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DISSERTATION

**WHERE DOES SHE FIND THE TIME?
ESSAYS ON WOMEN AND WORK IN
TWO SOUTHEAST ASIAN COUNTRIES**

Submitted by

Julie H. Gallaway

Economics

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2001

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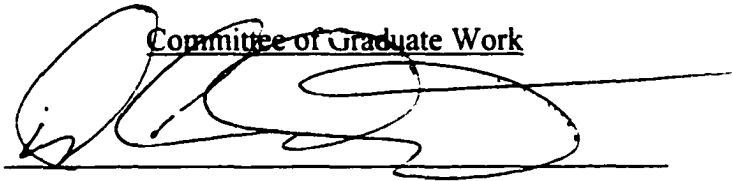
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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY JULIE H. GALLAWAY ENTITLED "WHERE DOES SHE FIND THE TIME? ESSAYS ON WOMEN AND WORK IN TWO SOUTHEAST ASIAN COUNTRIES" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

WHERE DOES SHE FIND THE TIME?

ESSAYS ON WOMEN AND WORK IN TWO SOUTHEAST ASIAN COUNTRIES

This research is motivated by the need to examine the constraints facing women in their labor force participation. Studying women's access to income is important because various studies have found women spend a larger proportion of their income on goods and services that benefit the household than men spend. These essays consider the labor force participation decision of women in Malaysia and Indonesia with three different approaches: (1) examining the effects of receiving past maternity leave on current labor force participation, (2) disaggregating the decision to work by distinguishing between formal and informal sector employment, and (3) investigating the tradeoff between time spent in market work and housework.

Chapter 2 examines a law designed to make labor market participation more compatible with a woman's family responsibilities by estimating how current labor force participation and earnings have been affected by receiving maternity leave from a prior employment. While the effect on earnings is inconclusive, results from the probit model indicate that past recipients of maternity leave are more likely to be current labor force participants than other women.

Chapter 3 considers whether the labor force participation decision is appropriately modeled as a choice between two options: to work or not to work. The results from a multinomial logit model confirm the decision between formal and informal sector employment is distinct. The model suggests higher education decreases the probability and the presence of young children increases the probability of informal sector employment.

Chapter 4 investigates the tradeoff between a woman's time spent in market production and housework. Results from a tobit model suggest the wives who participate in the labor market are unable to decrease their time in housework by an equivalent amount, thereby increasing their total time in productive activities. Additionally, the evidence from Chapters 3 and 4 leads us to reject the common preferences model of decision-making for these households because the effect of unearned income on the wife's labor force behavior depends on whether the husband or wife received it.

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Dedicated to my husband, Terrel,

and my parents, Jim & Judy,

for all their love

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CHAPTER 1

INTRODUCTION

An issue of growing importance in economics is how individual household members allocate their time between market and non-market activities. Non-market work may include informal economic activity or household work. Often, a double burden is placed on women because they maintain primary responsibility for biological and social reproduction even as their time spent in market production increases. The essays in this dissertation explore a few of the issues facing women in two Southeast Asian countries as their labor force participation increases.

The research in these essays is motivated by the need to examine the issues specific to women, as their labor force participation increases. If we can determine what constraints women face when deciding whether to enter the labor market, we can design more effective policies that are not gender biased, and which increase household income in a way that promotes the welfare of families. Studying women's income is especially important because several studies in a variety of countries and cultures have found that women spend income differently than men:

A series of studies in Brazil, India, Kenya, Malawi, and other countries indicates that a larger proportion of

women's than of men's income tends to be spent on household nutrition and basic welfare... This suggests that raising women's incomes directly is a good way to reach children as well as to strengthen women's status and bargaining power within the household.¹

Malaysia and Indonesia are ideal settings in which to study these issues for two reasons. First, both of these countries have been considered development success stories. Both are located in Southeast Asia, have had fairly high rates of economic growth over the past few decades, and have included a fairly explicit *principle of shared growth* in their development agendas. In fact, Malaysia and Indonesia are used as examples for the two-part development strategy recommended by the 1990 *World Development Report*—to promote efficient use of labor resources and to provide basic social services.²

Second, detailed micro-level data about household members exist for both countries. In 1988, the RAND Corporation and the National Population Development Board in Malaysia conducted the Second Malaysian Family Life Survey (MFLS2). For the survey, 3860 women and their families were asked a broad spectrum of questions. A few years later, 1993, the RAND Corporation collaborated with the University of Indonesia to conduct the Indonesian Family Life Survey (IFLS), interviewing members of 7200 households. Both of these data sets were designed to enable researchers to study household behavior and decision-making.³

The essay in Chapter 2 entitled “Maternity Leave, Labor Force Participation, and Earnings: Evidence from Malaysia,” examines the effects of a formal institution, “a law,” designed to make participation in the labor market more compatible with a woman's

¹ World Bank. 1990. *World Development Report 1990: Poverty*. New York: Oxford University Press. p. 37.

² Ibid.

³ The questionnaires, data, and codebooks are available from RAND. Also, RAND has returned to both Indonesia and Malaysia to conduct additional surveys that will allow more extensive research in these areas in the near future.

family responsibilities. One possible effect of the policy is to increase women's labor force attachment, however, the policy could also backfire, resulting in fewer jobs for women. We evaluate the maternity policy by estimating how women's current labor force participation and earnings have been affected by receiving maternity leave from a prior employment.

We estimate the labor force participation and earnings equations accounting for possible selection biases. While the effect on earnings is inconclusive, the main impact comes through increased labor force participation. Results from a probit model of labor force participation indicate that past recipients of maternity leave are more likely to be current labor market participants than other women, after controlling for age, ethnicity, education, training, and other household variables. Additionally, the positive effect of the maternity leave offsets the negative impact of having a few young children in the household.

The work in this essay contributes to the literature through an investigation and evaluation of a policy that focuses directly on women, their social responsibilities, and their labor force participation. Although the results in the chapter cannot identify how the policy has affected gender equality in Malaysia, the essay provides some insight into how the maternity leave policy has influenced women's labor force behaviors. The finding that maternity leave has a positive effect on women's participation in the labor market is encouraging for policy makers in other settings seeking the introduction of a similar policy.

In the essay in Chapter 3 entitled "To Work or Not to Work: Is that the Question? A Multinomial Logit Model of Married Women's Labor Force Participation in Urban

Indonesia,” we examine whether it is appropriate to model the labor force participation decision as a choice between two options: to work or not to work. We use a multinomial logit model that allows for differences in the decision to work between the formal and informal sectors. Given an ever-growing literature that suggests households do not always act as a single economic unit, our estimation allows us to test whether husbands and wives show evidence of having common preferences.

The estimation results suggest that a multiple-choice model that considers the differences in the formal and informal sectors is an appropriate way to analyze women’s labor force participation decisions in Indonesia. We find evidence that household responsibilities affect the choice between the formal and informal sectors. Having additional toddlers and men in the household increases the odds of being in employed in the informal sector relative to the formal sector. Nevertheless, some evidence confirms that it is the more marginalized women who work in the informal sector. The probability of informal sector employment decreases as the woman’s education level rises. Finally, the evidence leads us to reject the common preferences model for these households. The effect of unearned income on the wife’s labor force behavior is found to depend on whether it was the husband or the wife who received it.

This essay contributes to the current research in two ways. First, it finds that the decision between formal sector employment and informal sector employment is distinct, suggesting more attention needs to be paid to that choice for women. Second, it confirms what previous research on the household has found with further evidence that decision-making within a household is more complex than the standard Becker model suggests.

The final essay in Chapter 4 is entitled “Exhausting Time: The Tradeoff Between Time Spent in Market Production and Home Production For Women in Urban Indonesia.” In this essay we investigate the tradeoff between a married woman’s time spent in market production and her time spent in home production. We have another opportunity in estimating this model to test whether the husbands and wives truly have common preferences.

Using a tobit model of hours spent in home production, we find that the wives who participate in the labor market are unable to decrease their time in home production by an equivalent amount. This, in turn, increases their total time in productive activities, thereby decreasing their time spent in leisure or sleep. The largest decrease in time spent in housework occurs when the wife enters the labor market. After the entry decision is made, an additional hour spent in the market only decreases the wife’s home production time by a fraction of an hour. Once again, the evidence leads us to reject the common preferences model for these households.

This essay contributes to the research being done on time allocation. By focusing directly on the tradeoff between market and home production, it provides empirical evidence of the double burden women face. The results also suggest that the availability of childcare would lessen this burden, as an additional young child increases time spent in home production by up to six hours a week.

If “women’s access to paid work is crucial to achieving self-worth and the well-being of dependent family members,”⁴ then studying the labor force decisions of women and the constraints they face is essential. The desire to better understand these decisions

⁴ United Nations. 1995. *The World’s Women 1995: Trends and Statistics*. New York: United Nations. p. 105

is what motivated each of the essays in this dissertation. They contribute to a growing body of literature in a way that suggests where future research effort needs to be focused. In each case, answering one specific question raises several new questions that need to be explored.

CHAPTER 2

MATERNITY LEAVE, LABOR FORCE PARTICIPATION, AND EARNINGS: EVIDENCE FROM MALAYSIA

I. Introduction

To promote gender equality, government policies must recognize that women entering the labor force are typically disadvantaged due to their social responsibilities. Traditionally, women are responsible for biological and social reproduction. Social reproduction is “the care and maintenance of the household” (Momsen 1991, 28). The double burden placed on many women results from the fact that while their time spent in paid employment increases, they remain primarily responsible for the household labor. Economic growth and development are “gender-biased” if they ignore these social responsibilities (Jacobson 1992, Momsen 1991, and Folbre 1994). According to the 1995

The World's Women

[t]he sharing of parental responsibilities, the availability of child care and of maternal and other benefits all contribute to more equal conditions of women and men in the labour market. Maternity leave is the most basic protection for mothers working outside the home (United Nations, 128).

Government policies, such as paid maternity leave and childcare provisions, attempt to redefine employment conditions to reflect women's experience as workers.

Accordingly, maternity leave and childcare policies are important in promoting greater gender equality in the economy and in society generally. Such policies recognize the value of the biological and social reproductive work women perform and require employment conditions be defined in ways that do not penalize women for their social responsibilities. These policies are increasingly recognized as basic components of any development strategy concerned with promoting gender equality. Does the policy actually advance the interests of women or hinder them? The policies could potentially do more harm than good if implemented inappropriately. A paid maternity leave policy may lead to discrimination by employers trying to avoid the additional costs associated with it.

Malaysia offers an attractive setting in which to examine the impacts of maternity for three reasons. First, legislation was passed in 1955 granting Malaysian women the right to paid maternity leave (US Department of Labor 1993). Legally, an employer cannot fire a worker because of pregnancy, and the employer must provide full pay for 60 days during her absence due to pregnancy (United Nations 1995, 139). The policy signals a recognition and acceptance that women's productive labor is needed to achieve economic growth, while simultaneously valuing the woman's reproductive responsibility—the time a mother spends with a newborn immediately following birth.

Second, Malaysia is considered one of the development success stories from Southeast Asia (World Bank 1993). "Malaysia averaged 4 percent annual growth in real gross national product (GNP) per capita during the period 1965-1988" (Haaga et al. 1993, 7). Furthermore, Malaysia has promoted *shared growth* through the implementation of various policies. These policies are designed to ensure that growth benefits the rich and

poor, while remaining attractive to foreign investors. Malaysia was one model of the two-part development strategy recommended by the 1990 *World Development Report*—to promote efficient use of labor resources and provide basic social services. “[In] Malaysia this approach has brought about a substantial reduction in poverty along with rapid improvements in nutrition under 5 mortality, and primary enrollment” (1990, 3). Finally, the third reason is that micro-level data about receiving the benefit exist. The Second Malaysian Family Life Survey (MFLS2) for 1988 contains information whether or not a woman received maternity leave benefit, as well as detailed information about the characteristics of the respondent, the household composition, and the household economy.

This essay analyzes the consequences of the policy in terms of labor force participation and earnings—two factors the policy is expected to impact. While the effect on earnings is inconclusive, the main impact of the maternity leave policy comes through increased labor force participation. Results from a probit model of labor force participation indicate that past recipients of maternity leave are more likely to be current labor market participants than other past labor force participants, after controlling for age, ethnicity, education, training, and other household variables. The paper proceeds in the following manner: section two surveys the possible impacts of the maternity leave policy and examines the models; section three describes the data set and the setting; section four provides descriptive statistics; section five continues the analysis of the data through estimation of the empirical models, and section six concludes with implications and directions for future research.

II. Theories and Models

The effect of the availability of a paid maternity leave policy on women's labor force participation and earnings is uncertain. One of three things could happen. First, the policy may enable women to participate in the labor force while also providing them the opportunity to have children without being penalized. The maternity leave policy would benefit women by providing more job security and incentives to remain in the labor market. As women's labor force participation and attachment increase, their work experience will also increase, thereby increasing their earnings potential. In this case, the maternity leave policy will have a positive impact on women's labor force participation and earnings. Furthermore, the effect will be positive if employers willingly provide the benefit because they believe it will increase the women's productivity by making the job more valuable to the workers.

Second, the policy may have negative impacts on women's labor force participation and earnings. This could happen for a variety of reasons. According to Barbara Bergmann,

A policy requiring employers to give such paid leaves has important disadvantages for women. If the employer must pay a woman's salary for a long maternity leave, employers will have further incentive to keep women out of the high-paying fields. Even more than now, women will be confined to jobs in which the duties follow an easily learned routine and in which one person can easily be replaced by another. In such jobs, the pay would have to be lowered to make up for the cost of the maternity leave (1986, 213).

Employers may choose to discriminate against women, in which case few women may be able to access the policy. One study found that this happened in Tanzania. Some managers chose to stop hiring women altogether (Bryceson 1985). Employers also have

an incentive to pay women less if the costs of hiring them increase because of the policy. Thus, potentially the women who receive paid maternity leave will be paid less than those who did not receive the leave. One way to get around this problem is to have all employers share the cost of the policy, but that is not the case in Malaysia.

Finally, the maternity leave policy may have no impact on women's labor force participation and earnings. If the policy is not enforced legally or socially, then there will be no impact. The policy may not be enforced socially if women fear this will hurt their employment prospects. Women may choose not to take advantage of the policy.

Likewise, the policy will have no impact if it is not legally enforced. If there are no repercussions for violating the legislation, then employers may decide it costs less to violate than to follow. Another reason why the policy may not influence women's wages is that the positive effects and negative effects can offset each other. If an increase in labor force participation and attachment lead to an increase in experience and earnings while simultaneously employers discriminate against women and decrease their wages, the effects may cancel each other out.

To ascertain the effect of the maternity leave policy, we test if receiving paid maternity leave from a past employment affects a woman's current labor force participation and earnings by using a probit model of labor force participation and a regression model of earnings. Receiving leave from a past employment is used because using leave from a current employment may lead to biased results. Receiving maternity leave from a current employment would be endogenous in the labor force participation equation because only current participants would be eligible to receive the benefit. Additionally, receiving the benefit from a current employment may be endogenous in the

earnings equation. Bernasek and Gallaway (1997) find that the coverage of the maternity leave policy in Malaysia is uneven. Women who work in professional occupations and in the highest paying jobs are more likely to receive the benefit than other women. To circumvent these endogeneity issues, we assume that past maternity leave is exogenous because it is predetermined. Furthermore, we restrict the sample to women who have had at least one previous employment because only those women could have received the maternity leave benefit in the past. This is done to eliminate the possibility that the maternity leave variable is just a proxy for past employment.⁵

The decision to participate in the labor market is assumed to be a function of variables that influence a woman's expected offer wage and her reservation wage. The reservation wage is the minimum needed for a person to consider entering the labor force. A woman will enter the labor market if the expected offer wage is greater than her reservation wage. Human capital variables are expected to influence the offer wage. Characteristics of the household may influence the reservation wage by affecting the woman's productivity in the home and her demand for leisure time.

According to human-capital theory, the level of education and the amount of training received should influence the earnings. Employment characteristics, such as the length of employment and whether it is a full-time job, will also affect earnings. Furthermore, occupational characteristics will also determine what an employee will be paid. It is necessary to control for these variables to discover what significance the maternity leave policy has. Lastly, since ethnic tensions exist in Malaysia, controlling for ethnic differences is necessary.

⁵ The author would like to thank Richard Bryant and V. A. Samaranayake for this suggestion.

The variable of concern in these models is a dummy variable that equals one if the women ever received paid maternity leave from a previous employment and zero otherwise.⁶ The first hypothesis we test is receiving paid maternity leave has no impact on women's labor force participation. If this hypothesis is rejected, and the coefficient is positive then the policy has enabled recipients to better participate in the labor market. If the coefficient is negative, then the policy has decreased labor force participation. The second hypothesis is receiving paid maternity leave has no impact on women's wages. If this hypothesis is rejected and the coefficient is positive then the policy has enabled recipients to earn higher wages. If the coefficient is negative, then the policy has negative impacts on women's earnings.

To determine if receiving maternity leave has had an impact on women's labor force participation and earnings in Malaysia, we use the Heckman two-step procedure (Heckman 1979). Using this procedure, we first estimate the probability of being a labor force participant using a probit model. We then estimate the wage equation correcting for selection bias.⁷

The labor force participation decision is modeled using a probit equation. The dependent variable LFP equals 1 if the woman participates in the labor force and 0 if she does not. The probit equation estimated in the following section is specified as follows:

$$(1). \text{ Probability (LFP=1)} = 1 - F(-\beta X_1).$$

⁶ Unfortunately the data do not tell us why some women did not receive maternity leave. Some may have voluntarily left the jobs, others may have been denied the benefit, and some may not even know about the policy.

⁷ Manski (1989) questions this specification of the model, so we also ran the equations separately without the self-selection correction. The results from this estimation were not significantly different and are not reported.

In the equation above, F is the normal cumulative distribution function (Maddala 1983, 22) and X_1 is the vector of explanatory variables for the participation equation: whether maternity leave was received in the past, age, age-squared, ethnicity, level of education, number of job-related training programs taken, number of children under 6, number of children 6-14, number of women in the household older than 14, number of men in the household older than 14, husband's age, husband's income,⁸ homeownership, and dummy variables to represent the level of urbanization in which the household lives. Similar specifications for the participation decision can be found in Behrman and Wolfe (1984 & 1991), Reimers (1985), Khandker (1987a, 1987b, 1988), Sahn and Alderman (1988), and Skoufias (1993).

The earnings equation is an expanded version of the human-capital model. The pure human-capital model used by Jacob Mincer (1974) is specified as follows:

$$(2). \ln(\text{wage}) = f(\text{schooling}, \text{schooling-squared}, \text{experience}, \text{experience-squared}).$$

Mincer proposed that the earnings function is a useful tool of analysis and that he expected future research to expand the equation to include individual productivity measures and employment characteristics.

In principle, the earnings function represents a unification of analyses of investment parameters and income distribution; it provides an analytical expression for the earnings profile as an individual growth curve...At the same time, the coefficient of determination of the multiple regression measures the fraction of total earnings inequality (variance of logs) that can be attributed to the measured distribution of investments in human capital (Mincer 1974, 131).

This equation has been the starting point for many publications including Psacharopoulos (1977), Chiswick (1977), and McCabe and Rosenzweig (1976). Also, this equation has

⁸ Husband's age and income equal 0 if the husband is absent from the household.

been expanded to analyze developing countries and different policies—Behrman and Wolfe (1984), Sahn and Alderman (1988), Light and Ureta (1995), and Heckman (1980).

Because wages are only observed for women who are working, the wage equation may be subject to sample selection bias. Heckman (1974, 1976 & 1979) proposes a two-step procedure to correct for this potential bias. After estimating the labor force participation equation, we calculate the inverse of the Mill's ratio (λ) by the following equations from Heckman (1976):

$$(3). \quad \lambda_i = \frac{f(\phi_i)}{1 - F(\phi_i)}, \text{ where } \phi_i = -\frac{X_{2i}\beta_2}{\sqrt{(\sigma_{\varepsilon})}}.$$

In the above equations, F is the normal cumulative distribution function and f is the normal probability density function. Because ϕ is the negative of the predicted value from the Probit equation (1), λ is the non-selection hazard.

The wage equation estimated in the following section is specified as follows:

$$(4). \quad \ln(\text{wage}) = \alpha + X_2\beta + \varepsilon.$$

In this equation, X_2 is the vector of explanatory variables for the wage equation: whether maternity leave was received in the past, age, age-squared, ethnicity, level of education, number of trainings, employment characteristics, years employed at the current job, occupational category, urbanization, and the inverse of the Mill's ratio (λ) to correct for possible selection bias.

III. The Data and the Setting

Malaysia offers a unique setting in which to study the effects of a maternity leave policy because both the policy and micro-level data about receiving the benefit exist.

The data to be used in this essay are from the Second Malaysian Family Life Survey for

1988 (MFLS2).⁹ The Second Malaysian Family Life Survey was a collaborative effort of Lembaga Penduduk dan Pembangunan Keluarga Negara (National Population and Family Development Board) in Malaysia and RAND corporation. For the survey, 3860 women and their families were interviewed about a broad spectrum of questions, including whether or not a female respondent, who has given birth, received maternity leave from an employment. This survey “produced household-level retrospective and current data from women and their husbands...to enable study of household behavior in diverse settings during a period of rapid demographic and socioeconomic change” (Haaga et al. 1993, 1). The data set is rich and complicated allowing researchers to address diverse issues.

The country is as complex as the data. In traditional Malaysian society, both men and women worked. Whoever worked the land owned it and inheritance was equally split between all children. The introduction of Islam around 715 A.D. changed the inheritance laws, but women retained some ownership of assets. When the British colonized Malaysia they imported labor from China and India. This altered the mode of ethnicity and further distorted the rights of ownership in favor of men (Taplin 1989 & Heyzer 1986).

When examining Malaysia, one must consider the ethnic differences (Jesudason, 1989; Winzeler, 1985; Eden, 1989). There are three major ethnicities in Malaysia: Malay, Chinese, and Indian. The Malays consider themselves to be the indigenous group and are the majority. In 1988 fifty-eight percent of the population was Malay. The Chinese are the second most populous comprising thirty-two percent of the population. Ten percent are Indian (Haaga et al. 1993, 6). In the case of these three groups, ethnic

⁹ For details about the sampling plan and response rates see (Haaga et al. 1993)

background corresponds closely to religion. In the sample population of women in the Second Malaysian Family Life Survey, 99 percent of the Malays were also Muslims. Similarly, though not as dramatic, eighty-eight percent of the Chinese were Buddhist, Confucianist, or Taoist and eighty-five percent of the Indians were Hindu. Ethnic tensions have been present since the British occupation, but after Malaysia achieved its independence the tensions brewed until they exploded in 1969. "There were bloody racial riots for about two months, concentrated in the capital city [Kuala Lumpur]...The society was put under a state of emergency on 14 May 1969" (Jesudason 1989, 70). Shortly after the riots, the government started imposing more "pro Malay" policies. For example, "federal hiring quotas require that at least 30% of all such jobs [in multinational operations] be filled by Malays" (Eden 1989, 157).

Despite the fact that many women in Malaysia have traditionally worked, the number of economically active women in Malaysia more than doubled between 1970 and 1990. While the population was increasing, the labor market participation rate also increased during this time period. The female economic activity rate rose from 37 percent to 44 percent (United Nations 1991, 106). Both of these rates may understate women's economic contributions.

In rural areas of developing countries deficient data collection underreports much of women's unpaid work that is economic and contributes to national production. In societies where women's work is mostly within the household—and separation between workplace and home is blurred or nonexistent—the measurement problems are even greater (United Nations 1995, 109-10).

However, for the purposes of this paper, the problems with counting economic activity are ignored because much of the activity that is not counted occurs outside of the realm of maternity legislation.

For the analysis, the FULL sample consists of 1970 women, 16-49 years old, who have at least one child. To be included in the sample the women had to have answered the relevant questions. Furthermore, if the woman's husband is present in the household, he had to have answered the questions about his income.¹⁰ The 656 women in the sample who received an income from employment in 1988 are the labor force participants (LFP) and the other 1314 women are non-participants (NON). The labor force participants may be paid employees, self-employed workers or employers. Unpaid family workers do not receive an income and are therefore considered to be non-participants. Of the 174 women who have received maternity leave benefits from at least one past employment (LEAVE) almost half are currently in the labor force (see the sample sizes in Table 2.1).

IV. Descriptive Statistics

The first six tables give simple descriptive statistics of the data. The means and standard deviations for the quantitative independent variables are shown in Table 2.1. Noticeably, the women who received leave and are in the labor force (LEAVE & LFP) have a higher mean wage than the other women in the labor force. The t-statistic for the null hypothesis that the two means are equal is -3.6752 . Thus, the average pay of those who received leave is significantly higher at the 0.01 level¹¹ than those who never received leave. However, the women who received leave have been employed at their current job for a shorter period of time. On average, the wives who work outside of the home have significantly fewer young children (infants and toddlers) than women who do not work in the labor force, but the difference in the number of school-aged children (6-

¹⁰ The husband had to answer the questions, but does not have to have an income.

¹¹ With a p-value of 0.0001 for the one-tailed test.

14) is not significant. Furthermore, the wives who work tend to have additional women in the household who might relieve the wife from some of her home production responsibilities, while those who do not work tend to have additional men living in the household who are potential earners and may place more demands on the woman's time.

Ethnicity, education levels, and homeownership for each of the three main samples are given in Table 2.2. The average labor force participation rate is 33 percent. Indian women, in this sample, have the highest labor force participation rate, 41 percent. The labor force participation rates for Malay and Chinese women are 31 and 34 percent, respectively. Furthermore, women with different education levels have different participation rates. In order of increasing educational attainment from no education to a post-secondary level of education, the labor force participation rates are 37, 30, 32 and 72 percent. Thus, the women with the highest education level have the highest participation rates, followed by the women with the lowest educational attainment. Lastly, labor force participation rates do not differ significantly for women in households that own their own home when compared with women in other households.

Table 2.1: Means (and Standard Deviations) for Quantitative Independent Variables

Variables	LEAVE & LFP N=86	LEAVE & NON N=88	LEAVE N=174	NO LEAVE & LFP N=570	LFP N=656	NON N=1314	FULL N=1970
Woman's Age	36.59 (6.57)	35.27 (7.29)	35.93 (6.95)	34.83 (7.17)	35.06 (7.12)	33.39 (7.69)	33.95 (7.54)
Number of Children under 6 years	0.93 (0.99)	1.08 (1.00)	1.01 (0.99)	0.90 (1.01)	0.90 (1.01)	1.13 (1.04)	1.05 (1.03)
Number of Children 6-14 years	1.76 (1.17)	1.33 (1.34)	1.54 (1.27)	1.46 (1.37)	1.50 (1.35)	1.41 (1.34)	1.44 (1.34)
Number of Additional Women 15+ years	0.91 (1.12)	0.61 (0.85)	0.76 (1.00)	0.70 (1.01)	0.73 (1.03)	0.59 (0.96)	0.64 (0.99)
Number of Men 15+ years	1.70 (1.30)	1.48 (0.92)	1.58 (1.12)	1.46 (0.90)	1.49 (0.97)	1.57 (1.01)	1.54 (1.00)
Husband's Age	38.22 (11.94)	36.42 (12.20)	37.31 (12.07)	32.88 (15.77)	33.58 (15.42)	35.56 (12.32)	34.90 (13.46)
Husband's Average Monthly Income	906.83 (996.05)	1083.43 (1643.18)	996.15 (1361.29)	595.27 (655.23)	636.12 (716.09)	716.61 (1075.85)	689.81 (971.52)
Husband's Age (if present)	40.58 (7.38) N=81	38.61 (8.50) N=83	39.59 (8.01) N=164	38.56 (8.51) N=486	38.85 (8.38) N=567	37.78 (8.81) N=1237	38.11 (8.69) N=1804
Husband's Average Monthly Income (if present)	962.81 (999.77) N=81	1148.70 (1670.97) N=83	1056.89 (1379.21) N=164	698.16 (657.04) N=486	735.97 (720.97) N=567	761.22 (1093.43) N=1237	753.28 (991.42) N=1804
Number of Training Programs	1.02 (2.30)	0.44 (0.97)	0.73 (1.78)	0.74 (2.01)	0.78 (2.05)	0.26 (0.73)	0.43 (1.35)
Average Monthly Earnings	588.79 (894.38)			352.73 (484.63)	383.67 (560.53)		
Tenure—Years at Job	5.33 (4.97)			6.96 (6.95)	6.75 (6.75)		

**Table 2.2: Ethnic Composition, Educational Attainment
and Homeownership of Each Sample**

Variable	NON N=1314	LFP N=656	FULL N=1970
Ethnicity			
Malay	737	324	1061
Chinese	385	198	583
Indian	192	134	326
Education Level			
No Schooling	173	103	276
Primary	662	286	948
Secondary	459	215	674
Post-Secondary	20	52	72
Homeownership			
Own Their Home	779	386	1165
Do Not Own	535	270	805

Table 2.3: Education Levels and Homeownership for Each Ethnic Group

Variable	Malay N=1061	Chinese N=583	Indian N=326	FULL N=1970
Education Level				
No Schooling	146	86	44	276
Primary	483	292	173	948
Secondary	388	187	99	674
Post-Secondary	44	18	10	72
Homeownership				
Own Their Home	684	362	119	1165
Do Not Own	377	221	207	805

Table 2.3 provides the educational levels and homeownership by ethnicity. On average, Malay women are more highly educated than Chinese and Indian women. Forty-one percent of the Malay women have a secondary or better education, compared to 35 percent of the Chinese and 33 percent of the Indian women. While Malay women tend to be better educated, they have a lower labor force participation rate than the other ethnic groups. The most striking ethnic difference comes from looking at homeownership. Approximately 59 percent of the households own their home, but only 37 percent of the Indian households do. This difference is a legacy from the British colonization when Indian workers were brought to Malaysia to work on the rubber plantations. Indian families still frequently work and live on estates, where the provision of housing is included as part of their pay.

The next three tables focus on women who participate in the labor force. As expected, women who work in fulltime jobs, all year long, are have higher wages than those who work in part-time jobs or who for part of the year. Information on employment status is in Table 2.4. Sixty-six percent of the women in the labor force work fulltime and year-round, but employment status does vary by ethnicity, education level, and occupational category. Indian women, women with no education, and women with a secondary or better education are over-represented as fulltime, year-round employees. Women who work in sales or processing are under-represented as fulltime, year-round workers.

**Table 2.4: Ethnicity, Education Level and Occupational Category
by Employment Status**

Variable	Fulltime N=495	Allyear N=526	Fulltime & Allyear N=434	LFP N=656
Ethnicity				
Malay	233	246	188	324
Chinese	149	162	135	198
Indian	123	118	111	134
Education Level				
None	78	83	71	144
Primary	202	210	166	396
Secondary	169	185	152	348
Post-Secondary	46	48	45	107
Occupational Category				
Professional—technical	20	19	19	20
Professional—general	35	39	33	43
Managerial	7	7	7	7
Clerical	70	72	70	74
Sales	62	78	50	99
Service	67	68	55	95
Agriculture	135	122	113	152
Manufacturing—processing	48	73	43	103
Manufacturing—skilled	17	14	14	17
Manufacturing—construction	34	34	30	46
Earnings				
Mean Monthly Earnings	454.97	428.96	480.56	383.67
Standard Deviation	(617.25)	(605.99)	(647.96)	(560.53)

Table 2.5: Occupational Category for Each Education Level

Variable	None N=103	Primary N=286	Secondary N=215	Post- Secondary N=52	Mean Monthly Earnings*
Professional— technical	0	0	15	5	892.85 (892.54)
Professional— general	0	2	23	18	659.49 (415.15)
Managerial	0	0	2	5	1824.86 (1983.94)
Clerical	1	2	54	17	733.46 (486.48)
Sales	14	47	34	4	380.23 (813.15)
Service	10	59	26	0	309.31 (546.67)
Agriculture	46	97	9	0	250.76 (171.82)
Manufacturing— processing	18	48	36	1	174.01 (163.39)
Manufacturing— skilled	2	7	7	1	337.00 (124.55)
Manufacturing— construction	12	24	9	1	209.35 (149.44)
Mean Monthly Earnings*	233.30 (163.75)	266.60 (496.40)	452.49 (457.35)	1060.73 (1053.90)	383.67 (560.53)

*Standard deviations are below the means.

Table 2.6: Maternity Leave and Occupational Categories for Each Ethnic Group

Variable	Malay N=324	Chinese N=198	Indian N=134	LFP N=656
Maternity Leave				
Received Leave	30	27	29	86
Never Received Leave	294	171	105	570
Occupational Category*				
Professional—technical	14	2	4	20
Professional—general	31	6	6	43
Managerial	3	3	1	7
Clerical	37	28	9	74
Sales	69	27	3	99
Service	33	36	26	95
Agriculture	61	31	60	152
Manufacturing—processing	59	38	6	103
Manufacturing—skilled	7	6	4	17
Manufacturing—construction	10	21	15	46

*Some jobs that are included in each category are as follows:

Professional—technical = scientists, engineers, doctors, nurses, midwives, economists

Professional—general = accountants, teachers, writers, artists, athletes

Managerial = managers

Clerical = government officials, bookkeepers, stenographers, typists, transportation, telephone operators

Sales = insurance, real estate, salespersons, shop assistants, wholesale and retail managers and proprietors

Service = housekeeping, restaurant workers, launderers, hairdressers, protective service, catering, lodging

Agriculture = plantation supervisors, planters, farmers, animal husbandry workers, forestry, fishermen

Manufacturing—processing = production supervisors, metal, chemical and other processors, weavers, dressmakers

Manufacturing—skilled = shoemakers, carvers, blacksmith, electrical workers, plumbers, welders

Manufacturing—construction = rubber and plastics makers, painters, bricklayers, freight handling

Table 2.5 summarizes the relationships between educational attainment and occupational categories. As expected, women with the highest levels of education have the highest earnings. Also, women employed in professional, managerial, and clerical occupations tend to have above average earnings, while women employed in unskilled manufacturing jobs tend to have the lowest earnings. Furthermore, women with the highest levels of education tend to be employed in the occupations with the highest pay. Of the 52 women with a post-secondary education, 45 are employed in professional, managerial, or clerical occupations.

The final descriptive table contains more details about maternity leave and occupational categories for women in the labor force by each ethnic group. Less than 15 percent of the women in the labor force have received maternity leave from a prior job.¹² Indian women have the highest percent, 22 percent, and Malay women have the smallest percent, 9 percent, who received leave. Malay women tend to be under-represented in construction, agriculture and service occupations, and over-represented in professional and sales. Chinese women are over-represented in managerial, clerical, service, processing, and construction occupations. Finally, almost half of the Indian women are found in agriculture.¹³

¹² Actually, about 22% of the women in FULL have received maternity leave from their current job. These women are likely to be in high-paying, professional jobs (Bernasek & Gallaway 1997).

¹³ Indian women in agricultural are likely to receive maternity leave. (Bernasek & Gallaway 1997)

Table 2.7: Heckman Two-Step Selection Estimates

Dependent Variable for the Probit Equation:¹⁴ Labor Force Participant
 Dependent Variable for the Regression Equation:¹⁵ Ln of Monthly Earnings

Variable ¹⁶	Probit Estimates	Regression Estimates
Received Leave from a Previous Employment	0.355** (0.106)	0.165 (0.087)
Woman's Age	0.151** (0.042)	-0.041 (0.039)
Age-Squared	-0.002** (0.0006)	0.0004 (0.0005)
Chinese	0.061 (0.081)	0.391** (0.067)
Indian	0.319** (0.089)	0.169* (0.084)
Primary Education	-0.207* (0.094)	0.033 (0.086)
Secondary Education	-0.084 (0.112)	0.142 (0.104)
Post-Secondary Education	0.764** (0.209)	0.509** (0.165)
Number of Job Related Training Programs	0.304** (0.050)	0.059 (0.042)
Number of Training Programs Squared	-0.011** (0.004)	-0.002 (0.002)
Number of Children Under 6	-0.084** (0.035)	
Number of Children 6-14	0.011 (0.026)	
Number of Women 15+	0.068 (0.035)	
Number of Men 15+	-0.063 (0.036)	

¹⁴ The base for the LFP equation is a Malay woman with a no education who lives in a rural area.

¹⁵ The base for the wage equation is a Malay woman with a no education who works part-time, part of the year in agriculture, and lives in a rural area.

¹⁶ Table 2.9 in Appendix A provides the means of the urbanization variables.

Table 2.7: Heckman Two-Step Selection Estimates (continued)

Husband's Age	-0.008** (0.003)	
Husband's Income	-0.0002** (0.0001)	
Home Ownership	-0.045 (0.069)	
Number of Years at Current Employment		0.040** (0.013)
Tenure Squared		-0.001** (0.0005)
Fulltime, Year-Round Employment		0.906** (0.095)
Parttime, Year-Round Employment		0.135 (0.110)
Fulltime, Part-Year Employment		0.728** (0.123)
Professional-Technical		0.801** (0.186)
Professional-General		0.465** (0.149)
Managerial		0.871** (0.289)
Clerical		0.519** (0.129)
Sales		0.239* (0.101)
Service		0.044 (0.101)
Manufacturing-Processing		-0.288** (0.099)
Manufacturing-Skilled		0.151 (0.178)
Manufacturing-Construction		-0.241* (0.119)
Small Town	-0.043 (0.087)	0.149* (0.076)

Table 2.7: Heckman Two-Step Selection Estimates (continued)

Large Town	-0.018 (0.110)	0.233* (0.092)
City	0.210 (0.148)	0.433** (0.119)
Other Type of Town	-0.421** (0.162)	-0.134 (0.168)
Constant	-2.802** (0.698)	4.924** (0.792)
Mills ratio		0.026 (0.159)
Observations	1970	656
Chi-squared (Probit) or F (Regression)	447.64**	24.48**
R-squared		0.5314
Adjusted R-squared		0.5097

Standard Errors are in parentheses beneath the coefficients

* significant at the 5% level

** significant at the 1% level

Table 2.8: Predicted Probabilities of Labor Force Participation

	Predicted Probability of Labor Force Participation
Base (all variables at their means)	0.3203
Past Maternity Leave	
Did not receive	0.3092
Received	0.4432
Number of Children Under 6	
0	0.3564
1	0.3221
2	0.2893
Combinations of Children Under 6 and Past Maternity Leave	
1 & no leave	0.3110
1 & leave	0.4452
2 & no leave	0.2787
2 & leave	0.4085

V. Empirical Results

The results from estimating the labor force participation and earnings equations are given in Table 2.7. The dependent variable for the selection equation is a dummy variable for labor force participation. The natural logarithm of the average monthly pay in Malaysian dollars is the dependent variable for the earnings equation.¹⁷ The results indicate that women who have received maternity leave have higher labor force participation rates than other women, but the effect on earnings is inconclusive.

The descriptive statistics suggested that Indian women and women with post-secondary levels of education have the highest labor force participation rates. They also showed that women with no education have higher labor force participation rates than those with a primary level education. The results of the probit model confirm these suggestions. Furthermore, labor force participation increases with age and the number of job-related training programs taken, but at a diminishing rate. The results reflect the ethnic and human capital differences of the labor force participants.

Variables that increase a woman's productivity in the home relative to the market are likely to increase her reservation wage and decrease her labor force participation. Children under six have a significant negative impact on a woman's labor force participation. While having men in the household tends to decrease the probability and the presence of other women tends to increase the probability of the respondent's labor force participation, the results are insignificant. Measures of household wealth, homeownership and husband's income, have negative impacts on women's labor force participation. For the most part, the labor force participation of women living in rural

¹⁷ Monthly earnings are used because they are the most reliable estimate of pay. Over 95% of the respondents who answered the questions about pay gave their monthly earnings.

areas is not significantly different than that of women living in urban areas. The exception is for women who live in areas classified as another type of town. These are often military communities and the probit suggests that women in these areas are less likely to work in the labor force. One possible explanation is that there are fewer jobs available in this type of setting.

The labor force participation equation shows that even after controlling for the woman's age, ethnicity, education, training, number of young children, household composition, husband's age, husband's income, homeownership and household location, receiving maternity leave in the past increases the probability of current labor force participation. The positive effect of the maternity leave offsets the impact of having young children in the household. Holding all other variables at their means, receiving leave significantly increases the probability of labor force participation by 0.13 while an additional child decreases the probability by 0.03. A few predicted probabilities showing this compensating effect are provided in Table 2.8. Holding all other variables at their means, the predicted probability of labor force participation is about 0.28 for women who did not receive maternity leave and have two children under the age of six. For women who have received maternity leave and who have two children under the age of six, the predicted probability is 0.41.

In Table 2.1, we found the mean wage for those who had received maternity leave is significantly higher than for those who had not received leave. Looking at the regression results in Table 2.7, a positive relationship between maternity leave and earnings exists, but it is insignificant at the 0.05 level. Thus, we fail to reject the second hypothesis that maternity leave has no impact on earnings. After controlling for

ethnicity, education, occupational category, and employment status, the relationship between maternity leave and earnings is inconclusive. The difference in earnings for the women who have received leave is explained by their educational attainment, employment status, and occupational category.

The earning equation validates the findings from descriptive statistics that the women in Malaysia are realizing returns to human capital investment. Wages grow with a woman's years at a job and they tend to increase for every level of education. The largest returns come for women with a post-secondary education. On average, they earn approximately 50 percent more than those with no education, after controlling for ethnicity, years on the job, employment status, location, and occupational category. The number of training programs and age are insignificant at the 0.10 level. This could suggest that the most relevant experience to explain wages for these women is the time spent at their current job. It could also imply that age is not an appropriate measure of labor market experience for these women.

Finally, employment status, occupational category, and urbanization also have significant impacts on earnings. As expected, women who are employed fulltime, year-round, have much higher average monthly earnings than those who are employed part-time, for part of the year. Also women in professional, managerial, clerical, and sales occupations receive higher pay than those in agricultural jobs. On average, however, women employed in unskilled manufacturing jobs, processing and construction, receive lower pay than those employed in agriculture. Future research into the low earnings in manufacturing would be enlightening. It is often argued that these manufacturing jobs

provide an opportunity for women in developing countries, but in this sample the manufacturing jobs pay less than agricultural employment.

As a last point, while significant differences in labor market participation by urbanization did not exist, earnings in urban areas are typically higher than earnings in rural areas. The coefficients on small town, large town and city suggest that earnings in urban areas range from 20 to 45 percent higher than earnings in rural areas. This large difference may be partially explained by cost-of-living differences.

VI. Results and Their Implications

Government policies, such as maternity leave, are increasingly recognized as basic components of any development strategy concerned with promoting gender equality. In fact, most countries offer some form of paid leave for maternity. The major exceptions include New Zealand, Papua New Guinea, and the United States (United Nations 1995, 128, 137-140). In this paper we examined the effect of having received leave from a previous employment on the labor force participation and earnings of women in 1988 in Malaysia. The main effect of the policy was to increase the labor force participation of women who were able to receive the benefits. In fact, the positive effect of receiving maternity leave on labor force participation more than offsets the negative impact of the presence of a young child in the household. Theoretically, the increase in labor force participation increases work experience and thereby wages. However, we find the empirical impact of maternity leave on wages is indecisive.

Employers may still be discriminating against women to avoid paying maternity leave. This sample only included women with children. Because employers may discriminate against women whom they fear may become pregnant, this is an important

omission that must be examined before final conclusions can be drawn. There is some evidence that some employers are getting around the legislation:

Electronics companies also attempted to limit the employment tenure of their female workers to the short span of their life cycle when they were most capable of intensive labor. Most operators were young women ages 16 to 25 years, mainly single. In connection, government legislation for the protection of pregnant workers has had the unintended effect of reinforcing corporate policy to discourage married women from applying. Workers who got married while on the job could remain; however, they were often given counseling on family planning (Ong 1987, 147-48).

A longitudinal examination of the women's employers, labor force behavior, and fertility is necessary to reject the possibility that the results in this essay are due to individual differences amongst the women and their employers. Such research is particularly important as countries continue to develop and grow and women's labor force participation rates increase.

Additionally, we must consider Malaysia's unusual population policy to determine if a similar policy is appropriate for other countries. While many countries in the world were trying to lower population growth rates, in the early 1980s, Malaysia's Prime Minister, Dr. Mahathir Mohamad, announced a desire to increase Malaysia's population five-fold by 2100. He openly encouraged families to have five children and extended maternity leave benefits to cover the fourth and fifth children. Furthermore, the tax code was changed to lower the cost of children (Mohamad 1983; Govindasamy & DaVanzo 1992, 250; and Haaga et. al. 1993, 5). Because Malaysia has an unusual population policy, the impacts of maternity leave policies maybe different in other countries. Studies of similar maternity leave policies in other countries would be enlightening.

Finally, in the long run the effects of a maternity leave policy may be counterproductive for women for two reasons. First, the policy was intended to protect women with family responsibilities, but it may, in fact, reinforce the gender division of labor. While the policy may recognize the value of the biological and social reproductive work performed primarily by women, maternity leave reinforces that it is the woman's responsibility to perform such tasks. Women exclusively give birth, obviously, but men are capable of providing care for infants after the birth. The provision of paternity leave would recognize the value of fathers in social reproduction. Second, a maternity leave policy, alone, is not enough. Maternity leave only covers the first few weeks or months following birth, then families are on their own to find care for the child. If the family does not have resources to provide care or an extended family to help out, often it is the woman who gives up her job.

[E]ven when maternity protection is extended to a large number of women, lack of assistance for child care forces many women to stay away from their job for longer periods of time, usually without pay and with negative consequences for their advancement and career opportunities (United Nations 1995, 128).

Further investigation into the relationship between maternity, childcare and employment is necessary to better create policies promoting greater gender equality in the economy and in society.

Appendix A

Table 2.9: Means and Standard Deviations^a for the Urbanization Variables

Variable	LEAVE N=174	LFP N=656	NON N=1314	FULL N=1970
Small Town	0.2989 (0.4591)	0.2104 (0.4079)	0.1994 (0.3997)	0.2030 (0.4024)
Large Town	0.1379 (0.3458)	0.1372 (0.3443)	0.1043 (0.3057)	0.1152 (0.3194)
City	0.0690 (0.2541)	0.0701 (0.2556)	0.0441 (0.2055)	0.0528 (0.2237)
Other Type	0.0287 (0.1675)	0.0305 (0.1721)	0.0632 (0.2434)	0.0523 (0.2227)

^aStandard deviations are below the means.

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CHAPTER 3

TO WORK OR NOT TO WORK: IS THAT THE QUESTION? A MULTINOMIAL LOGIT MODEL OF MARRIED WOMEN'S LABOR FORCE PARTICIPATION IN URBAN INDONESIA

I. Introduction

In many developing countries, the participation of women in the labor market has been instrumental for economic growth. Nevertheless, women continue to retain primary responsibility for biological and social reproduction. A woman's decision to enter the labor market may be more complex than the standard labor force participation model permits because of these responsibilities. The decision of whether to participate in the labor market is frequently modeled as a decision between two choices: to work or not to work. However, in developing countries a large percent of economically active women work in the informal sector. "The informal sector is characterized by a large number of small-scale production and service activities that are individually or family owned" (Todaro 2000, 297). They may work in this sector because other opportunities are not available or because the informal sector is more compatible with their family responsibilities. A multiple-choice model that considers the differences in the formal and

informal sectors may be a more appropriate way to analyze women's labor force decisions.

In a 1995 article, Solomon Polachek argues, "that an individual's labor market success is perhaps the most important indicator of welfare. As such, studying how earnings are distributed is of paramount importance" (284). But thinking about income as only an *individual* indicator overlooks the importance of family and social welfare. When a woman's income increases she will tend to spend it on the household and family. Many studies in a variety of countries and cultures have found that women spend income differently than men:

a series of studies in Brazil, India, Kenya, Malawi, and other countries indicates that a larger proportion of women's than of men's income tends to be spent on household nutrition and basic welfare... This suggests that raising women's incomes directly is a good way to reach children as well as to strengthen women's status and bargaining power within the household (World Bank 1990, 37).

Other studies have found correlation between a mother's income and child nutrition, survival, household consumption, and other measures of family well-being (Lloyd & Gage-Brandon 1993, Thomas 1990, Papanek & Schwede 1988). From a policy standpoint, if we can determine what constraints women face when deciding whether or not to work in the formal or informal sectors of the labor market, we can design perhaps more effective policies that address women's needs and increase household income in a way improves the welfare of families.

This study investigates the labor force participation decision of married urban women in the context of a single developing country—Indonesia. Indonesia is an excellent setting for studying this topic for two reasons. First, Indonesia has been

considered a development success story. Located in Southeast Asia, Indonesia is categorized as one of the Newly Industrializing Economies (NIEs), one of countries in the second generation of Asian Tigers, and one of the *High-Performing Asian Economies* (HPAEs). Furthermore, Indonesia has included a fairly explicit *principle of shared growth* in its development agendas. The principle of shared growth established legitimacy for the development policies by “promising that as the economy expanded all groups would benefit” (World Bank 1993, 13). According to the 1990 *World Development Report* on poverty, Indonesia has “encouraged a pattern of growth that makes efficient use of labor and (has) invested in the human capital of the poor” (51). This two-part approach is *the* basic strategy for the reduction of poverty proposed by the report.¹⁸ Second, micro-level data about time allocation of women in Indonesia exist.

By using data from the Indonesian Family Life Survey (IFLS) for 1993, this paper examines the labor market participation decision of married urban women. We use a multinomial logit model that allows for bargaining within the household. The results from the multinomial logit model indicate that the decision-making process is more complex than a simple two-choice model will allow. We find that working for wages and self-employment are distinct outcomes that should not be combined. The effects of the determinants of employment depend on which choice is being studied. The choices between staying at home, working in the formal sector, and working in the informal sector are distinct. Having additional toddlers, children, and male adults in the household increases the odds of informal sector employment relative to the formal sector. This provides some evidence that women may be attempting to combine informal work with

¹⁸ Indonesia successfully decreased poverty by 40% from 1970-1987: in fact, the poverty rate continued to fall during the 1984-87 recession.

their household responsibilities. Furthermore, because the gender of the recipient of unearned income matters, the common preferences approach to decision-making within a household is questioned.

II. Literature Review

Gary Becker's famous 1965 article "A Theory of the Allocation of Time" spurred numerous empirical and theoretical investigations into how individuals choose to allocate their time optimally. For the first fifteen years after Becker's article, researchers treated the household as a single decision-maker, or as a cohesive unit. This approach has often been labeled the common preferences model; the implicit assumption is that the household members share the same preferences. The common preferences model of household behavior assumes that the members of the household make decisions to maximize a joint household utility function subject to income and time constraints. People are assumed to receive utility from their leisure time and the consumption of goods. The goods may be purchased or produced within the home. Goods produced within the home require two composite inputs: market goods and time. The ability to purchase market goods depends on the income of the household, which is determined by the time spent working in the labor market and from other non-labor sources.

Reuben Gronau extended the general Becker model of time allocation to valuing a housewife's time with a series of articles (1973a, 1973b, 1976, 1977, 1980). Since a housewife is not earning a wage it is necessary to find the shadow price of her time.

A woman's labor supply is the mirror image of her derived demand for time at home, and hence her price of time in the absence of market opportunities corresponds to her "entry wage"—the wage at which she is ready to supply the

first unit of labor... Thus, by estimating women's labor supply, one should be able to derive the "entry wage" and the housewife's value of time (1973a, p. S175).

Wales and Woodland (1977) were among the first to challenge the classification of housework as leisure. Their model includes three uses of time: Work, Leisure, and Housework. They argue the standard model is biased because time spent in home production has been treated as leisure. The major problems with home production are to determine what the output is and how it is to be measured. Further discussion about the household production function can be found in Pollak and Wachter (1975), Gronau (1980), Chiswick (1982), and Graham and Green (1984).

While some authors were looking at specifying the household production function, others were questioning the basic assumption that the household maximizes a utility function subject to total household income. What if the preferences of the household members differ? How does the household arrive at a decision? Dissatisfied with the idea that a husband and wife must have the same preferences and agree on household decisions, Manser and Brown (1980) and McElroy and Horney (1981) developed bargaining models of household decision-making. This approach is particularly appealing, because it allows the husband and wife to have different preferences even though only one outcome can be observed.

Bargaining models¹⁹ of the household are an alternative to the common preferences model. A number of alternative models exist, but it is difficult, at best, to

¹⁹ See Phipps & Burton (1995) and Haddad, Hoddinott, & Alderman (1997) for overviews of the different approaches.

prove which is more appropriate (Phipps & Burton 1995).²⁰ Although there are different approaches to how the bargaining takes place, the basic idea is to allow husbands and wives to have different preferences.²¹ One approach is to assume two people marry and remain married as long as it increases their own utility. In a marriage, spouses pool resources and are able to benefit from the joint consumption of some goods (e.g. children, paintings). Household decisions are made to maximize household utility, but it cannot be a zero-sum game. If a person in the marriage would be better off as a single person, the marriage may dissolve. Both partners must benefit from the union for it to survive. To allow for different preferences, a game theoretic approach can be used. The household utility function depends on the utility of each spouse minus her or his respective opportunity cost of the marriage. What is the next best alternative to the union? One simple measure would be the utility you would receive if the union did not exist—the utility from being single or in an alternative arrangement.

One way to test empirically whether the common preferences model is an appropriate approach is to see if the household truly “pools” all of its resources. The test does not actually prove or disprove the bargaining model, because the bargaining model does not prohibit income pooling. If the household does pool its resources, then the source of a resource will not influence the household’s decision-making. For example, the amount of the unearned income can influence decisions, but who receives it should not matter. In a study of Thailand, T. Paul Schultz rejected the “restrictions” of the

²⁰ For a more detailed discussion about different bargaining approaches see Manser and Brown (1980), McElroy & Horney (1981), and McElroy (1990) for the divorce threat model, Folbre (1984) and Pollak (1985) for the transactions costs approach, Lundberg & Pollak (1993, 1994, 1996) for the separate spheres approach.

²¹ Haddad, Hoddinott, & Alderman (1997) contains a collection of articles about modeling, measuring the outcomes, and policy implications of intrahousehold resource allocation.

common preferences model, but also cautioned “the evidence does not actually accept the ‘bargaining’ model” (1990, 623). Further evidence against the common preferences approach to intrahousehold allocation has been found in a variety of situations.²²

III. Empirical Model

The decision to participate in the labor market is assumed to be a function of the variables that influence a woman’s expected offer wage and her reservation wage. The reservation wage is the minimum needed for a person to consider entering the labor force. A woman will choose to enter the labor market if the offer wage is greater than her reservation wage. Human capital variables are expected to influence the offer wage, while characteristics of the household may influence the reservation wage by affecting the woman’s productivity in the home and her demand for leisure. If the choice is simply whether or not to enter the labor market, a simple binary logit model of labor market participation is appropriate.

Often, especially in developing countries, a large percent of economically active women work in the informal sector. The informal sector is “characterized by small competitive firms, petty retail and services, labor-intensive methods, free entry, and market-determined factor and product prices” (Todaro 2000, 749). The literature on the informal sector suggests that while it may provide short-run employment opportunities for women in developing countries, in the long run the informal sector may reinforce women’s inferior position in the labor market. The jobs in the informal sector are frequently considered inferior to those in the formal sector because they are the lowest

²² See Dwyer & Bruce (1988), Kooreman & Kapteyn (1990), Schultz (1990), Thomas (1990, 1997), Blumberg (1988), Hopkins, Levin, & Haddad (1994), Lundberg, Pollak, & Wales (1997), & Haddad (1999).

paying and least secure. Often it is the poor, unskilled, and uneducated women who are employed in the informal sector, perhaps because it is the only choice they have. Further discussion about the informal sector can be found in Bernasek (1999), Folbre (1994), and United Nations (1991 & 1995). In Indonesia, up to 65 percent of economically active women are found in the informal sector (United Nations 1995, 115). A multiple-choice model that considers the difference in the formal and informal sectors seems to be a more appropriate way to analyze women's labor force decisions (Hill 1983). In this case, a multinomial logit model can be used.

A binary logit²³ equation takes the form of

$$(1) \quad \ln(P/(1-P)) = \alpha + X_i\beta_i$$

where P is probability of an event, (1-P) is the probability of a nonevent, α is the intercept, X_i is the vector of i independent variables, and β_i is the vector of coefficients. The coefficient β represents the change in the log of the odds (logit) of an event for a one-unit change in the independent variable. The equation can be solved for the odds, $(P/(1-P)) = e^{X\beta}$, and for the probability of an event, $P = (e^{X\beta} / (1 + e^{X\beta}))$. To interpret the coefficient, it is useful to take this one step further and compute the percent change in the odds of an event from a change in one variable. To simplify, assume there is one independent variable. The change in the odds of an event is found by dividing the odds after the change by the odds before the change: $(e^{(X+\delta)\beta} / e^{X\beta}) = e^{\delta\beta}$, where δ is the amount by which X changes. If δ equals one, then e^{β} is the factor change in the odds from a unit increase in X.

²³ For more details about the logit and/or multinomial logit models see Maddala (1983), Aldrich & Nelson (1984), Hosmer & Lemeshow (1989), Long (1997), & Greene (2000).

The multinomial logit model (MNL) extends the binary logit model to more than two choices. Using the MNL, the labor force participation decision model can be illustrated as follows: assume there are three choices (1) do not participate in the labor market, working in home production (HOME), (2) participate in the formal sector, earning a wage (WAGE), or (3) participate in the informal sector, working for a family business or being self-employed (OWN). For the three-choice model in this essay, the MNL essentially estimates three binary logits, for example: WAGE (W) to HOME (H), HOME (H) to OWN (O), and WAGE (W) to OWN (O). A person can only make one of the three choices, so the logits must be related such that

$$(2) \quad \ln \left[\frac{P_W}{P_H} \right] + \ln \left[\frac{P_H}{P_O} \right] = \ln \left[\frac{P_W}{P_O} \right].$$

Because of this relationship, only two comparisons are needed to derive all possibilities in a three-choice model. The major assumption in the MNL is that the odds ratios, P_i/P_j , are independent of all other possible alternatives. This is known as the independence of irrelevant alternatives (IIA) assumption.

Interpreting the results from a multinomial logit model can be difficult. A coefficient in the model does not have to have the same sign as the marginal effect of the variable on the probability of the outcome. Additionally, the significance of the coefficient may differ from that of the marginal effect. This is because the marginal effect depends on not only on the coefficient, but also on all of the other coefficients in all of the equations. An exponentiated coefficient (e^β) of a given variable (X) can be interpreted as the conditional odds ratio: the odds of being in the specified category relative to the base category when X increases by one unit. In MNL an increase in the odds of an outcome does not necessarily imply an increase in the probability of that

outcome. The marginal effects ($\partial P_j / \partial x_i$) are the change in the probability of being in the specified category when X increases by one unit. While the coefficient of a variable may be positive for one outcome the probability of that outcome may decrease as the variable increases because the variable has an even larger positive effect on the third outcome.²⁴

The decision to work depends on the relative expected offer wages, as well as the relative reservation wages. Not only can the offer wages differ between sectors, but also the woman may have different reservation wages for the two sectors. These differences could arise because the informal sector might allow for more flexible hours and may be more compatible with a woman's family responsibilities. The explanatory variables in this model include variables that would influence a woman's offer wage and her reservation wage,²⁵ including variables reflecting the characteristics of the woman and her husband, their household composition, and their household economy. Average community wages for males and females are also included to control partially for differences in labor market conditions.

The variables for the woman include her age and education level. The probability of labor force participation is predicted to increase with an increase in the expected offer wage. Human capital is assumed to be positively related to the expected offer wage.²⁶ Thus, women with higher levels of education are expected to have higher probabilities of labor force participation. The characteristics of the woman's husband include variables reflecting his education level and work status. An increase her husband's earnings

²⁴ For more details about the calculation and interpretations of the coefficients and marginal effects see (Gould 2000) and (Greene 2000, 859-862).

²⁵ Similar specifications of the participation decision can be found in Behrman & Wolfe (1984 & 1991), Reimers (1985), Khandker (1987a, 1987b, & 1988), Sahn & Alderman (1988), & Skoufias (1993).

²⁶ Human capital can also increase the productivity in home production, but Gronau (1980) found that the increase in market productivity was greater than the increase in home productivity.

potential is expected to increase his labor supply and decrease her labor market participation by increasing her reservation wage through her nonlabor income.

Household-specific characteristics include variables for religion, household composition, and household economy. The religion of the household may reflect differences in beliefs about the status and role of the members. Young children will increase a woman's productivity in the home. Other women may increase a woman's labor force participation by providing a substitute for home production. Other men in the household will likely decrease her labor force participation by providing additional sources of market income and increasing demands on home production.

The household's real monthly per capita expenditures and number of rooms in the household per capita are used to proxy the wealth of the household. More wealth is expected to increase the woman's reservation wage, thereby reducing labor force participation. The number of rooms further reduces the probability of labor force participation by increasing the productivity in the home. The last two variables about the household economy are the separate unearned incomes for the husband and the wife. Unearned income is expected to increase the demand for leisure time and decrease labor supply. The wife's unearned income is separated from the husband's to allow for differences in preferences. If the effect of the unearned income depends on who receives it, then the common preferences model does not hold.

We test four hypotheses in this essay. The first and second hypotheses are tests about the specification of the model. First, we test the IIA property. The null hypothesis is that the difference in the coefficients is not systematic if one of the outcomes is omitted from the estimation. If this hypothesis is rejected then a MNL is not appropriate and an

alternative specification must be used. The second hypothesis is that the labor force decision is more complicated than a two-choice model will allow. The null hypothesis is that WAGE and OWN can be combined. If this hypothesis is accepted, then a simple binary logit model of labor force participation is appropriate, while if it is rejected, then the simple model ignores part of the decisions the wives are making. Next, we test to see if the common preferences model is appropriate for these wives. The null hypothesis is that the family member who receives the unearned income makes no difference in the wife's choice:

$$H_0: \beta_{\text{Wife's Unearned Income}} - \beta_{\text{Husband's Unearned Income}} = 0.$$

If the hypothesis is rejected, then the bargaining approach is a more appropriate model to use. Finally, we look for evidence that OWN is more compatible with household responsibilities than WAGE. It is predicted that women may perceive work in the informal (OWN) sector to be more compatible with her household responsibilities than work in the formal (WAGE) sector because it may allow for more flexible hours and working conditions. To test this hypothesis, we look at the impacts of young children and other household members on the wife's working decision.

IV. The Data and the Setting

Indonesia provides an interesting setting in which to study the labor supply decisions of women for a couple of reasons. First, Indonesia has been considered a development success story and women have become an important part of the labor force. In Indonesia, the economic role of women has changed over time and, in some respects, become less secure. "As far as can be established Javanese women have always worked

in the fields along with their men...Economic necessity and social circumstances made women seek gainful employment” (Mangkuprawira 1981, 86). Although cautioning against making too many generalizations, the World Bank states that

on the whole, there are few rigid cultural or religious restrictions on women’s behavior, but separate domains of privilege and responsibility are allocated to men and women...Women’s economic roles are considered secondary to their reproductive role, although women play an important decision-making role within many households and are in fact the managers of family finances in most (1999, 1).

But, as Indonesia is growing and changing the *household economy* may be changing as well. In one Javanese village Ann Ruth Willner found that the large influence women once had over the household economy was being diminished as their husbands migrated to the factories. Willner’s “research on factory workers suggested that when the sources of a man’s income are far from the locus of his household, his wife tends to have less control over it” (1980, 186-7). Studying what factors influence the decision-making process within a household is particularly important, since economic growth may change the balance of power.

Second, micro-level data about time allocation of women in Indonesia exist. The data used in this essay are from the Indonesian Family Life Survey for 1993 (IFLS). This survey is the result of a collaborative effort between RAND and Lembaga Demografi, Faculty of Economics, University of Indonesia. For the survey, members of 7200 households were interviewed about a broad spectrum of questions. The survey covered 13 of the 27 provinces in Indonesia (about 83 percent of the total population of

Indonesia).²⁷ The survey was designed to produce retrospective and current data on households covering demographic, social, and economic factors.

The potential areas of policy application of the IFLS are quite numerous and include education, population, health, nutrition, migration, labor force activities, and inter-household support. In addition, the IFLS can support analyses of urban-rural and gender differences (Serrato and Melnick 1995, 1).

For this essay we use a sample of 1828 married urban women aged 15-49 to examine the determinants of labor market participation.²⁸ The respondents were asked if they spent any time working for wages, working for self-employment income or for a family owned business, working for a family owned farm, or performing housework in the past seven days. Only urban households are considered for this 3-choice model.²⁹ To get at the decision-making within a family, only married women whose husbands were present in the household were selected. Furthermore, the sample was limited to women did housework or had only one economic activity outside the home.³⁰ Women who worked in the farm sector or worked in two sectors outside the household or who did not work inside or outside the home were excluded because the sample size for each category was too small for the analysis.³¹ The FULL sample includes 1828 married, urban

²⁷ For details about the sampling plan and response rates see (Serrato and Melnick 1995).

²⁸ The respondents in this sample are either the head of the household or their spouse. Some respondents were excluded from the sample because they did not answer all of the relevant questions.

²⁹ Future research on rural women would also be instructive. Because women in the rural sector often work in FARM, a 4-choice model would be necessary.

³⁰ There were 40 women in the Farm sector, 29 in both WAGE and OWN, and 41 who did NO work in the home or outside the home.

³¹ The small sample sizes led to many variables that were "perfect predictors" making convergence difficult. I considered merging HOME and NONE, but Wald and Likelihood Ratio tests for combining 2 categories rejected the idea that women who do not "work" are similar to those who work only in the HOME.

women, whose husbands are present in the household. Of this sample, 1 106 work in HOME, 519 in WAGE, and 203 in OWN.³²

V. Descriptive Statistics

The first five tables give simple descriptive statistics of the data. The means and standard deviations for the quantitative variables are shown in Table 3.1. The average wife in the sample is 34 years old and the average husband is 39 years old. The wives who work outside of the home are significantly older than those who only perform housework.³³ Households in which the wives work in the labor force have higher real monthly per capita expenditures than households in which the wife does not work outside of the home, on average. Wives who work in OWN have significantly more rooms in their house than other wives, but they also have more people living in the household. With respect to the household economy, the biggest surprise appears where the wife's unearned income is largest for OWN, while the husband's is the smallest for OWN. The unearned income is any income from a source other than from the family business or employment.³⁴ On average, wives receive as much in unearned income as their husbands. Furthermore, in the sample, 620 wives received some form of unearned income, while only 425 husbands did.³⁵ In general, the wives who stay at HOME have significantly more young children (infants and toddlers), but fewer older children (6-14)

³² In this sample, less than 30% of those women in the labor market are in the informal sector, compared to 65% found by the World Bank. In the IFLS, over 68% percent of the rural women are in the informal sector.

³³ At the 0.01 level, with a t-statistic = -5.8321 for $H_0: \mu(\text{HOME}) - \mu(\text{WAGE \& OWN}) = 0$ for a two-tailed test.

³⁴ Examples of possible sources of unearned income are Pensions, Gifts, Insurance, and Winnings. In calculating the total unearned income, preference was given to a respondent's own answers if different answers were given about the same source of income.

³⁵ In this sample 814 households have unearned income, but there are only 231 households in which both husband and wife received unearned income.

than women who work in the labor force have. Finally, significantly more adult women and servants are found in the households in which the wives work in the labor market than in the households where the wives stay at HOME.

More details about education levels, religion, and employment status of the households are given in Tables 3.2 through 3.4. Table 3.2 shows the education level for the husbands and wives in the FULL sample. On average, the education level of the husband is equal to or above that of his wife. In 52% of the households, the wife and husband have the same level of education and in 36% the husband's education level exceed that of his wife.³⁶ In Table 3.3, we find that differences in education by religion exist. Both the husbands and the wives in Protestant and Catholic households tend to be more highly educated than those in other households.

Education levels, religion and husband's employment status for each sample are provided in Table 3.4. Approximately 39% of the wives participate in the labor force. The wives with junior high and primary education levels have the lowest labor force participation rates, 32% and 37% respectively. Women with the highest education level and those with no schooling have the highest participation rates, 57% and 49%. Of the women who participate in the labor force, 72% are in WAGE and 28% are in OWN. The wives with the highest education levels, post-secondary and senior high, are over-represented in WAGE and under-represented in OWN. Women who have no schooling are over-represented in WAGE and OWN, while those with primary and junior high school educations are under-represented in the WAGE sector. From looking at Table 3.4, it appears that the relationship between education and employment status is complex.

³⁶ These results actually understate the difference in education. If the categories are further broken down (academic vs. vocational jr. and sr. high school, jr. college, college, and university) the husbands tend to receive a better quality education.

Table 3.1: Means (Standard Deviations) for Quantitative Independent Variables

Variable	HOME N=1106	WAGE N=519	OWN N=203	FULL N=1828
Wife's Age	32.78 (7.63)	34.50 (6.88)	35.69 (7.10)	33.59 (7.44)
Husband's Age	38.48 (9.35)	39.78 (8.92)	41.67 (9.47)	39.21 (9.30)
Real Monthly Per Capita Household Expenditures	92.39 (93.16)	108.38 (117.73)	108.27 (92.56)	98.69 (100.93)
Wife's Unearned Income	100.08 (432.12)	107.19 (309.83)	180.32 (492.92)	111.01 (409.42)
Husband's Unearned Income	133.89 (604.83)	127.73 (879.25)	56.36 (210.02)	123.53 (667.75)
Number of Rooms in the House	4.95 (2.51)	5.12 (2.26)	5.60 (2.48)	5.07 (2.45)
Household Size	5.18 (1.97)	5.04 (1.95)	5.63 (2.24)	5.19 (2.00)
Wife has an infant (less than 1 yr old)	0.14 (0.35)	0.05 (0.22)	0.06 (0.24)	0.11 (0.31)
Number of Wife's Toddlers (1-5 years old)	0.65 (0.72)	0.48 (0.65)	0.55 (0.68)	0.59 (0.70)
Number of Children (6-14 years old)	1.12 (1.14)	1.21 (1.11)	1.35 (1.21)	1.17 (1.14)
Number of Additional Women in the HH (15+ years old)	0.54 (0.85)	0.63 (0.88)	0.72 (1.00)	0.59 (0.87)
Number of Additional Men in the HH (15+ years old)	0.58 (0.94)	0.50 (0.80)	0.71 (0.95)	0.57 (0.91)
Number of Servants in the HH	0.04 (0.21)	0.08 (0.32)	0.09 (0.43)	0.06 (0.27)
Natural Log of the Average Community Wage for Male Workers	8.03 (0.40)	8.05 (0.35)	8.00 (0.33)	8.03 (0.38)
Natural Log of the Average Community Wage for Female Workers	7.83 (0.39)	7.81 (0.36)	7.75 (0.41)	7.81 (0.38)

Table 3.2: Education Levels for Wives and their Husbands

Wife's Education Level	Husband's Education Level					Total
	None	Primary	Jr. High	Sr. High	Post-High	
None	34	104	10	6	0	154
Primary	25	551	166	129	14	885
Jr. High	3	72	112	125	13	325
Sr. High	2	29	47	203	97	378
Post-High	0	2	5	23	56	86
TOTAL	64	758	340	486	180	1828

Table 3.3: Education Level for Each Religion

	Islam N=1583	Protestant N=94	Catholic N=54	Hinduism N=56	Buddhism N=41	Total N=1828
Wife's Education Level						
None	137	3	0	12	2	154
Primary	807	22	10	26	20	885
Jr. High	277	18	16	4	10	325
Sr. High	299	43	15	13	8	378
Post-High	63	8	13	1	1	86
Husband's Education Level						
None	61	0	1	1	1	64
Primary	690	15	8	27	18	758
Jr. High	288	19	15	7	11	340
Sr. High	406	43	15	11	11	486
Post-High	138	17	15	10	0	180

Differences in religion and husband's employment for each sample are also found in Table 3.4. The vast majority, 87%, of the households are Islamic. Islamic and Buddhist wives have the lowest labor force participation rates, and Protestant wives have

the highest. Most of the Hindu wives that work outside the home are found in WAGE, while Buddhist, Protestant, and Catholic wives are over-represented in the OWN sector. Not surprisingly, the labor force participation rate of the men is much higher on average than that of the women: 92% and 39% respectively. The majority of the husbands engage in wage work. Additionally, a wife's sector of employment corresponds to some extent with her husband's. This is most noticeable when the husband is employed in OWN. In these cases, 32% of the wives are also in OWN; only 11% of the wives in the full sample work in OWN. This may result if employing additional family members lowers transaction costs compared to hiring other employees.

In Table 3.5 we can see some of the differences in household expenditures and unearned income. Household expenditures, wife's unearned income, and husband's unearned income tend to increase with the education level of both the wife and husband.³⁷ On average, households in which neither the husband nor the wife works in the labor market have the highest average unearned income. This is consistent with economic theory that an increase in wealth will decrease labor supply. The smallest average expenditures occur in the households where only the wife is a labor force participant. Catholic households have the highest average expenditures, while Hindu households have the lowest. On average, wives in Catholic, Buddhist, and Protestant households receive the highest unearned income, while husbands in Protestant receive the highest unearned income.

³⁷ Although husband's unearned income appears to decrease with the husband and wife's post-secondary education, t-tests reveal that the mean is not significantly different than the means for senior high and junior high school levels.

**Table 3.4: Education Levels, Religion and
Husband's Employment Status for Each Sample**

	HOME N=1106	WAGE N=519	OWN N=203	Total N=1828
Wife's Education Level				
None	79	50	25	154
Primary	559	222	104	885
Jr. High	220	65	40	325
Sr. High	211	136	31	378
Post-High	37	46	3	86
Religion				
Islam	981	442	160	1583
Protestant	43	31	20	94
Catholic	30	15	9	54
Hinduism	28	24	4	56
Buddhism	24	7	10	41
Labor Force Participation				
Husband Participated	1014	485	189	1688
Husband Did Not	92	34	14	140
Husband's Sector of Employment *				
NONE	44	18	9	71
HOME	361	184	79	624
WAGE	877	445	108	1430
OWN	144	52	93	289
FARM	57	36	11	104
TOTAL **	1483	735	300	2518

*HOME, WAGE and OWN have the same interpretations for the husband as for the wife. Husbands could also perform NONE of the activities, and a few worked on a family FARM.

**The column total for the Husband's Sector of Employment is greater than the sample size because the husbands may be classified in multiple categories, unless they are in NONE. Only 69 of the husbands worked solely in HOME, 132 work in two sectors outside of the home, and 1 works in three sectors outside of the home.

Table 3.5: Means and Standard Deviations of Expenditures and Unearned Income by Education Level, Labor Force Participation, and Religion

	Mean Real Monthly Per Capita Household Expenses	Std. Dev.	Wife's Average Unearned Income	Std. Dev.	Husband's Average Unearned Income	Std. Dev.
Wife's Education Level						
None	59.92	(54.96)	50.13	(169.71)	60.00	(215.14)
Primary	72.36	(62.73)	83.09	(317.50)	80.50	(418.71)
Jr. High	104.22	(78.11)	129.38	(342.47)	169.75	(604.03)
Sr. High	141.72	(119.97)	164.22	(595.98)	204.08	(1161.16)
Post-High	229.13	(223.64)	208.40	(665.23)	151.45	(494.59)
Husband's Education Level						
None	69.93	(71.34)	6.36	(39.00)	35.34	(175.45)
Primary	66.36	(58.27)	85.99	(347.20)	77.06	(439.99)
Jr. High	96.41	(93.60)	124.14	(320.18)	158.85	(542.98)
Sr. High	114.93	(92.14)	130.95	(538.86)	177.86	(1028.50)
Post-High	202.89	(178.26)	174.92	(455.65)	137.19	(524.00)
Labor Force Participant(s)*						
Neither	98.64	(106.69)	189.92	(654.90)	379.90	(1104.04)
W only	74.82	(68.20)	84.73	(242.98)	162.40	(522.98)
H only	91.83	(91.88)	91.93	(405.41)	111.57	(532.50)
Both	110.74	(113.26)	130.81	(379.09)	103.76	(768.15)
Religion						
Islam	93.94	(91.68)	107.05	(392.99)	109.71	(514.76)
Protestant	115.05	(88.19)	146.31	(458.44)	382.73	(1941.42)
Catholic	199.03	(235.84)	232.49	(648.49)	174.41	(634.71)
Hinduism	91.35	(105.13)	20.48	(93.64)	108.75	(542.37)
Buddhism	122.59	(100.80)	146.34	(673.83)	15.86	(59.07)
FULL SAMPLE	98.69	(100.93)	111.01	(409.42)	123.53	(667.75)

* Sample Sizes: Neither = 92; Wife Only = 48; Husband Only = 1014; Both = 674.

Table 3.6: Multinomial Logit Model Results³⁸

Variables	(1)WAGE	(2) OWN	(3) OWN
Real Monthly Per Capita Household Expenditures (thousands)	0.0003 (0.48)	0.002 (1.70)	0.001 (1.31)
Wife's Unearned Income (thousands)	4.97 ⁻⁵ (0.33)	0.001** (3.68)	0.001** (3.15)
Husband's Unearned Income (thousands)	0.000 (0.75)	-0.001** (2.87)	-0.001** (2.64)
Number of Rooms per Capita	-0.099 (0.82)	0.379* (2.37)	0.477** (2.67)
Wife's Age	0.300** (3.60)	0.192 (1.54)	-0.108 (0.79)
Wife's Age Squared	-0.004** (3.37)	-0.002 (1.34)	0.002 (0.87)
Primary Education—Wife	-0.245 (1.11)	-0.694* (2.38)	-0.450 (1.43)
Jr. High Education—Wife	-0.222 (0.83)	-0.752* (2.10)	-0.529 (1.35)
Sr. High Education—Wife	0.726** (2.62)	-0.891* (2.23)	-1.617** (3.78)
Post-Secondary Education—Wife	1.514** (3.99)	-1.816* (2.21)	-3.330** (3.98)
Husband's Age	-0.021 (0.39)	-0.086 (1.08)	-0.065 (0.75)
Husband's Age Squared	0.0001 (0.23)	0.001 (1.07)	0.001 (0.83)
Primary Education—Husband	-0.237 (0.76)	0.540 (1.01)	0.777 (1.40)
Jr. High Education—Husband	-0.644 (1.89)	0.415 (0.72)	1.058 (1.76)
Sr. High Education—Husband	-0.891** (2.59)	0.365 (0.63)	1.256* (2.08)
Post-Secondary Education—Husband	-1.232** (3.12)	-0.187 (0.28)	1.045 (1.48)

³⁸ HOME is the comparison group for equations (1) and (2) and WAGE is the comparison group for equation (3). The base for the model is an Islamic Woman with no education whose husband has no education.

Table 3.6: Multinomial Logit Model Results (continued)

Variables	(1)WAGE	(2) OWN	(3) OWN
Husband Worked for Wages	0.616** (3.38)	-0.251 (1.14)	-0.867** (3.48)
Husband Worked on a Family Farm	0.549* (2.19)	-0.019 (0.05)	-0.568 (1.42)
Husband Worked for His or Family Business	0.104 (0.51)	1.609** (7.27)	1.504** (5.91)
Husband Did Housework	0.211 (1.75)	0.502** (2.85)	0.291 (1.52)
Number of Infants less than 1 year	-1.078** (4.68)	-0.539 (1.57)	0.539 (1.38)
Number of Toddlers 1-5	-0.471** (4.92)	0.012 (0.09)	0.483** (3.22)
Number of Children 6-14	-0.059 (0.97)	0.149 (1.75)	0.207* (2.23)
Number of Female Adults 15+	0.070 (0.96)	0.245* (2.40)	0.175 (1.58)
Number of Male Adults 15+	-0.276** (3.56)	0.012 (0.12)	0.289* (2.55)
Number of Servants	0.302 (1.34)	0.502 (1.72)	0.200 (0.65)
Buddhist	-0.520 (1.15)	0.341 (0.74)	0.861 (1.50)
Catholic	-0.280 (0.79)	0.561 (1.19)	0.841 (1.59)
Hindu	0.616* (2.02)	-0.120 (0.21)	-0.736 (1.26)
Protestant	0.371 (1.39)	1.274** (3.87)	0.903* (2.54)
Ln of the Community Male Wage	0.074 (0.38)	0.200 (0.69)	0.126 (0.40)
Ln of the Community Female Wage	-0.135 (0.69)	-0.720** (2.58)	-0.584 (1.92)
Constant	-4.713* (2.47)	-0.713 (0.25)	4.001 (1.28)

Absolute value of z-statistics in parentheses

* significant at 5% level

** significant at 1% level

LR $\chi^2(64) = 399.82$

Log likelihood = -1455.4339

VI. Empirical Results

The results from estimating the multinomial logit model are given in Table 3.6. The first and second hypotheses are tested to determine the appropriateness of the model. Hausman and McFadden (1984) developed a test for the independence of irrelevant alternatives (IIA) property. The test is to eliminate one of the categories and see if the model is significantly impacted. The null hypothesis is that the difference in the coefficients is not systematic when one category is excluded, and the test statistic is distributed chi-squared (χ^2). The results are as follows: $\chi^2(df=30) = -12.106$ if WAGE is omitted, $\chi^2(df=31) = -1.568$ if OWN is omitted, and $\chi^2(df=29) = -11.763$ if HOME is omitted. The negative χ^2 statistics can be interpreted as failing to reject the null hypothesis, or supporting IIA.³⁹ Hausman and McFadden note

[w]e have occasionally found the test statistic of equation (1.21) to be negative due to a lack of positive semidefiniteness in finite sample applications. Replacement by the alternative covariance matrix always leads to a small positive number. However, in no case have we found this alternative statistic to be so large as to come close to any reasonable critical value for a χ^2 test (1986, 1226n).

Therefore, the multinomial logit is accepted for this analysis.

The second hypothesis tested in this section is for combining outcomes. The null hypothesis is that WAGE and OWN can be combined. A likelihood ratio (LR) test can be used. The hypothesis is that the difference between the coefficients for all variables equals zero. The resulting $\chi^2(df=32)$ statistic is 212.494, leading us to reject the null at

³⁹ See Hausman and McFadden (1984), Freese and Long (2000), Greene (2000), Long (1997), and StataCorp (1999) for information about the tests used throughout this section.

the 0.01 level.⁴⁰ The decision these wives in Indonesia are making is not one of simple labor force participation. This implies that using a binary logit model of labor force participation will obscure some of the variables and relationships affecting these wives decisions.

The relationships between the variables and the decision to enter a sector are complex, and interpreting the results from a multinomial logit model can be complicated. The first two columns of Table 3.6 give the results for estimating the model with HOME as the base category. The signs of the coefficients in these two equations can be interpreted as impacting the odds of being in that sector relative to HOME. The third column gives the results for the log of the odds of OWN relative to WAGE. These results can be extracted from the first two columns:⁴¹

$$\beta_{O/H} - \beta_{W/H} = \beta_{W/O}.$$

Thus, a coefficient in column (3) equals the coefficient in column (2) minus the coefficient in column (1). However, the marginal effect on the predicted probability may differ in sign and significance from the coefficient in Table 3.6. The marginal effects of the variables evaluated at their means are located in Table 3.7. Additionally, some predicted probabilities for various scenarios are included in Table 3.8.

⁴⁰ A Wald test also rejects the hypothesis that WAGE and OWN can be combined at the 0.01 level with a $\chi^2(df=32)=167.038$.

⁴¹ $\beta_{O/H}$ is the coefficient for the OWN equation relative to HOME. Furthermore, the variance of $\beta_{O/W}$ can be computed from the variance-covariance matrix for the estimates. See Long (1997, p. 154-160).

Table 3.7: Marginal Effects

Variables	WAGE	OWN	HOME
Real Monthly Per Capita Household Expenditures (thousands)	2.80 ⁻⁵ (0.22)	0.0001 (1.67)	-0.0001 (0.99)
Wife's Unearned Income (thousands)	-5.44 ⁻⁶ (0.19)	5.07 ^{-5**} (2.93)	-4.53 ⁻⁵ (1.47)
Husband's Unearned Income (thousands)	7.17 ⁻⁶ (0.42)	-6.48 ^{-5**} (2.87)	5.76 ^{-5**} (2.59)
Number of Rooms per Capita	-0.028 (1.18)	0.029** (2.61)	-0.002 (0.07)
Wife's Age	0.055** (3.42)	0.007 (0.85)	-0.063** (3.70)
Wife's Age Squared	-0.0007** (3.23)	-8.11 ⁻⁵ (0.68)	0.0008** (3.42)
Primary Education—Wife	-0.034 (0.80)	-0.044* (2.21)	0.078 (1.74)
Jr. High Education—Wife	-0.028 (0.54)	-0.049* (1.98)	0.077 (1.41)
Sr. High Education—Wife	0.163** (3.05)	-0.079** (2.86)	-0.084 (1.46)
Post-Secondary Education—Wife	0.338** (4.59)	-0.162** (2.89)	-0.177* (2.09)
Husband's Age	-0.002 (0.22)	-0.006 (1.02)	0.008 (0.72)
Husband's Age Squared	7.78 ⁻⁶ (0.07)	6.09 ⁻⁵ (1.05)	-6.86 ⁻⁵ (0.58)
Primary Education—Husband	-0.058 (0.97)	0.044 (1.17)	0.015 (0.22)
Jr. High Education—Husband	-0.136* (2.08)	0.043 (1.08)	0.093 (1.29)
Sr. High Education—Husband	-0.184** (2.77)	0.045 (1.11)	0.139 (1.92)
Post-Secondary Education—Husband	-0.240** (3.14)	0.013 (0.27)	0.227** (2.72)

Table 3.7: Marginal Effects (continued)

Variables	WAGE	OWN	HOME
Husband Worked for Wages	0.127** (3.64)	-0.031* (2.03)	-0.096** (2.65)
Husband Worked on a Family Farm	0.109* (2.26)	-0.013 (0.50)	-0.096 (1.84)
Husband Worked for His or Family Business	-0.013 (0.33)	0.113** (7.10)	-0.100* (2.42)
Husband Did Housework	0.031 (1.34)	0.031** (2.57)	-0.063* (2.52)
Number of Infants less than 1 year	-0.202** (4.51)	-0.016 (0.65)	0.218** (4.77)
Number of Toddlers 1-5	-0.094** (5.05)	0.011 (1.15)	0.083** (4.30)
Number of Children 6-14	-0.015 (1.26)	0.012* (2.01)	0.003 (0.24)
Number of Female Adults 15+	0.009 (0.62)	0.016* (2.27)	-0.025 (1.66)
Number of Male Adults 15+	-0.055** (3.66)	0.007 (0.97)	0.048** (3.13)
Number of Servants	0.049 (1.14)	0.030 (1.49)	-0.079 (1.68)
Buddhist	-0.110 (1.26)	0.035 (1.08)	0.075 (0.85)
Catholic	-0.067 (0.98)	0.046 (1.39)	0.021 (0.30)
Hindu	0.125* (2.13)	-0.022 (0.54)	-0.103 (1.53)
Protestant	0.047 (0.91)	0.083** (3.70)	-0.130* (2.38)
Ln of the Community Male Wage	0.011 (0.28)	0.013 (0.53)	-0.023 (0.58)
Ln of the Community Female Wage	-0.012 (0.31)	-0.049* (2.50)	0.060 (1.51)
Constant	-0.919* (2.48)	0.048 (0.24)	0.870* (2.23)

Absolute value of z-statistics in parentheses

* significant at 5% level

** significant at 1% level

Table 3.8: Predicted Probabilities*

Variable	HOME	WAGE	OWN
Base (all variables at their means)	0.6504	0.2722	0.0775
Wife's Education**			
None	0.6089	0.2392	0.1519
Primary	0.6983	0.2147	0.0870
Jr. High	0.6983	0.2196	0.0822
Sr. High	0.5224	0.4242	0.0535
Post-Secondary	0.3539	0.6318	0.0144
Religion			
Islam	0.6578	0.2703	0.0719
Buddhist	0.7152	0.1748	0.1100
Catholic	0.6656	0.2068	0.1275
Hindu	0.5383	0.4096	0.0522
Protestant	0.5034	0.2998	0.1968
Number Infants			
0	0.6271	0.2939	0.0790
1	0.8111	0.1293	0.0596
Number of Toddlers (1-5)			
0	0.5984	0.3309	0.0708
1	0.6826	0.2356	0.0817
2	0.7481	0.1612	0.0906
Number of Children (6-14)			
0	0.6459	0.2895	0.0647
1	0.6499	0.2747	0.0755
2	0.6522	0.2599	0.0879
Number of Female Adults (15+)			
0	0.6646	0.2669	0.0686
1	0.6400	0.2758	0.0843
2	0.6134	0.2834	0.1032
Number of Male Adults (15+)			
0	0.6218	0.3046	0.0736
1	0.6705	0.2492	0.0803
2	0.7127	0.2009	0.0864
Husband Performs Housework			
No	0.6713	0.2614	0.0674
Yes	0.6073	0.2921	0.1007
Husband Works in OWN			
No	0.6649	0.2737	0.0614
Yes	0.5213	0.2382	0.2405

*Holding all other variables at their means.

**Holding all other variables at their means except the other religion or education dummy variables, which are set to zero.

The model confirms much of what we learned from the descriptive statistics. According to the predicted probabilities in Table 3.8, women with primary and junior high levels of education have the highest probabilities of HOME, whereas those with the highest levels of education have the lowest. Women with no education have the highest probability of OWN, almost twice that of all the other women, while women with the highest levels of education have the highest probabilities of WAGE. This confirms the suggestion that it is the most marginalized women who work in the informal sector—those with the least education and lowest potential earnings.

The descriptive statistics suggested that Islamic and Buddhist wives have the lowest labor force participation rates, and Protestant wives have the highest. Furthermore, we saw that Hindu wives who participated are likely to be engaged in WAGE, while Buddhist, Protestant, and Catholic wives are over-represented in OWN. The predicted probabilities corroborate these findings.

For the third hypothesis we look at unearned income to see if there is evidence of bargaining in these households. Common preference theory dictates that unearned income has the same impact, no matter who receives it between the husband and wife. Bargaining models of the household suggested that a test of common preference theory is to see if it does matter. The estimated model suggests that who gets the income matters with respect to the OWN sector. The results of Wald tests for the null hypothesis

$$H_0: \beta_{\text{Wife's Unearned Income}} - \beta_{\text{Husband's Unearned Income}} = 0.$$

differ between OWN and WAGE. The test statistic in the OWN equation (relative to HOME) is a $\chi^2(1)$ statistic of 15.15. Thus, the null hypothesis is rejected at the 0.01 level. The same test for the WAGE equation gives a $\chi^2(1)$ of 0.33. Here, we fail to reject

the null hypothesis at the 0.10 level. The results are mixed, but do suggest that the common preferences model does not apply to all of the households in this sample.

Looking more closely at the household economy, the results are not all as expected. The marginal effects from Table 3.7 indicate that higher levels of the husband's unearned income significantly decrease the probability that the wife will be employed in OWN relative to HOME, as predicted. However, his unearned income does not have a significant impact on the probability of WAGE. Furthermore, higher levels of the wife's unearned income significantly increase the probability of OWN. This result warrants further investigation. It could indicate a source of bias in the model. We know whether the unearned income comes into the household through the wife or the husband, but we cannot explain why the person receives the income.⁴² However, the negative impact of wealth on labor force participation is expected because it is assumed that an increased demand for leisure results in a decrease in labor supply, thus raising the reservation wage. The implicit assumption is the choice is between labor force participation and leisure. In truth, the choice is more complicated. In this model we assumed a choice between HOME, WAGE, and OWN. Women were choosing between three types of production, not including leisure time.

For the final hypothesis, we look for evidence that OWN is more compatible with household responsibilities than the WAGE sector. To get at the relationship between the compatibility of OWN and household responsibilities, we examine variables thought to influence the demands on the wife's time at home: infants, toddlers, additional men, and additional women. The predicted probabilities for various values of these variables found

⁴² It is possible to subdivide the unearned income to some extent, but whether a "gift" is given to help a business or it is simply a gift cannot be determined.

in Table 3.8 are informative. Having an infant significantly increases the probability the wife will be in HOME and decreases the probabilities of WAGE or OWN, but the having an infant does not impact the WAGE and OWN equally. The odds of being in HOME relative to WAGE are almost 3 times greater for women who have an infant, while the odds of being in HOME relative to OWN are 1.7 times greater for women who have an infant, holding all other variables at their means.⁴³ Having young children in the household tends to decrease the probability of WAGE and increase the probability of HOME. The first toddler decreases the probability of WAGE by 0.10, and the second toddler decreases it by 0.07. While the increase in the probability in OWN from an additional toddler is small, toddlers have a similar impact on the odds of HOME and the odds of OWN relative to WAGE: the odds of being in OWN or HOME relative to wage are about 1.6 times greater for women with each additional toddler. This is especially compelling evidence that women may choose OWN because it allows them flexibility to care for their children while simultaneously providing a source of income.

Additional women and men have different effects. Having additional men in the household significantly decrease the probability of WAGE and increase the probability of HOME. Other women decrease HOME and increase WAGE, though the marginal effects are not significant at the 0.05 level. The additional men increase the demand for home production and the additional women increase the supply of home production, these differences are as we expected. However, both men and women increase the probability of OWN, though the marginal effect of men is not significant. Looking at the impact of whether the husband does housework is the last variable considered for this comparison.

⁴³ The odds can be calculated from the probabilities: P_w/P_H . Using the predicted probabilities to calculate the change in the odds from having an infant is consistent with the interpretation of e^β in the estimation.

Having a husband who performs housework increases the probabilities of WAGE and OWN, but only the increase in OWN is statistically significant. All of these results provide some evidence that women may be better able to combine informal work with their home production responsibilities.

VII. Conclusions

In this paper we examined the labor force participation decision for married urban women in Indonesia using a multinomial logit model. The evidence from the estimation of the model depends on which sector is examined, but the results reject the hypothesis that the common preferences model of decision-making is valid for all households in this sample. If households truly made decisions as one unified entity then unearned income should have the same effect on the wife's decision to work regardless of who received it. In this model, who receives the income makes a difference in the OWN sector, but these results warrant further investigation. Husband's unearned income has the expected affect on OWN and HOME, more unearned income decreases the probability of OWN and increases the probability of HOME. This is consistent with economic theory that increased wealth will increase the demand for leisure resulting in a decrease in the supply of labor. The impact of the wife's unearned income is a little more unsettling. At first glance, the idea that a woman's unearned income would have a positive impact on her labor supply suggests a bias in the model. Part of the unearned income could be a gift from a family member to help the wife in her business endeavors. If this is the case, better measures of individual wealth and from where the unearned income comes are needed.

However, this could also be another indication that the labor force decision is more complicated than the standard model allows. If increased income and individual wealth translates into increased bargaining power in the household, a wife may have a preference for working outside of the home to maintain a source of income. Furthermore, the basic assumption of the standard labor force model is that the choice is between labor and leisure. This may not adequately reflect the choice set for women. If the choice is between labor and housework, some women may view housework as an inferior good. So, to fully understand the household's decision-making process, more investigation into what choices women have is essential.

The decision to enter the labor force is usually modeled as a simple choice: work or not work. However, the results from this investigation indicate that WAGE and OWN are distinct outcomes, and the effects of the variables depend on the choice being studied. A woman's decision to enter the labor market is more complex than the standard labor force participation model allows, conceivably because of her household responsibilities and the multiple demands on her time. If a researcher wants to understand how factors influence women's labor market decisions, a multiple-choice model that considers the differences in the formal and informal sectors is more informative than a simple two-choice model. This is especially important with respect to developing countries because a large percent of women work in the informal sector.

Why would women choose to work in the informal sector? Two reasons are often given: (1) the informal sector jobs are more compatible with other demands on a woman's time or (2) opportunities in the formal sector are scarce. We find some evidence of both reasons. First, some evidence exists that women may choose

employment in the informal sector because of its compatibility with their family responsibilities. Having additional toddlers, children and male adults in the household increases the odds of OWN relative to WAGE. These additional household members are likely to increase the demands on the wife's time by increasing the demand for home production.

Second, our data do not include information about what type of jobs are available, but the wives with the least education (none) have the highest predicted probabilities of OWN; those with the highest levels of education have the lowest predicted probabilities of OWN, but have the highest labor force participation rate. This confirms that it is the most marginalized women who work in the informal sector. People who are concerned the informal sector is more of a survival strategy rather than a choice may have a valid point. The availability of better jobs in WAGE for the highly educated women might more than offset any flexibility offered from OWN.

If "women's access to paid work is crucial to achieving self-worth and the well-being of dependent family members" (United Nations 1995, 105), then studying labor force decisions of women is imperative. Policies to improve women's labor force participation and earnings should pay more attention to the reasons why women might choose informal sector employment. The effectiveness and appropriateness of a policy will depend on why women choose informal sector employment. If they enter it because it is the only available option, then increasing education and training will enable more women to enter the formal sector. On the other hand, if women choose the informal sector because of its flexibility even though the earnings are lower then policies to improve the informal sector jobs or relieve some of the household responsibilities would

be helpful. To create policies that improve the position of women in the economy and the welfare of families more research looking specifically at the informal sector is necessary.

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CHAPTER 4

EXHAUSTING TIME: THE TRADEOFF BETWEEN TIME SPENT IN MARKET PRODUCTION AND HOME PRODUCTION FOR WOMEN IN URBAN INDONESIA

I. Introduction

How individual household members allocate their time between market and non-market activities is an increasingly important issue in economics. Often, a double burden is placed upon women as they enter into market production because they continue to retain primary responsibility for biological and social reproduction. This is especially true in many developing countries where the gender division of labor tends to be rigidly defined and the participation of women in the labor market has been instrumental for economic growth. This study investigates the tradeoff between the time spent in market production and the time spent in home production of married urban women in the context of a single developing country—Indonesia.

Indonesia presents an attractive setting in which to study the tradeoffs between market and home time for two reasons. First, Indonesia is one of the newly industrializing countries in Southeast Asia that has received considerable attention as a

development success story (World Bank 1993). According to the 1990 *World Development Report* on poverty, Indonesia has “encouraged a pattern of growth that makes efficient use of labor and (has) invested in the human capital of the poor” (51). Second, micro-level data from the Indonesian exist. The Indonesian Family Life Survey (IFLS) for 1993 contains information about time spent in various activities during the survey week, as well as detailed information about the characteristics of the respondent, the household composition, and the household economy.

This essay investigates the tradeoff between a married woman’s time spent in market production and her time in home production. Using a tobit model of hours spent in home production, we find that wives who are labor market participants are unable to decrease their time in home production by an equivalent amount, thus increasing their total time in productive activities. Given there are only twenty-four hours in day, this increase must be offset by a decrease in some other activity: leisure or sleep. Additionally, we find evidence to reject the common preferences approach to household decision-making. The husband’s unearned income has a significant positive effect on the wife’s time in home production, whereas the wife’s unearned income has a negative, although insignificant, impact. The coefficients are statistically different from one another, thus who receives the unearned income makes a difference in the decision-making process of these households.

II. Literature Review

Gary Becker’s famous 1965 article “A Theory of the Allocation of Time” spurred numerous empirical and theoretical investigations into how individuals choose to allocate

their time optimally. For the first fifteen years after Becker's article, researchers treated the household as a single decision-maker, or as a cohesive unit. This approach has often been labeled the common preferences model; the implicit assumption is that the household members share the same preferences. The common preferences model of household behavior assumes that the members of the household make decisions to maximize a joint household utility function subject to income and time constraints. People are assumed to receive utility from their leisure time and the consumption of goods. The goods may be purchased or produced within the home. Goods produced within the home require two composite inputs: market goods and time. The ability to purchase market goods depends on the income of the household, which is determined by the time spent working in the labor market and from other non-labor sources.

Reuben Gronau extended the general Becker model of time allocation to valuing a housewife's time with a series of articles (1973a, 1973b, 1976, 1977, 1980). Since a housewife is not earning a wage it is necessary to find the shadow price of her time.

A woman's labor supply is the mirror image of her derived demand for time at home, and hence her price of time in the absence of market opportunities corresponds to her "entry wage"—the wage at which she is ready to supply the first unit of labor... Thus, by estimating women's labor supply, one should be able to derive the "entry wage" and the housewife's value of time (1973a, p. S175).

Wales and Woodland (1977) were among the first to challenge the classification of housework as leisure. Their model includes three uses of time: Work, Leisure, and Housework. They argue the standard model is biased because time spent in home production has been treated as leisure. The major problems with home production are to determine what the output is and how it is to be measured. Further discussion about the

household production function can be found in Pollak and Wachter (1975), Gronau (1980), Chiswick (1982), and Graham and Green (1984).

While some authors were looking at specifying the household production function, others were questioning the basic assumption that the household maximizes a utility function subject to total household income. What if the preferences of the household members differ? How does the household arrive at a decision? Dissatisfied with the idea that a husband and wife must have the same preferences and agree on household decisions, Manser and Brown (1980) and McElroy and Horney (1981) developed bargaining models of household decision-making. This approach is particularly appealing, because it allows the husband and wife to have different preferences even though only one outcome can be observed.

Bargaining models⁴⁴ of the household are an alternative to the common preferences model. A number of alternative models exist, but it is difficult, at best, to prove which is more appropriate (Phipps & Burton 1995).⁴⁵ Although there are different approaches to how the bargaining takes place, the basic idea is to allow husbands and wives to have different preferences.⁴⁶ One approach is to assume two people marry and remain married as long as it increases their own utility. In a marriage, spouses pool resources and are able to benefit from the joint consumption of some goods (e.g. children, paintings). Household decisions are made to maximize household utility, but it cannot be a zero-sum game. If a person in the marriage would be better off as a single person, the

⁴⁴ See Phipps & Burton (1995) and Haddad, Hoddinott, & Alderman (1997) for overviews of the different approaches.

⁴⁵ For a more detailed discussion about different bargaining approaches see Manser and Brown (1980), McElroy & Horney (1981), and McElroy (1990) for the divorce threat model, Folbre (1984) and Pollak (1985) for the transactions costs approach, Lundberg & Pollak (1993, 1994, 1996) for the separate spheres approach.

⁴⁶ Haddad, Hoddinott, & Alderman (1997) contains a collection of articles about modeling, measuring the outcomes, and policy implications of intrahousehold resource allocation.

marriage may dissolve. Both partners must benefit from the union for it to survive. To allow for different preferences, a game theoretic approach can be used. The household utility function depends on the utility of each spouse minus her or his respective opportunity cost of the marriage. What is the next best alternative to the union? One simple measure would be the utility you would receive if the union did not exist—the utility from being single or in an alternative arrangement.

One way to test empirically whether the common preferences model is an appropriate approach is to see if the household truly “pools” all of its resources. The test does not actually prove or disprove the bargaining model, because the bargaining model does not prohibit income pooling. If the household does pool its resources, then the source of a resource will not influence the household’s decision-making. For example, the amount of the unearned income can influence decisions, but who receives it should not matter. In a study of Thailand, T. Paul Schultz rejected the “restrictions” of the common preferences model, but also cautioned “the evidence does not actually accept the ‘bargaining’ model” (1990, 623). Further evidence against the common preferences approach to intrahousehold allocation has been found in a variety of situations.⁴⁷

III. Empirical Model

Following the conventional models of time allocation, it is assumed that individuals allocate their time in ways that will maximize their utility from their leisure time and the consumption of goods. The consumption goods may be purchased in the market or produced within the home, and those produced within the home require two

⁴⁷ See Dwyer & Bruce (1988), Kooreman & Kapteyn (1990), Schultz (1990), Thomas (1990, 1997), Blumberg (1988), Hopkins, Levin, & Haddad (1994), Lundberg, Pollak, & Wales (1997), & Haddad (1999).

composite inputs: market goods and time. In addition to a budget constraint, individuals face a time constraint where available time (T) equals the summation of the time spent in the labor market (T_W), home production (T_H), and leisure (T_L):

$$(1) \quad T = T_W + T_H + T_L.$$

Moreover, the extension of this model is fundamental to analyses of the family, as discussed in section II of this chapter. The derivation of the utility maximization model of time allocation can be found in numerous publications including, but in no way limited to, Becker (1965), Gronau (1973a, 1973b, 1976, 1977, & 1980), Chiswick (1982), Graham & Green (1984), Khandker (1987 & 1988), and Kooreman & Kapteyn (1990).

To determine whether the double burden is significant for the women in our sample, we focus directly on the tradeoff between market and home production by estimating an equation for the hours spent in home production. Gronau (1980) estimated a similar equation for hours spent in home production using the following explanatory variables: wife's age, wife's education, husband's education, husband's wage, unearned income, number of children, age of the youngest child, number of rooms in the household, and the imputed expected wage for the wife. His results suggested that the hours spent in home production are positively related to the wife's age and education, husband's age, number of children and rooms in the household, and are negatively related to the husband's wage, unearned income, age of the youngest child, and the imputed expected wage. The results were what he expected:

[e]ducation and on-the-job training (i.e., age) are expected to increase the wife's marginal productivity at home the same way they affect productivity in the market. Children increase the value assigned to the wife's services and, hence, should increase her marginal productivity at home, though this increase may taper off as the child grows older.

Similarly, the value of marginal productivity may increase with the size of the house as measured by the number of rooms. The husband's wage and education and the family's non-earned income are proxies for other inputs in the home process (Gronau 1980, 410).

Biddle and Hamermesh (1990) extend this analysis a step further and include sleep as a choice variable in the time constraint. They find that each additional hour spent working in the labor market decreases sleep time by about 10 minutes (929). The data used in this investigation do not allow us to separate leisure from sleep, however, we use a methodology similar to the one in section II of their paper (926-930).

A tobit model is used to investigate the determinants of a wife's time spent in home production. It takes the form of

$$(2) \quad y_i^* = \beta X_i + u_i$$

$$(3) \quad y_i = 0 \text{ if } y_i^* \leq 0$$

$$(4) \quad y_i = y_i^* \text{ if } y_i^* > 0$$

where y_i^* is the latent dependent variable that is censored at 0 and X_i is the vector of independent variables. Since the dependent variable is censored at zero hours of housework, the latent variable y_i^* can be defined as the desired time in housework (Maddala 1983, 160). Thus, the coefficients can be interpreted as the effects of a change in the independent variable on the desired number of hours a wife will spend in housework.

To determine the tradeoff between the time spent in market and home production, the model includes the wife's labor force participation and time spent in market production as independent variables. The other explanatory variables in the model include variables that would affect the woman's productivity in the household, including

variables reflecting the characteristics of the woman and her husband, their household composition, and their household economy. Average community wages for males and females are also included to control partially for differences in labor market conditions.

The variables for the woman include her age and education level. As mentioned earlier, these are expected to increase the women's productivity in the household.⁴⁸ The characteristics of the woman's husband include variables reflecting his age, education, work status, time spent in the labor market and time spent in home production. Household-specific characteristics include variables for religion, household composition, and household economy. The religion of the household may reflect differences in beliefs about the status and role of the members. Young children will probably increase a woman's productivity in the home. Other women and servants may provide a substitute for some of the woman's time in home production, while other men will likely increase her time in home production by providing additional sources of market income and increasing demand on home production. The three variables about the household economy are the number of rooms in the household, the husband's unearned income, and the wife's unearned income. The number of rooms in the household is expected to increase the woman's productivity. Unearned income is expected to increase the demand for leisure and decrease time spent in productive activities. The wife's unearned income is separated from the husband's to allow for differences in preferences. If the effect of the unearned income depends on who receives it, then the common preferences model does not hold.

⁴⁸ Gronau (1980) finds that education does increase the value of home production, but the increase in productivity is only 70% of the increase in the productivity in the labor market. Thus, the predicted impact of education on the hours spent in home production is uncertain, because it also depends on the impact on hours spent in the labor market.

We test three hypotheses in this essay. First, we test to see if there is a tradeoff between time spent in market production and time spent in home production. For this test we look at the sign, magnitude, and significance of the coefficients of the variables representing whether a woman works in the market and how much time she spends working outside the market. The null hypothesis is that there is no tradeoff. Next, we test to see if the common preferences model is appropriate for these wives. The null hypothesis is that the family member who receives the unearned income makes no difference in the wife's time spent in home production. If the hypothesis is rejected, then a bargaining approach is a more appropriate model to use. Finally, we look for evidence that the household composition affects the time a woman will spend in home production. For this, we look at the impacts of the presence of young children and other household members on the wife's time spent in home production.

IV. The Data and the Setting

Indonesia provides an interesting setting in which to study the labor supply decisions of women for a couple of reasons. First, Indonesia has been considered a development success story and women have become an important part of the labor force. In Indonesia, the economic role of women has changed over time and, in some respects, become less secure. "As far as can be established Javanese women have always worked in the fields along with their men...Economic necessity and social circumstances made women seek gainful employment" (Mangkuprawira 1981, 86). Although cautioning against making too many generalizations, the World Bank states that

on the whole, there are few rigid cultural or religious restrictions on women's behavior, but separate domains of

privilege and responsibility are allocated to men and women... Women's economic roles are considered secondary to their reproductive role, although women play an important decision-making role within many households and are in fact the managers of family finances in most (1999, 1).

But, as Indonesia is growing and changing the *household economy* maybe changing as well. In one Javanese village Ann Ruth Willner found that the large influence women once had over the household economy was being diminished as their husbands migrated to the factories. Her "research on factory workers suggested that when the sources of a man's income are far from the locus of his household, his wife tends to have less control over it" (1980, 186-7). Studying what factors influence the decision-making process within a household is particularly important, since economic growth may change the balance of power.

Second, micro-level data about the time allocation of women in Indonesia exist. The data used in this analysis are from the Indonesian Family Life Survey for 1993 (IFLS). This survey is the result of a collaborative effort between RAND and Lembaga Demografi, Faculty of Economics, University of Indonesia. For the survey, members of 7200 households were interviewed about a broad spectrum of questions. The survey covered 13 of the 27 provinces in Indonesia (about 83 percent of the total population of Indonesia)⁴⁹. Furthermore, "the survey links household-level data to community-level data on public services and economic infrastructure...[enabling] researchers to better understand how surrounding conditions influence family behavior" (Serrato and Melnick 1995, 2). The survey was designed to produce retrospective and current data on households covering demographic, social, and economic factors.

⁴⁹ For details about the sampling plan and response rates see (Serrato and Melnick 1995).

The potential areas of policy application of the IFLS are quite numerous and include education, population, health, nutrition, migration, labor force activities, and inter-household support. In addition, the IFLS can support analyses of urban-rural and gender differences (Serrato and Melnick 1995, 1).

For this essay we use a sample of 1895 married urban women aged 15-49 to examine the determinants of time spent in home production.⁵⁰ The respondents were asked how many hours they spent working for wages, working for self-employment income or for a family owned business, working for a family owned farm, or performing housework in the past seven days.⁵¹ Only urban households are considered for this essay and furthermore, the sample excludes urban women who worked in the farming sector.⁵² The sample includes 1895 married, urban women, whose husbands are present in the household. Of these 1895 women, 750 are labor force participants (LFP) and 1145 are not (NOT). The labor force participants may be working for wages, helping in a family business, or self-employed.

⁵⁰ The respondents in this sample are either the head of the household or their spouse. Some respondents were excluded from the sample because they did not answer all of the relevant questions.

⁵¹ If the total working time equaled or exceeded 168 hours (including time in home production) for the husband or the wife the household was excluded. These households represented less than 0.5% of the sample.

⁵² We excluded 40 women who worked in the farming sector.

Table 4.1: Labor Force and Housework Participation for Each Sample*

Variable	Conditional on Wife's Labor Force Participation		Unconditional
	NOT N=1145	LFP N=750	TOTAL N=1895
Labor Force Participation			
Wife Participated	0	750	750
Wife Did Not Participate	1145	0	1145
Husband Participated	1043	699	1742
Husband Did Not Participate	102	51	153
Housework			
Wife Did Housework	1104	641	1745
Wife Did No Housework	41	109	150
Husband Did Housework	369	269	638
Husband Did No Housework	776	481	1257

*138 of the husbands and 29 of the wives worked in multiple sectors outside of the home, 72 husbands worked solely in home production, and 81 husbands did not work inside or outside the home.

V. Descriptive Statistics

The first seven tables give descriptive statistics of the data. Table 4.1 provides information on the productive activities of the wife and husband. Most husbands partake in market production, while most wives work in home production. Approximately 40% of the wives and 92% of the husbands participated in the labor market while 92% of the wives and 34% of the husbands performed housework. Examining the activities conditioning on the wife's labor market status is more enlightening. The majority of the women who do not do any housework are working in the labor market. Additionally, 36% of the husbands with working wives perform

housework, compared to 32% of the husbands whose wives do not work outside of the home.⁵³

The conditional and unconditional means and standard deviations for the quantitative variables are shown in Tables 4.2 and 4.3. The average wife in the sample is 34 years old and the average husband is 39 years old. The wives who work outside of the home are significantly older than those who do not work outside of the home.⁵⁴ The information about hours worked in market and home production is revealing. As expected, typically the wives spend significantly more time in home production than the husbands⁵⁵ and the husbands spend significantly more time in market production than the wives. On average, the husbands' total time spent in productive activities is greater than the wives'.⁵⁶ However, in households with a working wife, the average wife's total time in productive activities exceeds her husband's total time by ten hours. Compared to a wife who does not work in the labor force, the average working wife spends about 15 hours less in home production, while her husband does not spend significantly more time in home production. These data also seem to indicate that the wives who work are supplementing, not replacing, the husbands' income.⁵⁷ Ninety-three percent of the wives who work in the labor market have husbands who work in the labor market, while 91% of the women who do not participate in the labor market have husbands who do work in the

⁵³ This is significant at the 0.10 level with a t-statistic of -1.6398 for $H_0: \mu (\text{NOT}) - \mu (\text{LFP}) = 0$ for a one-tailed test.

⁵⁴ At the 0.01 level, with a t-statistic = -5.8210 for $H_0: \mu (\text{NOT}) - \mu (\text{LFP}) = 0$ for a two-tailed test.

⁵⁵ The fact that the majority of the husbands do not perform housework is reflected in their low average hours in home production. Men who do housework still spend significantly less time than women: 12.14 average hours with a standard deviation of 10.66.

⁵⁶ The difference is significant at the 0.01 level with a t-statistic of 3.2866 for $H_0: \mu (\text{Husband's Total Time} - \text{Wife's Total Time}) = 0$ for a two-tailed test.

⁵⁷ There are 51 households in which the wife works in the market and the husband does not. In these cases the wife's income maybe a substitute for her husband's.

labor market.⁵⁸ Furthermore, the husbands of the labor force participants do not spend less time in market production than other husbands.

Table 4.2: Means and Standard Deviations* for Quantitative Variables

Variable	Conditional on Wife's Labor Force Participation		Unconditional
	NOT N=1145	LFP N=750	TOTAL N=1895
Wife's Age	32.89 (7.63)	34.91 (6.96)	33.69 (7.43)
Husband's Age	38.62 (9.34)	40.32 (9.04)	39.29 (9.26)
Wife's Hours in Market Production	0.00 (0.00)	43.42 (23.27)	17.18 (25.79)
Wife's Hours in Home Production	37.70 (21.45)	20.39 (15.34)	30.85 (21.04)
Wife's Total Time in Market and Home Production	37.70 (21.45)	63.81 (24.32)	48.03 (25.98)
Husband's Hours in Market Production	45.80 (23.93)	47.58 (23.06)	46.50 (23.59)
Husband's Hours in Home Production	4.02 (8.52)	4.19 (8.31)	4.09 (8.43)
Husband's Total Time in Market and Home Production	49.81 (23.54)	51.77 (23.09)	50.59 (23.38)

*The standard deviation is in parenthesis below the mean.

⁵⁸ This difference is significant at the 0.10 level with a t-statistic of -1.6477 for $H_0: \mu(\text{NOT}) - \mu(\text{LFP}) = 0$ for a one-tailed test.

Table 4.3: Means and Standard Deviations* for Quantitative Variables

Variable	Conditional on Wife's Labor Force Participation		Unconditional
	NOT N=1145	LFP N=750	TOTAL N=1895
Wife's Unearned Income	97.48 (425.56)	127.88 (371.31)	109.51 (404.13)
Husband's Unearned Income	131.45 (595.58)	106.21 (726.47)	119.48 (650.52)
Number of Rooms in the House	4.96 (2.51)	5.28 (2.41)	5.09 (2.47)
Wife has an infant (less than 1 yr old)	0.14 (0.34)	0.05 (0.22)	0.10 (0.30)
Number of Wife's Toddlers (1-5 years old)	0.64 (0.71)	0.49 (0.66)	0.58 (0.69)
Number of Children (6-14 years old)	1.13 (1.15)	1.26 (1.14)	1.18 (1.14)
Number of Additional Women in the HH (15+ years old)	0.55 (0.85)	0.65 (0.91)	0.59 (0.87)
Number of Additional Men in the HH (15+ years old)	0.58 (0.95)	0.55 (0.85)	0.57 (0.91)
Number of Servants in the HH	0.04 (0.21)	0.08 (0.35)	0.06 (0.27)
Household Size	5.19 (1.97)	5.20 (2.03)	5.20 (2.00)
Natural Log of the Average Community Wage for Male Workers	8.03 (0.39)	8.03 (0.35)	8.03 (0.37)
Natural Log of the Average Community Wage for Female Workers	7.83 (0.38)	7.79 (0.38)	7.81 (0.38)

*The standard deviation is in parenthesis below the mean.

Table 4.3 provides more insight into the household economy and household composition. In this sample, more women than men received unearned income: 636 wives versus 434 husbands. The unearned income is any income from a source other than from the family business or employment.⁵⁹ In households where the wife does not work, the husband's unearned income is significantly higher than the wife's unearned income,⁶⁰ however, in the households where the wife does work the means are not significantly different. On average, the wives who work outside of the home have significantly fewer young children (infants and toddlers), but more older children (6-14) than women who do not work in the labor force. Furthermore, the wives who work tend to have additional women and/or servants in the household.

Tables 4.4, 4.5, and 4.6 provide more information about the education levels, religions,⁶¹ and labor force participation of the wives and husbands. Table 4.4 shows the education level for the husbands and wives in the sample. On average, the education level of the husband is equal to or above that of his wife. In 52% of the households, the wife and husband have the same level of education and in 36% the husband's education level exceeds that of his wife.⁶² Insight into the relationship between education and a wife's labor force status is found in Table 4.5. The wives with junior high and primary education levels have the lowest labor force participation rates, 33% and 37% respectively, while women with post-secondary education and those with no education have the highest participation rates, 59% and 48%. Differences in labor force

⁵⁹ Examples of possible sources of unearned income are Pensions, Gifts, Insurance, and Winnings.

⁶⁰ At the 0.05 level with a t-statistic = -2.1800 for $H_0: \mu$ (Wife's unearned income) - μ (Husband's unearned income) = 0 for a two-tailed test.

⁶¹ The wife's religion was used in the 25 cases where the husband and wife have different religions.

⁶² These results actually understate the difference in education. If the categories are further broken down (academic vs. vocational jr. and sr. high school, jr. college, college, and university) the husbands tend to receive a better quality education.

participation by religion are found in Table 4.6. The vast majority, 86%, of the households are Islamic. Islamic and Buddhist wives have the lowest labor force participation rates; Protestant and Hindu wives have the highest. Furthermore, we find that differences in education by religion exist. Only 32% of the Hindu wives, 51% of the Hindu husbands, 41% of the Islamic wives, and 52% of the Islamic husbands have better than a primary education. Whereas, both wives and husbands in the Catholic and Protestant families have relatively high education levels: 73% of the Protestant wives, and more than 80% of the Protestant husbands and the Catholic wives and husbands have better than a primary education.

Table 4.4: Education Levels for Wives and their Husbands

Wife's Education Level	Husband's Education Level					TOTAL
	None	Primary	Jr. High	Sr. High	Post-High	
None	35	107	12	6	0	160
Primary	26	570	171	131	15	913
Jr. High	3	78	121	127	14	343
Sr. High	2	30	48	207	100	387
Post-High	0	2	5	26	59	92
TOTAL	66	787	357	497	188	1895

Table 4.5: Education Level and Religion for Each Sample

	NOT N=1145	LFP N=750	TOTAL N=1895
Wife's Education Level			
None	83	77	160
Primary	577	336	913
Jr. High	231	112	343
Sr. High	216	171	387
Post-High	38	54	92
Religion			
Islam	1004	623	1627
Protestant	47	54	101
Catholic	35	24	59
Hinduism	33	32	65
Buddhism	26	17	43

Table 4.6: Education Level for Each Religion

	Islam N=1629	Protestant N=101	Catholic N=59	Hinduism N=65	Buddhism N=43	TOTAL N=1895
Wife's Education Level						
None	141	3	1	13	2	160
Primary	826	24	11	31	22	914
Jr. High	290	21	17	5	10	343
Sr. High	305	44	16	15	8	388
Post-High	67	9	14	1	1	92
Husband's Education Level						
None	63	0	1	1	1	66
Primary	713	16	10	31	18	788
Jr. High	196	22	16	10	13	357
Sr. High	414	45	16	12	11	498
Post-High	143	18	16	11	0	188

Table 4.7: Means and Standard Deviations of Wife's Hours in Productive Activities by Education Level, Religion and Labor Force Participation.
(N=1145 if NOT & N=750 if LFP)

	NOT Wife's Home Hours	LFP Wife's Home Hours	LFP Wife's Market Hours	LFP Wife's Total Hours	Husb's Home Hours	Husb's Market Hours	Husb's Total Hours
Wife's Education							
None	31.93 (16.80)	17.61 (14.85)	46.75 (26.84)	64.36 (25.23)	3.58 (8.46)	43.00 (28.50)	46.58 (27.79)
Primary	37.55 (21.04)	20.98 (15.62)	44.90 (24.61)	65.88 (24.98)	4.11 (8.38)	47.03 (24.04)	51.14 (24.15)
Jr. High	37.31 (22.38)	22.13 (13.74)	46.43 (26.06)	68.55 (25.53)	3.88 (7.68)	47.46 (24.49)	51.34 (23.51)
Sr. High	40.17 (21.71)	20.59 (15.97)	38.68 (16.94)	59.22 (21.78)	3.96 (8.42)	45.98 (20.33)	49.94 (19.77)
Post-High	40.92 (27.03)	16.67 (14.85)	38.19 (17.22)	54.85 (19.74)	6.04 (11.21)	45.96 (18.31)	52.00 (20.21)
Religion							
Islam	38.05 (21.07)	20.91 (15.16)	43.02 (23.99)	63.93 (24.93)	4.31 (8.70)	45.94 (23.32)	50.25 (23.11)
Protestant	38.66 (22.67)	21.28 (17.06)	44.69 (18.76)	65.96 (21.93)	2.94 (5.61)	49.21 (24.72)	52.15 (24.70)
Catholic	38.26 (29.82)	20.04 (15.49)	42.29 (19.67)	62.33 (22.54)	4.17 (9.40)	48.41 (20.26)	52.58 (19.13)
Hinduism	27.21 (19.46)	9.91 (12.16)	48.69 (21.06)	58.59 (20.62)	1.00 (3.38)	47.12 (29.85)	48.12 (29.74)
Buddhism	34.96 (20.78)	18.82 (16.08)	45.65 (17.71)	64.47 (17.26)	2.95 (6.38)	57.72 (22.32)	60.67 (23.10)
Labor Force Participant(s)**							
Neither	34.37 (24.59)				9.92 (16.24)		
Wife only		16.92 (15.31)	48.25 (25.73)	65.18 (26.92)	9.29 (16.02)		
Husband only	38.03 (21.09)				3.44 (7.10)	50.28 (20.08)	53.72 (20.30)
Both		20.65 (15.33)	43.07 (23.06)	63.71 (24.14)	3.82 (7.32)	51.05 (19.82)	54.87 (20.30)
FULL SAMPLE	37.70 (21.45)	20.39 (15.34)	43.42 (23.27)	63.81 (24.32)	4.09 (8.43)	46.50 (23.59)	50.59 (23.38)

* Only Home Hours are given for women in NOT since Home Hours = Total Hours.

** Sample Sizes: Neither = 102; Wife Only = 51; Husband Only = 1043; Both = 699.

In Table 4.7 we see some of the differences in the both the husband and wife's time allocation based on her education, her religion and their joint labor force participation. While time spent in housework tends to increase with education for women who do not work outside of the home, this relationship is more complex for women in the labor force. Working wives with a post-secondary education and those with no education spend significantly less time in home production than other working wives,⁶³ but possibly for different reasons. In general, the wives with no education spend less time in housework than the other wives, but nonworking wives with post-secondary educations spend a relatively large amount of time in home production. Of the wives who work, those with the highest education levels spend fewer hours in market production and fewer total hours in productive activities. Some evidence exists that the wives with the highest levels of education are finding substitutes for some of their time in home production. Less than five percent of the households have any servants, yet 29 percent of the households where the wives have a post-secondary education have at least one servant. Furthermore, in these households, husbands spend significantly more time in home production than other households.⁶⁴

In examining the relationship between religion and hours worked, Hindu households stand out. These couples spend substantially less time in home production than other couples.⁶⁵ Finally, time allocation varies depending on the labor force participation of both the wife and her husband. Wives who work outside of the home

⁶³ This is significant at the 0.01 level with a t-statistic of 2.6136 for $H_0: \mu$ (hours in market for wives with no education or a post-secondary education) – μ (hours in market for other wives) = 0 for a two-tailed test.

⁶⁴ This is significant at the 0.05 level with a t-statistic of 2.2835 for $H_0: \mu$ (husband's hours in home for women with post-secondary education) – μ (husband's hours in home for other women) for a two-tailed test.

⁶⁵ Further investigation shows that Hindu households tend to have more adult females than other households so some of the housework is probably shared.

spend over 50 percent more time on productive activities than wives who do not (see Table 4.2), while husbands who are not labor market participants spend more than twice as much time in home production than those who do work in the market.

VI. Empirical Results

The results of estimating the tobit model are presented in Table 4.8. The results indicate that wives who work in the market spend significantly less time in home production. The largest impact occurs when the wife enters the labor market, where she decreases her desired time in home production by over nine hours. This is consistent with the general conclusion that the “strongest empirical effects of wages and nonlabor income on labor supply are to be found at the extensive margin—at the margin of entry and exit” (Heckman 1993, 117). Once the decision is made to enter the labor market, working an additional hour in the market only decreases the wife’s desired home production time by 11 minutes. Thus, the wife can only substitute her time between the market and home to a certain extent. A few examples of the predicted desired hours of housework are given in Table 4.9. The model predicts that a wife who does not work in the labor market will desire to spend approximately 37 hours per week in home production, while a wife who spends 5 hours per week in the labor market will desire to spend about 27 hours per week in home production. Thus a wife who only spends a few hours per week working in the market is predicted to spend less total time in productive activities during the week than those who specialize in household production. As wives increase their time in market production their time in home production continues to decrease, but not as dramatically as it does when they enter the labor market.

Table 4.8: Tobit Estimates of the Wife's Hours in Home Production⁶⁶

Variable	Coefficient	Marginal Effect⁶⁷
Wife is LFP	-9.288 ** (5.50)	-8.552
Wife's Market Time	-0.184 ** (5.70)	-0.169
Wife's Unearned Income	-0.002 (1.52)	-0.002
Husband's Unearned Income	0.003 ** (3.55)	0.002
Number of Rooms in House	0.195 (0.91)	0.179
Husband is Not LFP	-5.468 * (2.57)	-5.035
Husband's Market Time	-0.024 (0.96)	-0.022
Husband's Home Time	0.134 * (2.37)	0.123
Number of Infants less than 1 year	5.798 * (3.71)	5.339
Number of Toddlers 1-5	3.159 ** (4.41)	2.909
Number of Children 6-14	1.171 ** (2.72)	1.078
Number of Male Adults 15+	0.872 (1.52)	0.803
Number of Female Adults 15+	-1.840 ** (3.14)	-1.694
Number of Servants	-5.215 ** (2.79)	-4.802
Ln of the Community Male Wage	-3.023 (1.93)	-2.783
Ln of the Community Female Wage	4.206 ** (2.71)	3.873

⁶⁶ The base for the tobit regression is an Islamic wife who has no education.

⁶⁷ This is the marginal effect at the censoring rate that is equal to β times the proportion of the wives working in home production. Since 92% of the wives work in home production, these marginal effects are not much different than the β s. (Greene 2000, 908-911)

Table 4.8: Tobit Estimates of the Wife's Hours in Home Production (continued)

Variable	Coefficient	Marginal Effect
Wife's Age	0.167 (1.46)	0.153
Husband's Age	-0.036 (0.41)	-0.033
Primary Education	4.560 ** (2.60)	4.199
Jr. High Education	4.999 * (2.51)	4.603
Sr. High Education	5.060 * (2.49)	4.659
Post-Secondary Education	2.551 (0.89)	2.349
Protestant	-0.363 (0.17)	-0.335
Catholic	-0.886 (0.33)	-0.816
Hindu	-12.164 ** (4.58)	-11.201
Buddhist	-2.965 (0.95)	-2.731
sigma	19.736 (1.50)	
Log Likelihood	-7839.619 **	
Observations	1895	
Number left-censored	150	
Proportion who work in Home Production	0.92	

*significant at the 5% level.

**significant at the 1% level.

Absolute value of t-statistics in parentheses

Table 4.9: Examples of Predicted Hours⁶⁸ in Home Production

Variable	LFP	Hours Spent in Market	Predicted Desired Hours in HOME*	Actual Mean Hours in Home from Table 4.7
Sample				
NOT	No	0	36.82	37.70
Works 5 hours	Yes	5	26.62	
Works 20 hours	Yes	20	23.86	
Works 43 hours	Yes	43	19.64	20.39
Works 60 hours	Yes	60	16.51	
Education				
None	No	0	32.56	31.93
Primary	No	0	37.12	37.55
Jr. High	No	0	37.56	37.31
Sr. High	No	0	37.62	40.17
Post- Secondary	No	0	35.11	40.92
None	Yes	43	15.38	17.61
Primary	Yes	43	19.94	20.98
Jr. High	Yes	43	20.38	22.13
Sr. High	Yes	43	20.44	20.59
Post- Secondary	Yes	43	17.93	16.67

*Holding all other variables at their means.

⁶⁸ These are the predicted unconditional hours in home or the predicted values of the latent variable (Y^*). Negative hours are predicted for some individuals, partially explaining why all of the predictions are below the actual means from Table 4.7.

Looking at the effects of unearned income on time spent in home production offers evidence of bargaining in these households. Common preference theory dictates that unearned income has the same impact, no matter who receives it between the husband and wife. Bargaining models of the household suggested that a test of common preference theory is to see if it does matter. The results of estimating the model suggest that who receives the income matters. We reject the null hypothesis

$$H_0: \beta_{\text{Husband's Unearned Income}} - \beta_{\text{Wife's Unearned Income}} = 0$$

at the 0.01 significance level with an F (1, 1869) statistic of 7.81. While the wife's unearned income has a negative, although insignificant, impact on her time in home production, her husband's unearned income has a significant positive impact. There is some evidence to suggest that the increase in home production maybe explained by the fact the role of a housewife is a status symbol in Indonesia (Mangkuprawira 1981).

Further investigation into the effects of the husband's time allocation on the number of hours wives spend in housework is informative. Wives in households in which the husband did not participate in the labor market spend significantly fewer hours in home production. In a few of these households, the wife maybe the primary earner, but the descriptive statistics showed that in households where the husband did not work in the labor market the wives had lower labor force participation rates on average than the households where the husband did work in the labor market.⁶⁹ The amount of time husbands spend in the market does not have a significant impact on the wives' home time. However, each additional hour a husband spends in home production increases the wife's desired home production time by approximately 8 minutes. This further implies

⁶⁹ Future research into the reasons why the husbands and wives in these households did not work would be instructive.

that the husband's time is not substituting for the wife's time. Two possible explanations come to mind: (1) the husband performs different activities than the wife and may create more demands on her time to clean up or (2) households in which the husband performs housework have higher standards of cleanliness. Unfortunately, these data do not allow us to do more than speculate on this issue.

Finally, the composition of the household affects the wife's time spent in housework. Younger children appear to place more demands on a woman's time. Having an additional young child⁷⁰ increases the wife's time in home production by three to five hours per week,⁷¹ while an extra school-aged child increases it by a little over an hour per week. Lastly, the availability of substitutes in home production decreases the time the wife spends. An additional female living in the household decreases the wife's home time by over an hour and a half per week and an additional servant decreases it by about five hours per week.

VII. Conclusions

In this paper we examined the tradeoff between a married women's time spent in market production and her time in home production. First, the evidence rejects the common preferences model of household decision-making. If households truly made decisions as one unified entity then unearned income should have the same effect on the wife's decision to work regardless of who received it. In this model, who receives the

⁷⁰ We included the wife's "own" children (biological, adopted or step children) aged 0-14 who live in the household. Nieces, nephews, grandchildren, or others were included in a previous estimation and all had insignificant impacts on the respondent's time allocation.

⁷¹ The coefficient on Infants is not statistically different than the coefficient on Toddlers.

income makes a difference in how many hours the wife will desire to spend in home production.

Studying the tradeoff between time spent in market production and home production is essential to understanding how women allocation their time within a household. This is especially true in developing countries, where the labor force participation of women has been crucial in providing an engine for growth. In order for a country to really have “shared growth,” it needs to understand the roles women play in the economy and in economic development. Much of the interest in this topic stems from the recognition that women are traditionally responsible for biological and social reproduction—“the care and maintenance of the household” (Momsen 1991, 28). The double burden placed on many women results from the fact that while their time spent in market production increases they remain primarily responsible for the reproductive household labor as well. Economic growth and development have been gender-biased because of these responsibilities (see Folbre 1994, Momsen 1991, and Jacobson 1992).

Results from this study suggest that wives are only able to substitute their time between market production and home production to a certain extent. The largest impact occurs at the margin of entry, where the wife decreases her desired time in home production by over nine hours per week. More research is necessary to fully understand how the wives are able to accomplish the initial nine-hour decrease. A couple possibilities come to mind: (1) the household’s total time spent in home production decreases, or (2) someone else is available to perform the activities. If the household’s total time spent in home production decreases, we need to look more carefully at what is happening within the household. Is the household simply giving up unnecessary chores

or is the family actually sacrificing part of its welfare? If someone else is picking up the slack then the question is who: another adult or a perhaps an older child? Based on our model, the husband's time does not appear to substitute for the wife's time in home production. If it is her daughter's time that used to assume the household responsibilities, the double burden may be reinforced. On the surface, these are questions we cannot answer with these data.⁷²

Finally, beyond the initial nine-hour threshold, the wife has limited ability to substitute her time between market production and home production. After the initial decrease in home time, for every additional hour spent in market production, home time decreases by only a fraction of an hour each week. This confirms that the double burden placed on women is a significant issue and further investigation is needed regarding how to alleviate this burden. Until housework work is addressed, the increased labor force participation of women will come at a considerable cost.

⁷² Our data include detailed information about time allocation for the husband and wife and a sample of the other household members. To find the total time a household spends would require time allocation data for all members, including children and servants.

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CHAPTER 5

CONCLUSION

A variety of studies of developing countries have found that a larger share of women's income, compared to men's income, will be spent on the household and household members. Thus, increasing women's access to employment and income is vital to improving the welfare of women and their families. The research in the essays of this dissertation is motivated by the need to examine the constraints facing women in their participation in the labor force. Frequently, as women gain access to income by entering the labor market their family responsibilities remain, creating the "double burden." A better understanding of the labor force participation decision is important for the design of labor market policies that support women's work in the paid labor force.

The three essays in this dissertation consider the labor force participation decision of women in Malaysia and Indonesia with three different approaches: (1) examining the effects of receiving past maternity leave on the probability of labor force participation, (2) disaggregating the decision to work by distinguishing between formal and informal sector employment, and (3) investigating the tradeoff between time in market work and housework. The results here are far from conclusive, but they provide many insights into

the decision-making processes involved in these areas and suggest several directions for future research.

Maternity leave is one government policy directly targeted towards women in the labor market. The policy has the potential to make labor force participation more compatible with women's family and household responsibilities. Our research suggests that receiving this benefit does have a significant effect on the labor force participation decision—women who received the benefit from a past employment are more likely to be current labor force participants. This provides some evidence that the policy can increase the labor force attachment of women.

Although the evidence here is cautiously positive, a longitudinal analysis of the labor force behavior, fertility, and the women's employers is necessary to reject the possibility that the results stem from individual differences amongst the women, their employers, and their country. The maternity leave policy in Malaysia was examined during a period of economic expansion in the country. Malaysia is also a country with a rather unique population policy. To what extent these peculiarities influence the results remains to be seen. Furthermore, the question of whether this policy promotes gender equality also remains. By targeting leave towards women, the policy may, in fact, reinforce the gender division of labor at home. Further research comparing countries with maternity versus paternity leave policies would be valuable in addressing this issue.

While a maternity leave policy may be a step in the right direction, it is probably not enough to ensure gender equality in the labor market, household, or economy. All three essays provide evidence that young children are one of the major determinants of women's labor force decisions. In the essays in Chapters 2 and 3 we find that young

children have a significant negative impact on the probability that a woman will work outside the home. Additionally, in Chapter 4, we find that young children significantly increase the amount of time a woman will spend in home production each week. These results suggest that the availability of alternative childcare could positively impact the ability of women to work outside the home. When you come right down to it, childcare is probably a deeper issue than maternity leave because of the length of time the policy is likely to cover. Future research into the relationship between maternity, childcare, and employment is essential to create policies that promote gender equality.

Over the last few decades many alternative models of the household have been developed. The results from both Chapter 2 and Chapter 3 provide evidence against the common preferences or Becker model of the household, but they do not provide an answer as to how households make decisions. The ever-growing body of literature in this area suggests that a single explanatory model of the household will be difficult at best to construct. Nevertheless, understanding that the members of a household do not always act as a single economic agent reinforces the idea that who in the family receives or earns income may make a difference for the welfare of the family. One particularly interesting issue is whether a woman's bargaining and decision-making power within a household changes when she earns an income. Is it the case that women with more power within a household are likely to earn an income because they choose to work outside of the home, or is it that earning an income increases their power within the household? I suspect both reasons have some validity. Several studies conclude that it is income that increases bargaining power, but it is often the most highly educated women who have the highest earnings. Some of the bargaining power within the household may come through

education and the additional opportunities the education generates for these women. A longitudinal study that looks choices women make over their lifetime and the reasons for those choices would be enlightening here.

The results from the essay in Chapter 3 suggest that further investigation into the choice between employment in the formal sector and in the informal sector is vital to improving women's positions in the economy. We find evidence that the decision to work is more complicated than the standard labor force participation model allows and the choice between the formal and informal sectors is distinctive. It is especially important for future research to learn why women choose to work in the informal sector. The evidence here supports both of the contending theories: (1) informal sector jobs are more compatible with household production and (2) the most marginalized women choose the informal sector because formal sector jobs are not available.

The problem with supporting both ideas is the appropriate policy action would depend on which reason is more prevalent. If the informal sector were chosen because of its flexibility and compatibility with family responsibilities, then policies, like childcare, that simply lessen these responsibilities or policies that improve the working conditions in the informal sector might be appropriate. If, as the evidence also suggests, it is the least-educated women who choose the informal sector, perhaps because there is no other choice, then the suitable policy response would be to improve education and training. Without more research we do not know the relative importance of the possible reasons for choosing the informal sector, but education, training, and childcare policies would probably all be beneficial for these women. Further research should be undertaken in women's reasons for working in the informal sector and focused on the rural sector of the

economy where the informal sector tends to play a larger role. In the rural sector, the choice becomes even more complicated by the addition of the farming sector. The farming sector is sometimes lumped in with other types of self-employment and distinguishing subsistence farm work from home production can be difficult. Nevertheless, a large part of the population in many developing countries is located in rural areas and needs to be studied.

We conclude by looking at the double burden placed on women who work outside of the home. The research in Chapter 4 provides some empirical evidence that the extra burden is real and significant. Wives who work outside of the home are able to decrease their time in home production to some extent, but, on average their total time in productive activities is more than 65 percent greater than wives who work solely in the home. The tradeoff between time spent in market production and in home production that does occur has the biggest impact at the point of entry into the labor market where the wife decreases her time in home production by over nine hours per week. Our evidence suggests that if someone else is picking up the slack, it is not her husband. His additional time in home production actually increases her time in home production, suggesting his time is not a substitute for hers. If her daughter's time is used to assume the household responsibilities the double burden may be reinforced and passed down through the generations. Another option is the household simply lowers its time spent in home production. The household could be purchasing in the market what it used to make for itself, or it might give up something. More research is needed to understand how this initial decrease is accomplished.

We have discussed just a few of the potential directions for future research in this chapter. Each of the essays in this dissertation contributes to a growing body of literature on women and work in developing countries. This research suggests that many questions about the labor force participation decision, decision-making within the household, and housework remain to be explored. Specifically, we need to look more closely at the reasons why women make certain choices and what impact their social responsibilities have on these choices. The bottom line is unless the division of housework changes it may not be possible to alleviate the double burden placed on many women.

Malaysia and Indonesia continue to be excellent settings in which to study the broader issues of gender equality. The Asian Crisis in 1997 hurt both countries, and may have affected women and men differently. The Second Indonesian Family Survey was completed before the crisis, but RAND went back to conduct a follow-up survey specifically looking for consequences related to the crisis. One issue that should be explored is whether women were hurt more than men. Were women more likely to lose their jobs than men? Were maternity leave policies enforced? How did the government react to the crisis? What types of policies were enacted with regards to the crisis and did any of the policies consider possible gender implications? These are just a few possible questions that future studies could seek to answer.