Education and Labor Market Participation of Women in Asia: Evidence from Five Countries*

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I. Introduction

The role of women's education in economic development has recently received considerable attention in the development literature. A virtuous cycle or paradigm has been suggested wherein resources devoted to lifting the educational attainment of women bear fruit in a number of ways. Women's education increases labor market participation and provides better employment opportunities for women and hence raises their incomes. This raises the status of women both in society and within the family. There are also positive externalities to such a process, including a reduction in fertility and population growth, improved health and life expectancy of children, reduced infant mortality, and a reduction in environmental degradation.[1] Evaluation of the benefits has led many develop-

ment economists to argue that educating women yields substantial eco-

s—higher economic returns than those that result from i

xpenditures on men. In the words of Lawrence Summers,

e benefits are recognized, investment in the education of

l be the highest-return investment available in the devel-

?

less, the many-faceted impact of women's education on la-

utcomes in developing countries has received relatively

n. In contrast, the relationship between education and labor

ipation of women has been a major focus of research in

untries. The process by which women enter the labor mar-

to an understanding of how improvements in women's in-

nd social status in developing countries can be facilitated.

s analyses of the relationship between women's education

e participation have used aggregate time series data. While

can be instructive, women's labor force participation can

rly understood by analyzing household-level data sets,

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which are capable of exploring the details of labor force participation within the context of the household.

Development economists have argued that the impact of education on labor force participation rates is not uniform across years of education. The relationship may be U-shaped. Labor force participation rates (LFPRs) were found to be high for illiterate women, lower for women educated at the primary and (perhaps) at the secondary school level, and higher yet for women college graduates. This relationship has been explained by the correlation between women's education and income. At the low end of the scale, where education and income are low, this high LFPR can be explained by the pressing need to earn some income, no matter how meager, in order to survive. Labor force participation rates were found to be an increasing function of wage rates, although there is some evidence that women in landless households initially reduce their labor force participation as wages rise. S. R. Khandker finds a positive relationship between women's education and labor force participation in Bangladesh. Khandker also finds that the husband's education is likely to reduce his wife's labor force participation rate because of the positive wealth effects of potential earnings.[4] P. L. Gertler and L. I. Newman employ a model of family labor supply based on maximization of a family utility function subject to budget and time constraints.[5] Using unit record data for Peru, they find that schooling of the family head enters positively into labor supply equations of both male and female family members. They did not, however, include a specific female education variable in their model.

In the economic literature on women's labor force participation decisions in developed countries, it is common to assume that the household references can be represented by a family utility function. While this assumption may be plausible in developed countries, in developing countries, especially in Asian societies, women often have less say about family decisions than do their husbands. One of the beneficial roles of women's education is to empower them to assert their preferences more effectively in household decision making. We believe that this hypothesized role of education is more suitably modeled in terms of a bargaining process in which a woman's education affects her bargaining power.

A number of recent studies have modeled household outcomes using bargaining models. T. P. Schultz analyzed the labor force participation and hours of work decisions of families in Thailand using a household survey with data from 1980 to 1981.[6] He used the Nash Bargaining Solution (NBS) for household labor supply decisions to motivate the reduced-form equations estimated. Schultz found the incomes of the husband and the wife to have different impacts on the labor supply decisions in the household. This is not consistent with a family utility function model.

Other researchers have also found evidence inconsistent

holds in developing countries acting as if one utility function represents the household. D. Thomas found that unearned income of the mother has a larger positive effect on the health of her family than does unearned income under the control of the father.[7] Similarly, L. Haddad and J. Hoddinott found that if a greater proportion of family income accrues to women, boys' height for age increases relative to that of girls'.[8] Hoddinott and Haddad also concluded that households in Côte D'Ivoire are better modeled as collective entities in which bargaining occurs among members rather than as a single unit that makes decisions that maximize a single, agreed-on utility function.[9]

In this article, we first consider the possible impacts of an increase in the wife's education on the household decision-making model, where it is assumed that the outcomes are Pareto efficient. A reduced-form participation index is derived from the model and used in estimation on household data from five Asian countries. The data used in the empirical analysis are the 1975–76 World Fertility Surveys (WFS) for Indonesia, Korea, the Philippines, Sri Lanka, and Thailand. These data have not been previously exploited in a study of this kind. Their relative lack of use in the literature and their high degree of comparability across countries make them a valuable and much underused asset. The cross-country aspect is particularly appealing because it allows an examination of the

ipation deci- role of cultural backgrounds in women's labor force partic
iod to study sions. The mid-1970s are also a particularly interesting per
exception of because at that time most of the survey countries, with the
[illegible] behavior during the early stages of industrali
zation

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II. Theoretical Issues

Before analyzing the empirical relationship be
and their labor market participation, a discuss
ory predicts about this relationship is useful. It
the different avenues through which women's
impact on their labor market participation dec
present a stylized model of household decisio
the labor force participation decision for the w
based on the collective model of Chiappori and
and wife have separate sets of preferences for
market participation of the wife and that th
gaining process is Pareto efficient.[10] The colle
tary household model and cooperative bargain

Under the collective model, household de
as maximizing the utility of one spouse (with
spouse 1) subject to (1) a minimum condition

ity (with the wife denoted as spouse 2), (2) the household budget constraint, and (3) a nonnegativity constraint on the wife's hours.

$$\begin{aligned} &\text{Max } U^1(c,h) \\ &\text{Subject to } \mu : U^2(c,h) \geq u_2, \\ &\qquad\qquad \lambda : c \leq wh + y, \\ &\qquad\qquad \delta : h \leq 0, \end{aligned} \tag{1}$$

where

$U^1(c,h)$ is the utility of the husband;
$U^2(c,h)$ is the utility of the wife;
c is family consumption;[11]
h is the wife's hours of work in the labor market;[12]
y is household income other than the wife's labor income;
w is the wife's wage rate; and
u_2 is the wife's reservation utility.[13]

Both $U^1(c,h)$ and $U^2(c,h)$ are strictly quasi-concave functions with $U^i_h \equiv \partial U^i/\partial h$ and $U^i_c \equiv \partial U^i/\partial c$ for $i = 1, 2$.

A key issue is the fact that the marginal utility from consumption, U^1_c and U^2_c, and the marginal utility from the wife's hours of work in the labor market, U^1_h and U^2_h, may differ across spouses. Hence, it is possible that the husband prefers the wife to stay at home and provide household services when she would prefer to enter the labor market. Alternatively, it is possible that in certain situations the wife may wish to stay at home with her children while the husband prefers that [illegible] and perhaps [illegible] she generate further household income by entering the labor market.

Assuming an interior solution for c, two of the necessary conditions are

$$U^1_c(c,h) + \mu U^2_c(c,h) = \lambda \tag{2}$$

and

$$U^1_h(c,h) + \mu U^2_h(c,h) = -(\lambda w + \delta). \tag{3}$$

In equation (2), a weighted average of the marginal utility of consumption of the husband and of the wife are set equal to the multiplier on the household budget constraint. The weight, μ, is the multiplier on the wife's reservation utility constraint. This is an increasing function of the bargaining power of the wife in the household bargaining problem.[14]

In equation (3), a weighted average of, first, the husband's marginal utility from the wife's hours of work and, second, the wife's marginal utility from her own hours of work are set equal to the negative of the

multiplier on the household budget constraint multiplied by her wage rate plus the multiplier on the nonnegativity constraint for the wife's hours. If the wife works a positive number of hours then $U_h^1(c,h) + \mu U_h^2(c,h) = -\lambda w$; otherwise, $U_h^1(c,h) + \mu U_h^2(c,h) \le -\lambda w$; that is, the marginal welfare (defined in terms of the weighting of the husband's marginal utility and the wife's marginal utility) derived from the wage does not compensate the household for the drop in welfare associated with an hour of the wife's labor.

Substituting equation (2) into equation (3) and rearranging gives

$$U_h^1(c,h) + wU_c^1(c,h) + \mu[U_h^2(c,h) + wU_c^2(c,h)] = \delta. \quad (4)$$

The following participation index can be defined using equation (4) when $h = 0$ $(c = y)$:

$$I \equiv [U_h^1(y,0) + wU_c^1(y,0)] + \mu[U_h^2(y,0) + wU_c^2(y,0)]. \quad (5)$$

If $I > 0$ then the wife works for wages; otherwise the wife does not. The terms in parentheses represent the change in utility that each spouse experiences if the wife were to work for wages an additional hour (at $h = 0$ and $c = y$). Note that it can be the case that the wife would choose to work for wages if the decision were left up to her, $U_h^2(y,0) + wU_c^2(y,0) > 0$, but she does not do so because it decreases the husband's utility, $U_h^1(y,0) + wU_c^1(y,0) < 0$, and the weight, μ, is such that the household decides against the wife working.

Following human capital theory, we assume that the wife's wage is an increasing function of her human capital as measured by her education (E): if $w_E > 0$, then an additional year of education increases the wife's wage. In addition to this, it is likely that higher education leads to higher bargaining power for the wife within the marriage. This means that the weight attached to the wife's utility function, μ, increases. More specifically, the partial derivative of μ with respect to the wife's education is assumed to be positive, $\mu_E > 0$.

Under these two assumptions, the derivative of the above index with respect to E yields

$$\frac{\partial I}{\partial E} = [U_c^1(y,0) + \mu U_c^2(y,0)]w_E + [U_h^2(y,0) + wU_c^2(y,0)]\mu_E. \quad (6)$$

The first term on the right-hand side of equation (6) represents the wage effect of the increase in educational attainment. That is, the higher wages that are now attainable increase the marginal welfare that the household receives from extra hours of work for wages of the wife. The second term represents the effect of the wife's education in terms of the change

in the relative bargaining positions of the spouses. If an increase in the wife's education increases her relative bargaining power, then this would make the household's preferences more similar to the wife's underlying preferences.

Note that the unitary household model corresponds to the case in which $\mu = 0$. The husband and wife share the same utility function, $U^1(c,h)$. Setting $\mu = 0$ reduces the effect of education on participation to

$$\frac{\partial I}{\partial E} = U_c^1(y,0)w_E. \tag{7}$$

That is, there are no bargaining effects, and education affects participation only to the extent that it raises the wage and hence the marginal utility of working and in this way makes work for wages more attractive. Unfortunately, our data do not allow us to differentiate between the wage

TABLE 1

SAMPLE MEANS (%)

	Korea	Thailand	Sri Lanka	Indonesia	Philippines
Woman:					
Labor market participation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Age	33.63	33.00	33.59	30.99	33.49
Education:					
None	.1960	.1837	.2150	.6027	.0552
Primary	.5081	.7537	.3930	.3353	.2445
Intermediate	.1730	.0432	.2557	.0351	.3692
Secondary	.0964	.0131	.0981	.0219	.2090
Postsecondary	.0265	.0057	.0382	.0050	.1221
Rural	.4774	.8845	.8179	.8409	.6834
Children (last 5 years)	.9464	.9902	.9360	.9282	1.209
Children	3.200	3.598	3.650	2.893	4.130
Illiterate	.1722	.1853	.2677	.5200	.1139
Births	3.571	4.158	4.057	3.613	4.599
Husband:					
Age	38.01	37.15	40.33	36.86	37.12
Education:					
None	.1041	.1199	.0747	.3098	.0499
Primary	.3256	.7190	.4122	.5564	.2540
Intermediate	.2148	.1055	.3407	.0631	.3092
Secondary	.2318	.0279	.1147	.0534	.2450
Postsecondary	.1237	.0136	.0577	.0172	.1418
Illiterate	.0489	.0798	.0828	.3001	.1065
Sample	5,052	2,982	5,866	7,940	8,678

NOTE.—Variable definitions are presented in the appendix.

data set is that the surveys focus primarily on women. To facilitate the analysis, the sample was restricted to married women 15–49 years old. The data provide a rich base of information on family size, labor market activity, education, and spouses' characteristics. The total sample size is 30,518, ranging from 8,678 observations for the Philippines to 2,982 for Thailand.

The countries we studied were chosen on the basis of their level of development and labor market characteristics at the time of the sample. Korea was already well along the path to industrialization, having started the liberalization process and export promotion a decade earlier. Indonesia, the Philippines, and Thailand were just beginning to industrialize at this time, although they had not yet begun to focus on manufactured exports, and Sri Lanka was still in the import substitution phase. The countries provide an interesting array of experience and are religiously and culturally diverse.

Table 1 lists sample means of selected variables used in estimation. Labor market participation rates for women vary significantly across countries, from a low of 16% in Korea to a high of 29% in the Philip-

pines. These rates are significantly lower than the LFPRs for women in industrialized countries. Women's educational attainment and literacy also vary significantly, with Indonesia at the low end of the scale (52% of the population was illiterate and 60% had no education) and the Philippines at the high end (11% illiterate and only 6% had no education). Age and family size showed less variation at the mean: the average age of women respondents ranged from 31 to 34 (men between 37 and 40), and the average number of children was between 2.9 and 4.1.

V. Empirical Results

We carried out probit analysis on the binary choice model, in which the dependent variable is a zero-one dummy variable that equals one if the wife participates in the labor market. The explanatory variables are those discussed in Section III for equation (8). Education levels are represented by a set of dummy variables that represent the highest educational attainment achieved (no schooling as the default category, primary, intermediate, secondary, and postsecondary). There is also an additional dummy that indicates illiteracy. The family structure is reflected in the variables the total number of children and the number of children born in the past 5 years. The number of births is also included as a proxy for the time spent out of the labor market by the wife. In addition, a variable that reflects the rural or urban status of the household is included to reflect the different structure of rural and urban labor markets. Initially, pooled regressions were estimated. A country-specific dummy variable was included to capture cultural differences. However, statistical tests consistently rejected pooling as the appropriate model formulation (even after allowing various subsets of the coefficients to differ by country). Hence, tables 1–3 show the results when the estimation was carried out separately[15] for each country.

Marginal probabilities are more easily interpreted than the probit regression coefficients and are presented in table 2. They are defined as the partial derivatives of the probability of women being in the labor market with respect to individual control variables. The marginal probabilities in each case are defined at the sample means of the variables over the pooled sample from all five countries. The marginal probabilities are distributed asymptotically according to the normal distribution. The asymptotic standard errors of the marginal probabilities were derived through the use of the delta method.[16]

First we discuss the coefficients on the variables other than female education, and then we focus on the relationship between women's education and labor force participation. Earnings are normally assumed to be a concave function of age, and the results are consistent with concavity for women. A husband's age is not an important determinant of his wife's labor market participation. The coefficients on the husband's age variables are very small and are statistically significant only in Sri Lanka.

TABLE 2

MARGINAL PROBABILITIES FROM PROBIT ESTIMATION

	Korea	Taiwan	Sri Lanka	Indonesia	Philippines
Age	.0103*	.0425*	.0350*	.0237*	.0577*
	(4.73)	(4.90)	7.78)	(5.78)	(9.99)
Age²/100	−.0150*	−.0571*	−.0461*	−.0301*	−.0709*
	(−5.05)	(−4.68)	(−7.64)	−5.05)	(−8.75)
Births	.0046*	−.0025	.0083*	.0040	.0114*
	(2.44)	(0.30)	(2.09)	(1.19)	(2.02)
Children	−.0075*	−.0110	−.0167*	−.0105*	−.0177*
	(−3.43)	(−1.11)	(−3.78)	(−2.59)	(2.84)
Children (past 5 years)	−.0069*	−.0241*	−.0199*	−.0135*	−.0342*
	(−4.65)	(−2.50)	(−5.75)	(−2.73)	(−5.91)
4*	−.2554*	.0514*	−.0235*	.0563*	Rural −.028
	(−9.47)	(5.46)	(−2.30)	(4.83)	(−7.60)
9*	.4855*	.1743*	.1587*	.2325*	Tertiary .034
	(2.21)	(7.71)	(2.66)	(6.59)	(3.17)
5	.3937*	−.0301	.1843*	−.0131	Secondary .001
	(2.33)	(−1.65)	(5.77)	(−.40)	(.19)
3	.2042	−.0963*	.0734*	.0128	Intermediate .002
	(1.34)	(−5.96)	(2.95)	(.41)	(.35)
1	.0955	−.0137	.0043	.0297	Primary .006
	(.65)	(−1.16)	(.39)	(1.07)	(1.16)
7	.1175	.0431*	.0130	.0129	Illiterate .001
	(.92)	(3.77)	(1.40)	(1.18)	(.60)
band)	.0002	−.0039	−.0081*	.0051	−.0040 Age (husb
	(.13)	(−1.80)	(−2.78)	(1.88)	(−.98)
band)	.0008	.0046	.0065*	−.0056	.0021 Age²/100 (husb
	(.45)	(.93)	(2.08)	(−1.73)	(.47)
band)	−.0273*	.1211	−.0027	−.0727	−.0294 Tertiary (husb
	(−3.11)	(1.45)	(−.12)	(−1.85)	(−.81)
band)	−.0178*	.0966	−.0790*	−.0110	−.0907* Secondary (husb
	(−2.45)	(1.71)	(−3.66)	(−0.44)	(−2.76)
ate band)	−.0131	.1023*	−.0557*	.0012	−.0404 Intermedi (husb
	(−1.92)	(2.74)	(−3.07)	(0.06)	(−1.28)
band)	−.0076	−.0456	−.0082	.0329*	−.0380 Primary (husb
	(−1.24)	(−1.53)	(−0.50)	(2.30)	(−1.33)
and)	.0052	−.0153	.0089	.0299*	−.0085 Illiterate (husb
	(.68)	(−.41)	(.06)	(2.08)	(−.02)
	.116	.033	.074	R^2 (Maddala	.042 .53
	.775	.742	.617	Correct predictions (%)	.839 .812
,866	7,940	8,678		Sample	5,052 2,982 5

esented in parentheses. Variable defini-

NOTE.—Asymptotic standard errors are pr
tions are presented in the appendix.
* Significant at the 5% level.

In addition, we included the woman's number of live births. This variable was expected to be a proxy for time spent out of the labor market, and so it would have a negative effect on wages (and hence, labor market participation) because of lost human capital formation or human capital atrophy. It is interesting to note that the coefficients on this variable are positive and statistically significant in Korea, the Philippines, and Sri Lanka. It may be that for a given number children the more births a woman has is a proxy for low family income or wealth. If this were true, more births could be associated with a greater need to work for wages.

Variables indicating the total number of children and the number of children born in the previous 5 years were also included in the model. These variables are modeled to have an impact on the mother's labor market participation through their effect on the utility functions of the parents. The results support the hypothesis that children divert women's time from the labor market, but the effect is relatively small. The largest effect is for the Philippines, where an extra child under the age of 5 decreases the probability of the mother working outside the home by 3.4%. The coefficient on the variable showing the number of children born in the previous 5 years is significant and negative in all countries, as is the total number of children for all countries but Thailand.

The pattern of the husband's education was also included as a conditioning influence.[17] A higher level of the husband's educational attainment increases his earnings (and hence reduces the need for the wife to work). The results show that in all countries except Thailand, high levels of husband's education are correlated with lower LFPRs for the wives. For example, in the Philippines, a secondary school–educated male is 9% less likely to have a working wife than a male with no education. This is interpreted as an income effect. A husband with a higher level of education on average earns more. With a higher household income, the wife is less likely to be in the labor market.

The rural or urban dummy is statistically significant for every country but has a positive effect in the Philippines and Sri Lanka and is negative for the remaining countries. Most likely, this reflects different phases of the development process and different cultural norms.

Below we examine the effect women's education on LFPRs by [illegible] far the most striking result in table 2 is the effect of higher education on women's labor force participation rates. In every country, women's tertiary education is positively related to the probability of working, and in all countries other than Korea, the magnitudes of the effects are large. A woman with tertiary education is 49% more likely to be employed in the labor market than a woman with no education: in the Philippines, she is 23% more likely; in Sri Lanka, 17%; in Indonesia, 16%; and in Korea, 3%. The results clearly point to the importance of tertiary education over lower levels of education in promoting labor force participation, although secondary and intermediate education also increase the probabil-

n in the labor force in Indonesia, and second-
in Thailand. Figure 1 plots labor force
ducation for each country. The graph high-
ss countries. Only the results for Sri Lanka
hip. Sri Lanka was the poorest of the five
other countries, except Korea, tertiary educa-
fect on participation. In Indonesia and Thai-
cation has a large positive effect on participa-

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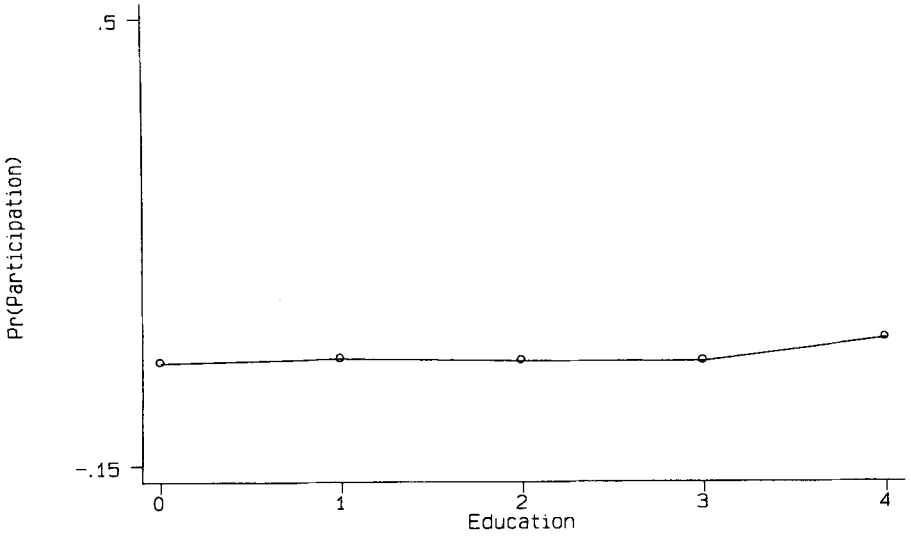
A. Korea



B. Thailand

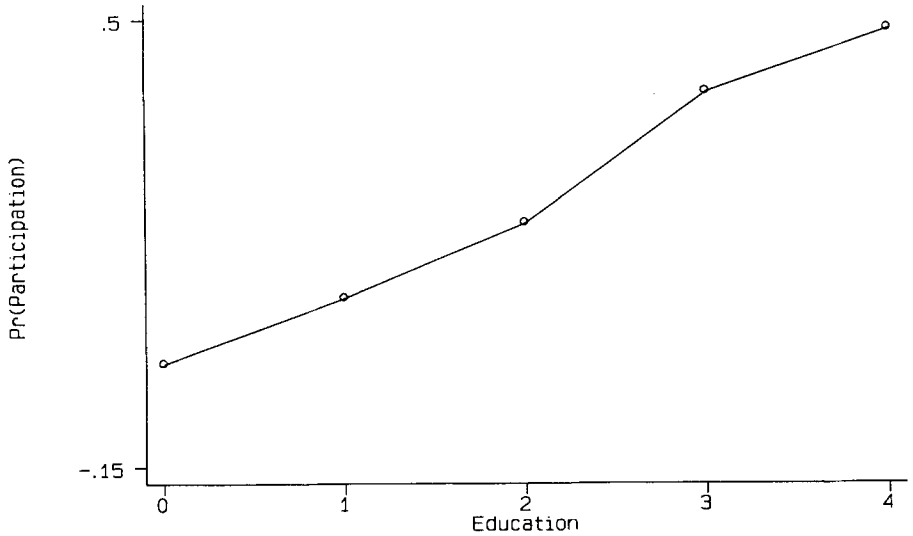
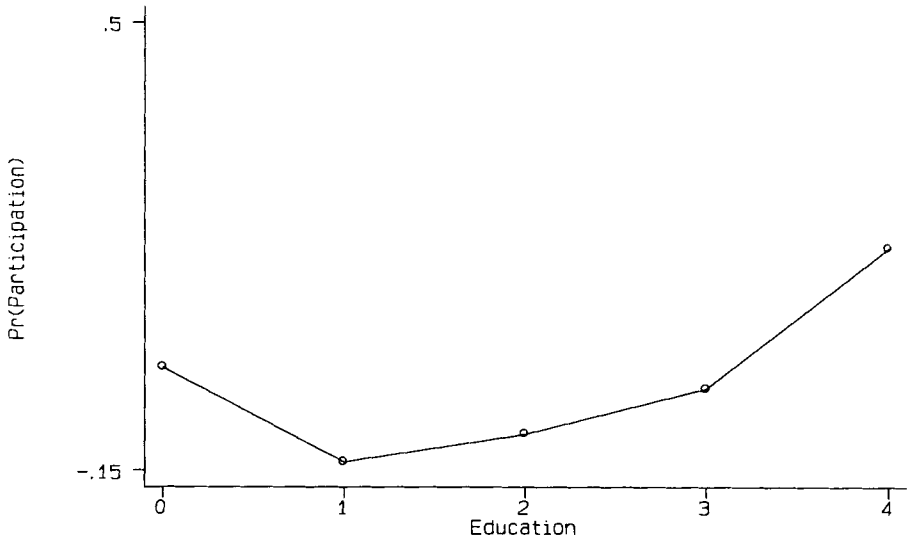
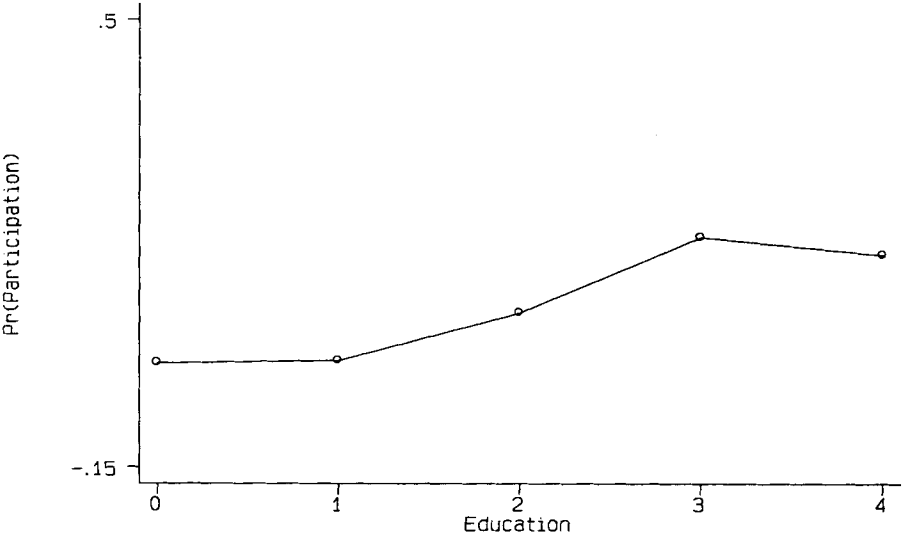


FIG. 1.—Probability of participation (relative to no education)

C. Sri Lanka



D. Indonesia



E. Philippines

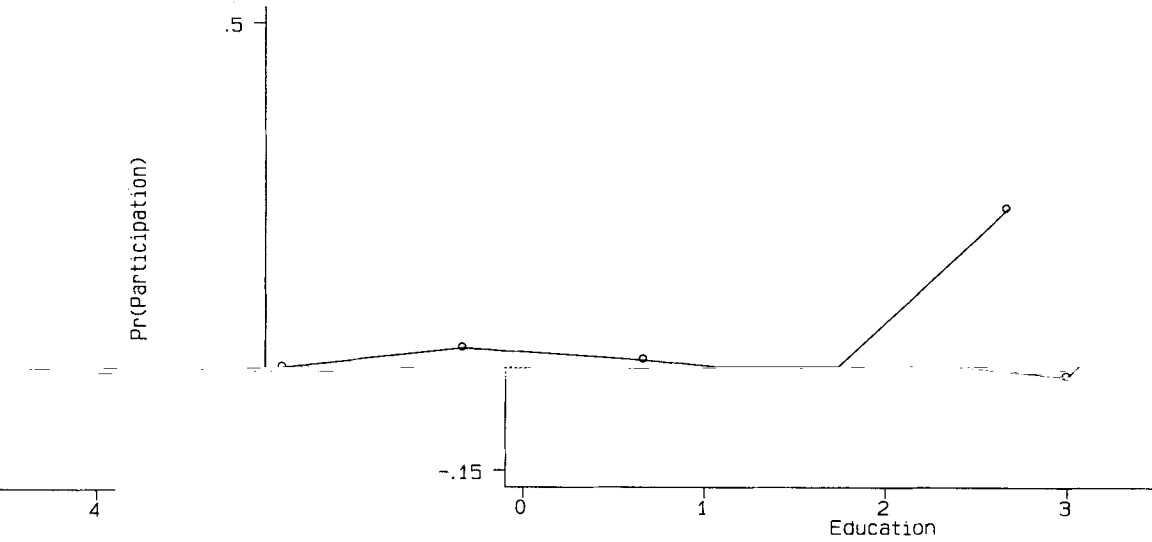


FIG. 1 (*Continued*)

TABLE 3

PREDICTIONS FROM PROBIT ESTIMATION OF PROBABILITY OF PARTICIPATION IN LABOR MARKET

Woman's Education	Korea	Thailand	Sri Lanka	Indonesia	Phili
Sample means for Participation dummy variable	.1615	.2110	.2392	.2594	
Predictions:					
At pooled sample means	.0861	.2836	.1773	.2470	
	(.004)	(.025)	(.010)	(.012)	
Postsecondary	.1453	.6947	.4525	.4148	
	(.026)	(.174)	(.058)	(.092)	
Secondary	.0553	.5733	.0931	.4551	
	(.022)	(.097)	(.052)	(.050)	
Intermediate	.0567	.3196	.0434	.2889	.3004
	(.020)	(.073)	(.053)	(.046)	(.032)
Primary	.0641	.1985	.1104	.2023	.3176
	(.020)	(.070)	(.053)	(.041)	(.034)
No schooling	.0526	.1192	.1263	.1976	.2877
	(.023)	(.169)	(.060)	(.043)	(.047)
Sample	5,052	2,982	5,866	7,940	8,678

NOTE.—Asymptotic errors are presented in parentheses.

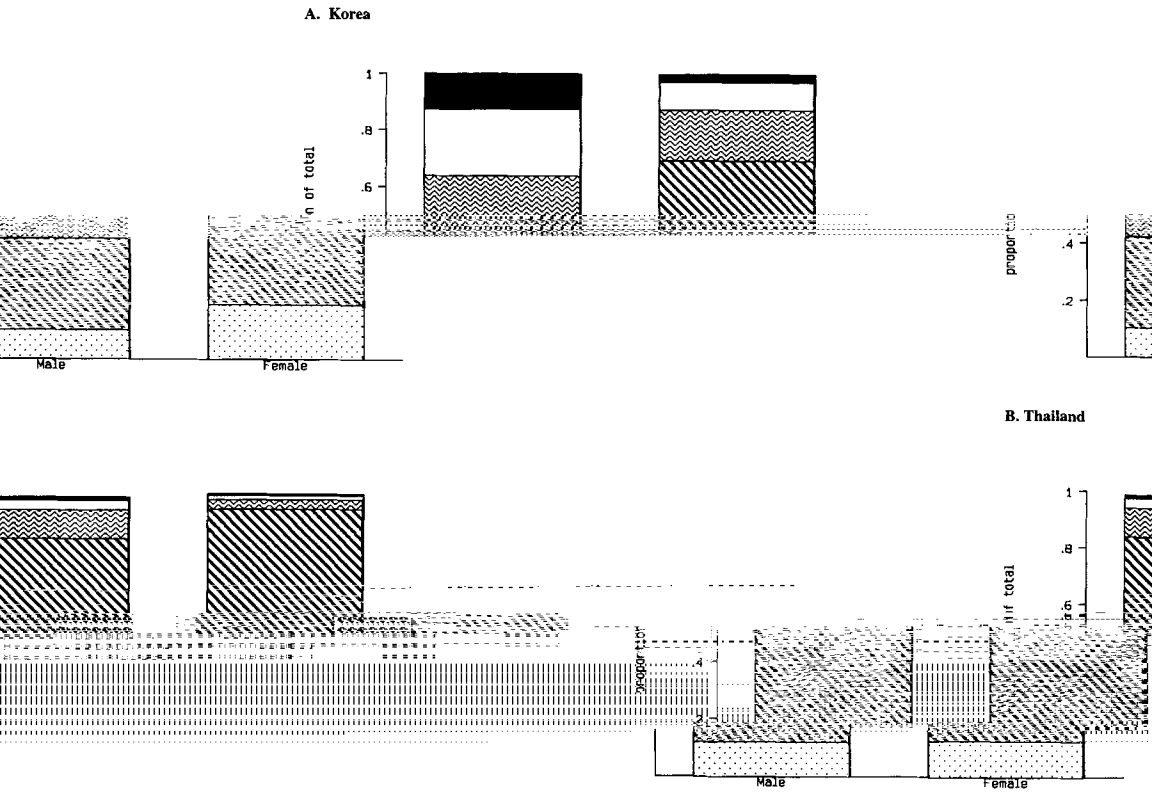


FIG. 2.—Education levels by gender and country

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average characteristics residing in either Korea or Sri Lanka w
a lower probability of entering the labor force than a woman
same characteristics who resides in the other countries. In 19
had a low participation rate (16.15%). Although, for women
higher education does not translate strongly into higher labor
ticipation, this rate was higher than the probability of participat
in table 3. Table 3 also includes the same predictions but for e
ble education level of the woman.

Figure 2 shows the proportions of men and women with e
of education by country in the data. In Korea, education le

Thailand and Indonesia owing to the level of development,
better educated than women. This suggests a society with
d gender roles and would also explain the weak relation-
education and labor force participation in Korea. Sri Lanka
ocialist development agenda during the sample period,
higher levels of education than those in similarly underde-
ries, and, unlike in Korea, this education was more equally

higher than in
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relatively fixe
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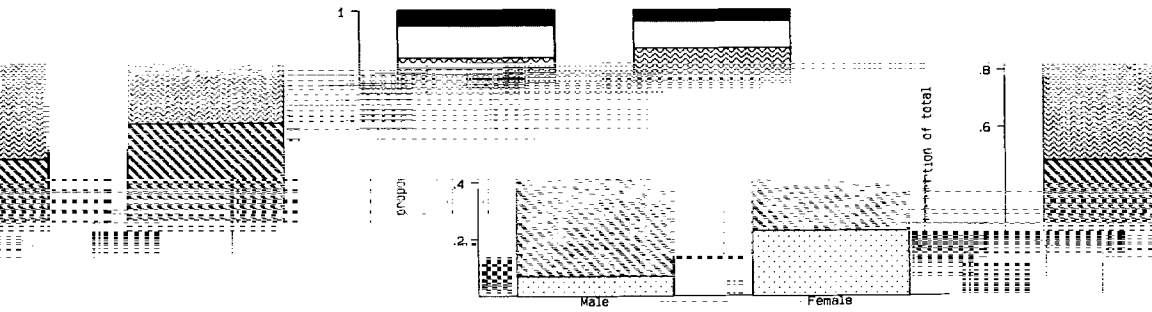
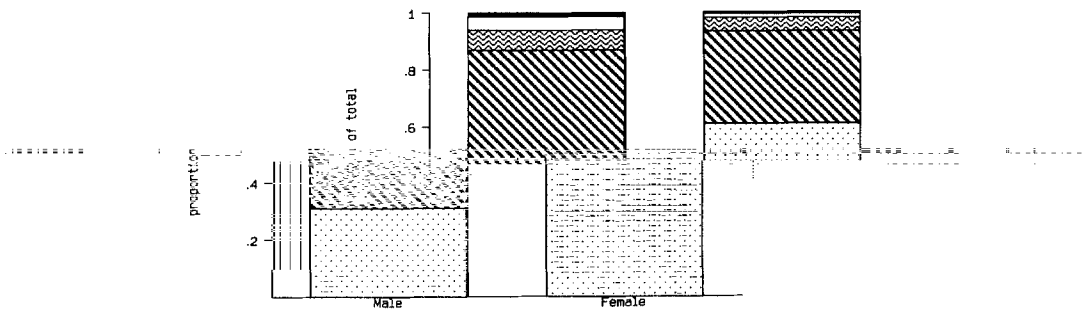
veloped count

C. Sri Lanka



D. Indonesia



E. Philippines

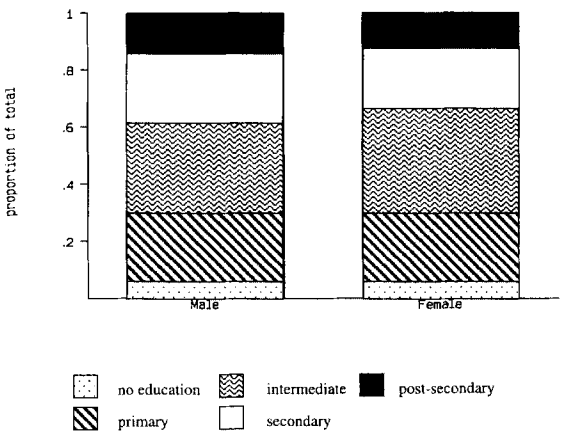


FIG. 2 (*Continued*)

spread across the sexes. While this education lead tertiary-educated women to enter the work force, those with lower levels of education did not. Had Sri Lanka's education levels been more similar to those experienced in other countries, women's labor force participation would have been lower.

With higher levels of education, women's LFPRs would have been significantly higher in the Philippines and Thailand. Traditional gender roles persist to a lesser extent in these countries. This is evident from the very small differences in education levels by gender in the Philippines (and to a lesser degree, Thailand) as shown in figure 2. Participation was low only because of the relatively low levels of education that prevailed owing to the Philippines' low level of development.

The cross-country comparisons highlight the importance of cultural differences. In countries like Korea, and, to a lesser extent, Sri Lanka, regardless of education levels, women's participation rates are low. In

levels are unlikely to bolster women's labor force participation rates. However, in countries where gender roles are less rigidly defined, like Thailand and the Philippines, there is likely to be a stronger relationship between women's education and labor force participation.

The theoretical model identified two channels through which education can affect women's labor force participation: the wage effect and the effect of enhanced bargaining power of the wife. Because of data constraints, it was not possible to quantify the relative importance of these channels. This is an area for future research with a more extensive data set.

TABLE A1

Definitions of Variables Used in Tables

Variable	Definition
Labor market participation	Dummy variable that equals 1 if the wife was working at time of survey, either for cash or in self-employment
Age	Age at time of survey in years
Births	Number of live births of the wife
Children	Number of children residing in the household at time of survey
Children (past 5 years)	Number of children born in past 5 years
Rural	Dummy variable that equals 1 if residence is in a rural area
Tertiary	Dummy variable that equals 1 if person has a tertiary qualification
Secondary	Dummy variable that equals 1 if person has a secondary school qualification
Intermediate	Dummy variable that equals 1 if person has an intermediate education qualification.
Primary	Dummy variable that equals 1 if person has a primary school qualification
Illiterate	Dummy variable that equals 1 if person cannot read

Notes

* We would like to thank Patrick Kenny for suggesting the use of the World Fertility Survey data. We would also like to thank two anonymous referees for helpful comments. All errors are our own.

1. Asian Development Bank, *Asian Development Outlook* (Manila: Asian Development Bank, 1989), pp. 170–71. See also Michael P. Todaro, *Economic Development*, 5th ed. (New York: Longman, 1995), chap. 11.

2. Appears in Elizabeth M. King and M. Anne Hill, *Women's Education in Developing Countries: Barriers, Benefits, and Policies* (Baltimore and London: Johns Hopkins University Press for the World Bank, 1993), p. v.

3. M. Sharif, "Landholdings, Living Standards and Labour Supply Functions: Evidence from a Poor Agrarian Economy," *Journal of Development Studies* 27 (1991): 256–76.

4. Shahidur R. Khandker, "Labour Market Participation of Married Women in Bangladesh," *Review of Economics and Statistics* 68 (1987): 536–41.

5. Paul J. Gertler and John L. Newman, "Family Labour Supply Decisions in Rural Peru," in *Issues in Contemporary Economics: Proceedings of the Ninth World Congress of the International Economic Association*, ed. Marc Nerlove (Athens, 1991).

6. T. Paul Schultz, "Testing the Neoclassical Model of Family Labor Supply and Fertility," *Journal of Human Resources* 25 (1990): 599–634.

7. Duncan Thomas, "Intra-household Resource Allocation: An Inferential Approach," *Journal of Human Resources* 25 (1990): 634–63.

8. Lawrence Haddad and John Hoddinott, "Women's Income and Boy-Girl Anthropometric Status in the Côte d'Ivoire," *World Development* 22 (1994): 543–53.

9. John Hoddinott and Lawrence Haddad, "Does Female Income Share Influence Household Expenditures? Evidence from Côte D'Ivoire," *Oxford Bulletin of Economics and Statistics* 57 (1995): 77–96. See also John Hoddinott, "A Model of Migration and Remittances Applied to Western Kenya," *Oxford Economic Papers* 46 (1994): 459–76, for an empirical application of Generalized Nash Bargaining in a model of migration and remittances in Kenya.

10. Pierre-Andre Chiappori, "Rational Household Labor Supply," *Econometrica* 56 (1988): 63–89.

11. The consumption good, *c*, is a composite commodity. The above utility functions assume that consumption is a household public good in that both spouses consume it.

12. The husband's labor supply is assumed to be predetermined. This is a common assumption in the labor supply literature for developed countries. See, e.g., Masao Nakamura, Alice Nakamura, and Dallas Cullen, "Job Opportunities, the Offered Wage, and the Labor Supply of Married Women," *American Economic Review* 69 (1979): 787–805. The assumption seems particularly plausible in the case of developing countries, where men typically work full-time hours.

13. The greater the bargaining power of the wife, the higher is her reservation utility constraint. Below, we consider the case in which the wife's bargaining power increases with her education level.

14. An increase in the wife's bargaining power appears as an increase in her reservation utility under the problem. This leads to lower utility for the husband in the solution to the problem and therefore leads to a higher marginal utility for the husband under the assumed quasi-concavity of the husband's utility function. This implies a larger value of μ.

15. Results from the estimation over the pooled sample are available from us on request.

16. See William H. Greene, *Econometric Analysis*, 3d ed. (New York: Macmillan, 1993), for a discussion [illegible]

17. The default category contains households in which the husband has no education.

18. United Nations Development Programme, *Human Development Report, 1996* (New York and Oxford: Oxford University Press, 1996).