168	0.764	.159	0.776
Log Pseudo Likelihood	-1186			
Pseudo R2	0.10			
N	2182			
Timing of 3rd birth equation				
Observant	**.668**	0.000	**.662**	0.000
Asian or African origin	**.353**	0.000	**.355**	0.000
Older cohort	.157	0.060	.139	.099
Age at 2nd birth	**-.044**	0.000	**-.0447**	0.000
Short duration	**-.373**	0.000	**-.376**	0.000
Long duration	**-.0863**	0.000	**-.085**	0.000
Observant x long duration	**-.088**	0.023	**-.085**	0.026
Constant	-.0263	0.920	-.015	0.953
Log Pseudo Likelihood	-611		-1790	
Pseudo R2	.11			
N	2182		2182	
ρ			**-.144**	

Bold - pvalue<0.01, ** p value<0.05, * p value<0.10

Table 3 : Factors Affecting Instant Risk of Working in the Market and of giving Birth to a 3rd Child: A Bivariate Probit Analysis.

Sample	All women		Women having Ever worked	
Work equation				
<highschool	**-.570**	-.393**	**-.328**	-.135
Tertiary education	**.453**	.432**	**.441**	.305
Observant	.315*	**.480**	.372*	.369**
Asian or African origin	-.119	-.069	-.129	-.051
Labor Force experience		**176**	**.126**	**.126**
Occupational ses				**.012**
Age at time t	**.047**	-.031	-.026	-.025
Age at 2nd birth	-.054**	-.078**	-.081**	**-.098**
Spacing between child 1 and 2	**.102**	.073	.079*	.097**
Constant	.161	**1.87**	**2.39**	**2.199**
Timing of 3rd birth equation				
Observant	**.630**	**.619**	**.593**	**.591**
Asian or African origin	**.348**	**.333**	**.285**	**.254**
Older cohort	.136*	.140*	.096	.083
Age at 2nd birth	**-.035**	**-.035**	-.030**	-.026**
Short duration	**-.377**	**-.373**	**-.363**	**-.363**
Long duration	**-.086**	**-.087**	**-.082**	**-.083**
Observant x long duration	-.084**	-.085**	-.066**	-.066*
Spacing between child 1 and 2	-.039	-.039	-.037	-.042
In the LF the previous year	.079			
Labor Force experience			-.003	-.001
Occupational ses				-.002
cst	-.158	-.109	-.196	-.160
Log Pseudo-likelihood	-1788	-1423	-1307	-.1278
N	2118	2148	1902	1886
ρ	-.188**	**-.188**	-.14**	-.118*

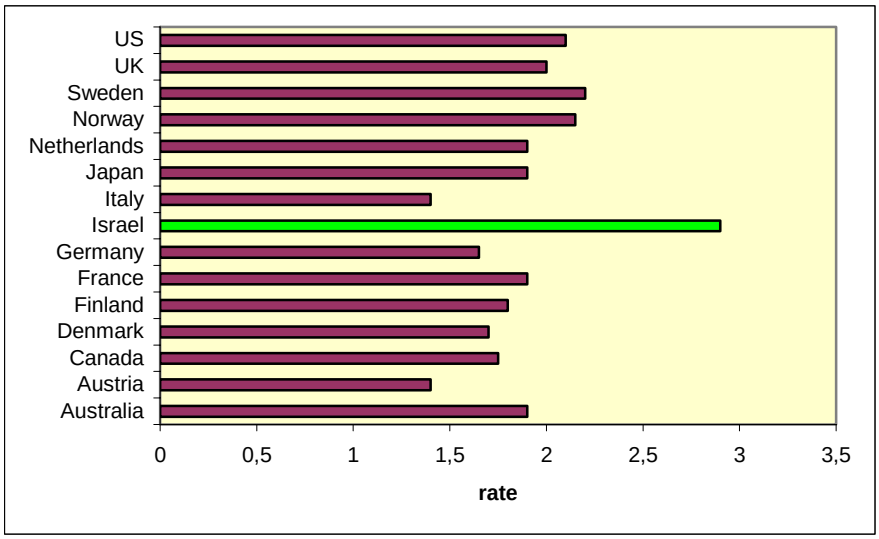

Figure 1 Total Fertility Rate, Selected Countries 1990-1995

Figure2 Women 25-60 in the Labor Force, ISSP 1998