Microfinance Programs, Empowerment and Contraceptive Use:

Evidence from Indonesia

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Abstract

This study examines the relationship between microfinance programs, empowerment and contraceptive use with data from the 1993, 1997 and 2000 waves of the Indonesia Family Life Survey. Community and individual fixed-effects models are used to control for nonrandom program placement and program participation selection bias. Empowerment of women, as measured by level of involvement in household decision-making, is the hypothesized mechanism linking microfinance programs and contraceptive use. I conclude that microfinance program participation and availability do not uniformly increase contraceptive use, but rather increase a woman's ability to achieve her fertility preferences as measured by desire for more children. Household decision-making is also associated with higher rates of contraceptive use, but does not mediate the relationship between microfinance programs and contraceptive use.

Introduction

The United Nations has declared 2005 the International Year of Microcredit (United Nations General Assembly 2003), highlighting the critical role the development community expects microcredit and microfinance services to play in achieving the Millenium Development Goals (Daley-Harris 2002; Littlefield, Murduch and Hashemi 2003). Since its inception in Bangladesh thirty years ago, microfinance has been widely recognized as a powerful tool for alleviating poverty and improving health outcomes for the world's poorest communities, and particularly for women and children. Models for microfinance provision have proliferated around the world; many are women-focused and use group-lending techniques to minimize risk and to develop and leverage social capital among borrowers.

Results claimed by the microfinance sector are impressive. In addition to increased household income and improved risk management and consumption, health-specific outcomes of microfinance programs include improved status and empowerment of women within the household and community (Amin and Pebley 1994; Hashemi, Schuler and Riley 1996; Schuler and Hashemi 1994; Schuler, Hashemi and Riley 1997), improved child nutrition, health and survival (Bhuiya and Chowdhury 2002; Bruce and Lloyd 1995; Buzzard 1995; MkNelly and Dunford 1995; Smith 2002), and increased rates of contraceptive use (MkNelly and Dunford 1995; Schuler and Hashemi 1994; Schuler et al. 1997; Steele, Amin and Naved 2001). Given the substantial financial resources devoted to microfinance services by governments and international development organizations, rigorous empirical studies of microfinance program impact are much needed but sorely lacking (Kurmanalieva, Montgomery and Weiss 2003).

In this study I take up the debate on the causal connections between microfinance programs, empowerment, and contraceptive use. Specifically, I attempt to replicate a 1991

Bangladesh study on credit programs, empowerment and contraceptive use (Hashemi et al. 1996; Schuler and Hashemi 1994; Schuler et al. 1997) using data from the Indonesia Family Life Surveys from 1993 and 1997. I also address some problems that persist in much of the empirical work on microfinance programs.

The literature to date on microfinance and reproductive health outcomes suffers from several shortcomings. First, it is heavily concentrated on Bangladesh and the perhaps unique experience of the Grameen Bank system. Second, empirical models often fail to account for selection biases of microfinance program placement and individual participation. Third, while there is considerable theoretical debate about individual vs. community-level effects of microfinance programs, few studies model this rigorously. Fourth, there is a lack of clarity about the specific mechanisms by which microfinance programs affect contraceptive use and other health outcomes. Finally, few datasets allow for longitudinal views of program participation. I hope to address these drawbacks in this study.

Background

Microfinance Programs and Contraceptive Use

There is an extensive literature attempting to explain the mechanisms by which microfinance participation leads to improved health and demographic outcomes for women and their families generally, and specifically to increased contraceptive use and decreased fertility. One line of argument builds upon the New Home Economics, viewing increased access to credit as an input for women's self employment that in turn increases the value of their market time and the opportunity cost for childbearing. In economies where children provide productive labor to family enterprises or provide household labor that enables women to allocate more time to

income generation, increased credit access may actually increase the demand for children. Similarly, if children are considered a normal good, then increased income will increase the demand for children (Pitt et al. 1999).

Other proposed pathways focus on the role of empowerment, or the ways in which women gain control over economic resources and the agency to allocate those resources for family welfare. Participation in a microfinance program is hypothesized to increase empowerment in at least three ways: by placing more financial resources in women's hands, by increasing women's bargaining power within the household as a result of increased financial contributions, and by building solidarity, self-esteem and self-efficacy through group activities with other women. These forms of empowerment, in turn, reduce barriers to accessing family planning services, including financial constraints, restrictions on mobility outside the household, lack of information about contraception, and opposition from husbands (Amin and Pebley 1994; Hashemi et al. 1996; Schuler and Hashemi 1994; Schuler et al. 1997; Steele et al. 2001). However, contrary to their hypotheses, Schuler et al. (1997) found that credit programs and increased empowerment operated independently on likelihood of contraceptive use. This particular pathway (from credit programs through empowerment to contraceptive use) presupposes that women prefer small families and are eager to adopt contraception but are not able to achieve these preferences until "empowered" by microfinance programs; there is not consistent evidence in the literature to support this assumption.

A third mechanism by which microfinance programs increase contraceptive use is social learning and social influence. Social influence is a diffusion model in which interpersonal interactions in social contexts change individuals' preferences; social learning is a closely-related concept in which interpersonal or impersonal interactions provide information that changes an

individual's decision-making process (Montgomery and Casterline 1996). Group-based programs may increase the demand for contraception through diffusion of the perceived advantages of a small family norm and shared strategies for achieving desired family size (Madhaven, Adams and Simon 2003; Steele et al. 2001). Women in communities where microfinance program participation is high may receive "spillover" effects from programs (even when they do not participate themselves) through the interactions with members and through changing community norms for contraceptive use.

Of course, these three proposed pathways are not mutually exclusive. Social interactions in credit groups may change perceptions about the costs and benefits of children, which may then change the decision to contracept. Similarly, empowerment may be a cause or an outcome of social learning in savings and credit groups, or of the calculations behind the economic arguments for contraceptive use. A rigorous evaluation of the effects of microfinance program participation on contraceptive use would require a critical analysis of intrahousehold allocation of resources that is beyond the scope of this paper.

Microfinance in Indonesia

Indonesia provides a compelling case study of microfinance programs. As of 2001, the microfinance sector supported 50,000 "units" or distinct posts or branches of specific programs, with a total of 12.0 million outstanding loans and 34.9 million savings deposits. The average outstanding loan amount in 2001 Rupiah was $181; the average savings deposit was $84 (Charitonenko and Afwan 2003). For a country of 214 million people, this is a remarkable rate of participation. The largest player in the industry is the Bank Rakyat Indonesia's Micro Business Divisions, whose village branches are known as BRI Unit Desa, or BRI UD. With 2.8 million

outstanding loans and 27.0 million depositors, BRI is not only Indonesia's largest microfinance institution, but the largest in the world.

One of the most common sources of short-term credit in Indonesia is pawning of household assets. The state-owned pawning company Perum Pegadaian (PP) had 5.2 million outstanding loans at the end of 2001, with an average loan amount of around Rp 259,000 or $25. PP served a total of 15.7 million clients in 2001, providing a very convenient, efficient, low-cost, and safe means of generating cash from household assets. The downfall of many formal financial institutions during Indonesia's financial crisis in 1997-1998 fueled significant growth in PP and other pawning institutions (Charitonenko and Afwan 2003).

Other credit providers include the Badan Kredit Desas (BKD), or village-owned credit organizations, and the Bank Perkreditan Rakyat (BPR), or rural people's credit banks. Many employers, neighborhood groups and industry associations (e.g. military personnel) also offer credit cooperatives or credit unions. Unlike many microfinance programs in South Asia, Africa and Latin America, Indonesia's microfinance programs are not primarily targeted at women. One exception is the Family Welfare Income Generation Project (UPPKS, also known as TAKESRA and KUKESRA) run by the National Family Planning Coordination Board, or BBKBN.

Indonesia has a long and strong tradition of *arisan* or informal rotating credit clubs in which large portions of the population participate. As is true in many developing countries, much of the population also relies on moneylenders and on friends and family for credit. Despite the variety and coverage of microfinance institutions in Indonesia, there is still unmet demand for credit and savings services. Two recent surveys conducted by the Asian Development Bank and BRI found that half of sampled households had no savings account and 60 percent had no access to credit from a semiformal or formal financial institution; figures were similar for households

with and without a viable commercial enterprise (Charitonenko and Afwan 2003). The BRI survey also revealed that demand for savings services was much higher than for credit services. Households were reluctant to take on debt for a risky enterprise, but required financial vehicles to manage liquidity and to finance significant expenditures like education, weddings, and funerals. Women in particular were eager for safe, convenient ways to save that could be hidden from their husbands. These results point to an ongoing need for appropriate microfinance services and for continued evaluation of their efficacy.

Contraceptive Use in Indonesia

An analysis of the relationship between microfinance programs and contraceptive use in Indonesia must be located in the context of the Indonesian family planning program and current patterns of contraceptive use. The 1997 Indonesia Demographic and Health Survey reported a contraceptive prevalence rate of 57 percent for currently married women. The most common methods are injectables (21 percent of all married women), pills (15 percent), and IUDs (eight percent). Sterilization rates in Indonesia are low relative to the overall contraceptive prevalence rates, with fewer than four percent of married women sterilized. Contraceptive histories from the DHS and other sources indicate that Indonesian women discontinue specific methods quite frequently and may use three or more methods over the reproductive span.

Indonesia's government family planning program is well-known and much emulated in the developing world (Frankenberg, Sikoki and Suriasrini 2003; Gertler and Molyneaux 1994; Warwick 1986). The National Family Planning Coordinating Board (or BKKBN as it is known in Indonesia) was established in 1970 with the goal of expanding access to contraceptive services, promoting continued use by acceptors, and institutionalizing the norms of family planning services use and small family size in Indonesia's diverse communities. Services are

offered through government health centers, from village midwives and BKKBN family planning field workers, and at community health posts, family planning posts and commercial pharmacies. The BBKBN-supported methods include oral contraceptives, injectables, implants, IUDs, male and female sterilization, and condoms.

Financing of contraceptive services varies by method and by source. Most users pay at least a portion of the costs for contraceptives, particularly for pills and injectables. Clinic-based methods, including implants and IUDs, are more heavily subsidized. Since the late 1980s social marketing programs have encouraged contraceptive users to purchase supplies and services from the private sector or to pay small fees for government-subsidized methods. As of 1997, more than half of all contracepting women received supplies from private sources and fewer than 20 percent paid nothing for contraception (Frankenberg et al. 2003).

While the program is heavily supported and promoted at the national level, there is also considerable tailoring to local conditions and contexts, and provincial and local officials allocate resources and set targets accordingly (Gertler and Molyneaux 1994; Warwick 1986). The program was initially rolled out in Java and Bali, spreading to the rest of the country by 1980. Different program inputs and activities are matched to local needs, with areas of low prevalence targeted for more intensive field worker visits and communication programs to promote adoption. Programs in high prevalence areas emphasize continuation and broader family welfare issues, including income generation.

Since the establishment of the BKKBN, Indonesia's total fertility rate has fallen by 50 percent, from 5.6 in 1970 to 2.8 in 1997 (Frankenberg et al. 2003; Gertler and Molyneaux 1994). While socioeconomic forces likely drove the desire for small families and the increased acceptance and use of contraceptive use among educated women, the supply and demand

elements of the government program certainly contributed to the TFR decline (Gertler and Molyneaux 1994). However, the decline in total fertility rate has not been accompanied by a commensurate drop in the maternal mortality ratio, which remains high relative to Indonesia's fertility level and stage of economic development. Promoting family planning services to delay first births and adequately space births remains a critical priority to improve maternal health (Beegle, Frankenberg and Thomas 2001).

Hypotheses and Conceptual Framework

The literature on microfinance and contraceptive use and the specific context of Indonesia point to three empirical hypotheses, similar to those proposed in Schuler and Hashemi (1994):

H1: Microfinance programs increase the likelihood that a woman will use contraception.

H2: Microfinance programs lead to greater decision-making power for women within the household.

H3: Women who report greater decision-making power in the household are more likely to use contraception.

The first hypothesis directly tests the linkage between microfinance programs and contraceptive use. Hypotheses 2 and 3 test whether the pathway by which microfinance alters contraceptive use is empowerment, as measured by household decision-making power. If empowerment is one of the pathways, then the relationship between microfinance programs and contraceptive use should be attenuated when decision-making power is added as a mediating force. If the data prove consistent with the first hypothesis but not the second, then another pathway (economic

arguments or social influence) needs to be examined. Figure 1 shows these hypothesized relationships.

All three variables of interest here present measurement challenges. Contraceptive use, the outcome variable, can be captured in several ways including current use, ever use, cumulative use, spells of use, or proportion of time at risk spent using. These measures can also be method-specific or cover all methods. Surveys that capture contraceptive use data typically use contraception and pregnancy calendars and/or structured questions on current and ever use. Although the dataset used in this study includes contraceptive calendars with monthly use data, I use current contraceptive status as the outcome variable. A review of Demographic and Health Surveys from six countries demonstrated close agreement between prevalence rates calculated from calendars and from current use questions (Steele and Curtis 2003). In addition, the covariates of interest are not available at monthly intervals.

Another difficult hurdle concerns the measurement of empowerment. Clearly empowerment is both a multi-level and a culturally-specific construct (Kar, Pascual and Chickering 1999; Mason and Smith 2003). Empowerment is experienced by individuals, groups and communities; and what may rank as empowered behavior for women in Bangladesh or India may not be so in Indonesia. Designing empowerment is a slippery concept that overlaps with related concepts like status and autonomy. Empowerment measures require significant qualitative fieldwork and testing to guarantee accuracy and reliability. In this study I rely on the household decision-making module of the Indonesia Family Life Survey developed specifically to measure the relative power of spouses (Frankenberg and Thomas 2001a)[1].

[1] This module was developed using existing ethnographic research, focus groups, in-depth interviews, a pretest, and pilots. The final instrument reflected feedback from focus group participants and pretest respondents on issues including management of the household budget, marriage markets, relative social status of partners, and lifecycle considerations, as well as methodological concerns about the length and specificity of the module.

Measuring microfinance program availability and participation has also challenged researchers. Econometric approaches that parameterize demand for credit typically use amount borrowed as the relevant measure (Pitt et al. 1999). Studies emphasizing the empowerment and social influence aspects of microfinance programs are more interested in program participation, whether or not loans were accessed (Amin, Hill and Li 1995; Schuler et al. 1997; Steele et al. 2001). Network or spillover effects may also occur, with women receiving the benefits of microfinance programs without needing to join specific credit or savings groups. If these effects are present, then community-level program availability or level of participation in the community may be a more accurate measure than individual participation. In this study I use availability and participation measures, discussed in more detail below.

In addition to measurement challenges, there are also several potential sources of bias in these types of program evaluations. At the community level, it is reasonable to assume that microfinance programs are not randomly distributed across communities. If programs are targeted to areas with greater- or less-than-average levels of contraceptive use or female empowerment, then unobserved community characteristics will bias estimates of program effects (DeGraff, Bisborrow and Guilkey 1997; Frankenberg and Thomas 2001b; Gertler and Molyneaux 1994; Pitt et al. 1999). At the individual level, many program evaluations use choice-based samples, in which the probability of being a program participant in the sample is greater than the probability of being a program participant in the population. Another potential source of individual-level bias is self-selection into programs. If women who participate in microfinance programs are also the women most likely to use contraception, then program effects will be overestimated.

In the current study, choice-based sampling is not a concern (see data description below). However, community and individual selection biases are. To control for nonrandom program placement in communities, I employ a community-level fixed-effects model to test Hypothesis 1. This technique compares a woman's contraceptive use and the availability of microfinance programs in her community at two points in time. Formally, the equation for this model is:

$$Cont_{it} = \alpha + \beta x_{it} + MF_{tc} + Z_{tc} + \varepsilon_{it} + \mu_c$$

where $Cont_{it}$ is current contraceptive use for woman *i* at time *t*, βx_{it} is a vector of individual variables for woman *i* at time *t*, MF_{tc} is the availability of microfinance programs at time *t* in community *c*, ε_{it} is the individual error term, and μ_c is the unobserved community-level effect. The fixed-effects estimator sweeps out of the model any community characteristics that remain constant within communities from Time 1 to Time 2 (Frankenberg and Thomas 2001b; Gertler and Molyneaux 1994; Heckman and Robb Jr. 1985; Khandker 2003; Pitt et al. 1999). This fixed effects approach is computationally equivalent to adding a dummy variable for each community in the analysis. This community-level fixed-effects approach guarantees that any observed or unobserved characteristics of villages that may have determined the placement of microfinance programs and that did not change from 1993 to 2000 will not bias the estimates of the coefficients of the covariates (Wooldridge 2003).

I control for individual selection bias in Hypothesis 1 in two ways. First, I use an availability rather than a participation measure for microfinance programs. Therefore, I am testing whether the presence of a microfinance program in a village changes the likelihood of contraceptive use, rather than testing whether a woman's borrowing history with a credit program changes contraceptive use.

In a second set of analyses (restricted to 1997 and 2000), I use individual measures of program participation over time but incorporate individual-level fixed effects to remove time-invarying characteristics of women that may be correlated with both program participation and contraceptive use. To test Hypotheses 2 and 3 I construct similar longitudinal models with individual fixed effects that relate microfinance program participation to decision-making power (Hypothesis 2) and decision-making power to contraceptive use (Hypothesis 3). These analyses are also restricted to 1997 and 2000 comparisons

Data and Methods

The data used in this study come from three waves of the Indonesia Family Life Survey, a panel survey fielded in 13 of Indonesia's 26 provinces that represents 83 percent of the Indonesian population. The first wave, IFLS1, was conducted in 1993 with a total of 7,224 households in 312 communities (Frankenberg and Karoly 1995). In 1997, IFLS2 reinterviewed 94 percent of IFLS1 households and 91 percent of target respondents (Frankenberg and Thomas 2000), including movers and "split-off" households. In 2000, IFLS3 reinterviewed 94 percent of original IFLS1 households plus 3,774 split-off households (Strauss et al. 2004).[2] IFLS includes

[2]The IFLS1 sampling scheme stratified on provinces, then randomly selected 321 enumeration areas within provinces using the representative sample frame employed by the 1993 SUSENAS, a major national socioeconomic survey. Urban enumeration areas and enumeration areas in smaller provinces were oversampled to facilitate residential and racial comparisons. Within enumeration areas, 7,730 households were randomly selected from 1993 SUSENAS listings, of which 7,224 were interviewed for IFLS1. IFLS2 reinterviewed 94 percent of these households, as well as 878 households to which an IFLS1 respondent had moved by 1997. IFLS3 reinterviewed 94 percent of IFLS1 households, plus 3,774 split-off households.

Within households, IFLS1 conducted interviews with selected members including the household head and spouse, two randomly selected children of the head and spouse under age 14, an individual over 50 and spouse, and, for a 25 percent random subsample of households, another individual age 15-40 and spouse. IFLS2 attempted to interview all current members of IFLS1 origin households, all 1993 respondents who had moved by 1997, and all IFLS1 household members born before 1968. IFLS3 expanded target criteria to include spouses and children of split-off household members, as well as basic information on non-target individuals. The analysis in this study accommodates the IFLS sample design in three ways. First, individual-level data from 1993 are weighted to adjust for the probability of being selected as an IFLS1 respondent within an IFLS1 household. No such weight is needed for 1997 and 2000 individual data. Second, urban residence and province are included as covariates in all

detailed information at the individual level, particularly for ever-married women, and at the household and community level, including the existence of and levels of participation in various community groups including microfinance programs.

Longitudinal Analysis with Community Fixed Effects

In this study I focus on two different samples for longitudinal analyses. The longitudinal sample includes married women age 15-39 at the time of survey. This sample includes 3,432 women from 1993, 3,456 women from 1997 and 3,765 women from 2000. The individual level variables in the combined data set (N=10,653) include age, number of years of education, current contraceptive use (coded 1 for use and 0 for no use), and desire for more children (coded 1 if the respondent reports wanting more children and 0 otherwise). Community-level variables include province, urban versus rural residence, the presence of a midwife in the village (coded 1 if the village has one or more midwives and 0 if none), and the availability of one or more microfinance programs in the village.[3]

Two of the community-level variables merit more discussion. The presence of the midwife is a control for availability of family planning services. The midwife variables for 1997 and 2000 were derived from the community questionnaire for each year. The leader of the village women's group (PKK) was asked if there was a midwife (*bidan desa*) in the village and what year she arrived. For 1993, presence of a village midwife is calculated from the 1997 survey. The village midwife program was launched by the Indonesian Ministry of Health in the early 1990s

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regressions, as these were the characteristics on which the sample was stratified. Third, all regressions employ a robust standard error estimation, with community as the cluster variable. This guarantees that standard errors reflect the non-independence of responses within communities.

[3] Respondents were included who had no missing data on any of the individual or community variables of interest. In addition, women who reported being menopausal were excluded. The community-level fixed-effects model employed with this dataset uses all records, even if a specific woman does not have a 1993, a 1997and a 2000 record.

as a response to persistently high levels of maternal mortality (Frankenberg and Thomas 2001b). Midwives are expected to provide a wide range of maternal child health, reproductive health, obstetric and community health services. While there are other measures of family planning service availability in IFLS, the village midwife is a reasonable proxy for this variable. However, there are likely to be program placement effects embedded in this measure, as poorer communities were more likely to gain a midwife (Frankenberg and Thomas 2001b).

The availability of microfinance programs in the village is the key predictor of interest in this study. In the 1993 survey, a community leader was asked to report on the existence of several government- and NGO-sponsored microfinance programs. Villages that reported one or more these programs were coded 1, and those with no programs were coded 0. Similarly, in the 1997 and 2000 surveys, the leader of the village women's groups was asked about opportunities to save and borrow funds within the village. Villages with at least one program were coded 1, all other were coded 0. In addition, there is a dummy variable coded 1 if the BKKBN's KUKESRA credit program was available.

Summary statistics for this first sample are provided in Table 1. About 60 percent of the sample in all three years are current contraceptive users. The sample is similar across IFLS waves in terms of age, but the 2000 wave has 1.4 more years of education. Most notably, desire for more children increases from around 50 percent in 1993 and 1997 to more than 60 percent in 2000. At the community level, the sample becomes more rural over time. Microfinance program availability increases substantially from 60 percent in 1993 to 90 percent in 2000. Village midwife prevalence does not change significantly.

Current contraceptive use by selected variables for 1993, 1997 and 2000 is shown in Table 2. Contraceptive use increases with age, but not uniformly with education except in the

1993 wave. Contraceptive use is much more common among women who desire no more children. However, almost one-quarter of the women in all waves who desire no more children do not use contraception. At the community level, urban women are more likely to use contraception.[4] Use rates vary little by presence of village midwife. In general, women in villages with microfinance programs have a higher use rate than women in villages with no programs. This gap is ten percentage points in 1993 (63 versus 53), it disappears in 1997, and narrows to five points in 2000. Figures 2 and 3 show higher proportions of women desiring more children in 2000 than in 1997 or 1993 across all age groups and educational attainment levels. This important shift drives considerable variability in contraceptive use that is not evident at the aggregate level. Desire for more children may be linked to Indonesia's slow recovery from the devastating economic crisis in 1998.

This first dataset was used to answer Hypothesis 1: microfinance programs influence contraceptive use. As mentioned above, the issue of program placement is nontrivial here. To control for this, I first conduct a logistic regression with community-level fixed effects on the pooled dataset with contraceptive use as the dependent variable (Model 1). In this model all observed and unobserved community characteristics that are constant from 1993 to 2000 are differenced out of the equation. The fixed-effects model therefore predicts change in contraceptive use as a function of the covariates (Frankenberg and Thomas 2001b; Gertler and Molyneaux 1994; Heckman and Robb Jr. 1985; Khandker 2003; Pitt et al. 1999; Steele et al. 2001).

Because the effect of microfinance program availability on contraceptive use may vary by age, education, or desire for more children, I also tested interactions of these variables. The preferred interactive model is Model 2. To test the specific impact of the KUKESRA program, I

[4] Use rates also vary substantially by province, though this is not shown in Table 1.

refit Model 2 using KUKESRA program availability instead of the more general microfinance program availability variable (Model 3). Because KUKESRA is implemented by the governmental family planning program, I hypothesize that the availability of these programs in villages may complement existing family planning program efforts and lead to higher levels of use.

Longitudinal Analysis of Program Participation and Household Decision-Making with Individual Fixed Effects

In order to analyze the relationship between microfinance program participation, household decision-making and contraceptive use and, I also use a more detailed dataset from the 1997 and 2000 waves of IFLS. This includes all the variables from the previous dataset, as well as measures for microfinance program participation and household decision-making. The analysis is restricted to currently married non-menopausal women age 15-39 who answered questions on microfinance program participation and on household decision-making. The resulting sample is 3,252 women in 1997 and 3,489 women in 2000.

The microfinance program participation variable is coded 1 if the respondent reported borrowing money in the last year from a microfinance program, including a cooperative, a save/borrow program, a village credit program, or IDT, a government-sponsored credit program for particularly underdeveloped villages. For the decision-making measure, a standardized index was created from the household decision-making module in IFLS2 and IFLS3. This module asks married men and women to identify the decision-makers for seventeen different household spending and time allocation decisions, including food expenditures, children's health, education, transfers to family, and savings. Respondents could identify one or more decision

makers, including self, spouse, parents, children, or others. Respondents could also indicate whether a particular decision was not made in the household. For example, households with no children did not make spending decisions on children's clothing. The last question on the list asked respondents who made the decision to use contraception or not.

To capture the extent to which women participated in household decisions, I created an index of decision-making power. Each of sixteen household decisions (excluding the contraception decision) [5] was coded 2 if a woman made the decision by herself, 1 if she made the decision together with her spouse or other household members, or 0 if she was not involved in the decision or if the decision did not apply to her household. Responses were summed (ranging from 0 if not involved in any decisions to 32 if the woman made all decisions by herself) and standardized across all 1997 and 2000 respondents.[6] The decision-making measure therefore reflects the degree to which a respondent deviates from the mean decision-making power of all 1997 and 2000 currently married women 15-39.

Table 3 shows summary statistics for this sample. A comparison with Table 1 reveals a very similar sample for 1997 and 2000. About seven percent of respondents borrowed from microfinance programs in the previous year. Household decision-making authority was slightly lower in the sample than in the full IFLS2 and IFLS3 samples of currently married women 15-39. Table 4 shows current contraceptive use by selected variables the 1997 and 2000 sample. In 1997, respondents who borrow from a microfinance program were five percentage points more likely to use contraception (67 vs. 62 percent) than non-borrowers. By 2000 this gap had

[5] This decision is clearly jointly determined with contraceptive use and so should not be included in the index. In addition, the possible responses differed across IFLS waves. Respondents in 1997 could reply "never used contraception" while 2000 respondents could reply "never considered the use of contraception."
[6] I also conducted a factor analysis to see if particular aspects of decision-making authority emerged from the data, but results were not conclusive.

widened to 12 percentage points (71 vs. 59 percent). Table 5 compares borrowers and non-borrowers on several individual and community characteristics. Borrowers are older, better-educated, and more urban than non-borrowers. They report less desire for more children than borrowers, and this gap is wider in 2000 then in 1997. Their household-decision making score is more than .40 standard deviations higher than non-borrowers. Borrowers are less likely to live in communities with village midwives than are non-borrowers.

This dataset from 1997 and 2000 is used to confirm the first hypothesis tested above and to evaluate the second and third hypotheses of the study: microfinance programs increase women's household decision-making power, and greater household decision-making power increases contraceptive use. I first confirm the results from Models 1 and 2 using logistic regressions with individual-level fixed effects. Model 4 uses individual program participation as a predictor of contraceptive use, and Model 5 uses program availability.

I test the second hypothesis regarding microfinance programs and household decision-making with two OLS regressions. The first OLS regression (Model 6) is "naïve" in that it does not control for selection bias into microfinance programs. Model 7 corrects this and demonstrates the importance of the fixed-effects approach. In Models 8 and 9 I refit Models 1 and 2 but add household decision-making as a covariate to test whether it mediates the relationship between microfinance programs (both availability and participation) and contraceptive use.

Results and Discussion

Microfinance Program Availability and Contraceptive Use

Effect parameters for Models 1-3 are shown in Table 6. In Model 1, age, education, and desire for more children are strong predictors of contraceptive use. Year is not significant, indicating no secular change in contraceptive use from 1993 to 2000 net of the other covariates. At the community level, none of the covariates is significant. Model 2 adds an interaction term for microfinance program availability and desire for more children. (Interactions between age and program availability and education and program availability were not significant). Here the picture changes substantially. The interaction term is highly significant, and the coefficient for the lower-order program availability also approaches significance.

This model suggests that microfinance program availability is associated with a greater ability to achieve desired fertility rather than with increased contraceptive use. In communities with microfinance programs, a desire for more children reduced the odds of contraceptive use by 70 percent relative to those who do want more children. In communities without microfinance programs, the comparable reduction in odds is only 59 percent. Similarly, for respondents who want more children, microfinance program availability decreases the odds of contracepting by 12 percent relative to respondents in communities with no available programs. For respondents who desire no more children, program availability *increases* the odds of contracepting by 20 percent. Recall that this fixed-effects estimator has controlled for all time-invariant characteristics of communities that could be correlated with both program placement and contraceptive use. One important community characteristic that is not controlled here is impact of the financial crisis, though this will addressed below.

In Model 3, I test whether this finding holds specifically for the BKKBN's KUKESRA borrowing program. Here the program availability measure is the presence of the KUKESRA program. Neither the interaction nor the lower order term is significant, nor are they jointly significant. For the more general case of program availability, however, I do find strong evidence for a causal link from microfinance program availability to differential contraceptive use as moderated by desire for more children.

Microfinance Program Participation and Contraceptive Use

In Model 4 (shown in Table 7) I replicate the preferred model above (Model 2) analysis using the 1997-2000 dataset and an individual-level fixed-effects estimator. The results are even more dramatic than in Model 2: in communities with microfinance programs, a desire for more children reduced the odds of contraceptive by 71 percent relative to those who do want more children. In communities without microfinance programs, the comparable reduction in odds is only 24 percent. Similarly, for respondents who want more children, microfinance program availability decreases the odds of contracepting by 37 percent relative to respondents in communities with no available programs. For respondents who desire no more children, program availability *increases* the odds of contracepting by 63 percent. Age effects are also much greater in the individual fixed-effects model, with use tripling age 15-19 to age 25-29, net of desire for more children and education.

In Model 5, an individual measure of program participation replaces community-level program availability. Again a similar pattern emerges: the significant interaction term suggests that women who borrow are more likely than non-borrowers to use contraception if they don't want more children; and are less likely to use contraception if they do want more children than

are non-borrowers. Here the gap is widest—borrowers have more than twice the odds (relative to non-borrowers) of contracepting if they want no more children. These results hold even with a measure of changing community wealth as captured by the log of per capita expenditures in the community. Increased per capita expenditures are associated with increased odds of contracepting net of the other covariates, and the effect of microfinance programs (availability and participation) on contracepting is net of changes in average household economic status.

Microfinance Programs and Household Decision-making

In Model 6 I address Hypothesis 2: does microfinance program participation lead to increased household-decision making? This model uses the 1997-2000 dataset, and covariates include age, education, year, microfinance program participation, presence of village midwife, urban residence, and the log of average per capita expenditure in the community. Desire for more children has been removed as a covariate as there is no theoretical reason to believe that this should be predictive of decision-making power.

Model 6 (shown in Table 8) does not employ a fixed-effects estimator. This "naïve" regression demonstrates the potential for biased estimates as a result of unobserved variables. In Model 6, borrowing from a microfinance program in the past 12 months is associated with a .31 standard deviation increase in household decision-making authority relative to non-borrowers. This is comparable to the difference in decision-making power between a 15-19 year-old wife and a 20-24 year-old. Per capita expenditure at the community level is also significant and associated with increased decision-making power for individuals.

In Model 7, the same regression is fit with individual fixed effects. The coefficient for microfinance program borrowing drops to .035 and loses significance. This suggests that there

are underlying unobserved characteristics of respondents that are correlated with both the microfinance program participation and with household decision-making authority; the effect of these variables biases the coefficient for program participation in Model 6 but not in Model 7. Age and average per capita expenditure remain significant. I conclude that microfinance program participation, as measured by borrowing in the past 12 months, is not a significant predictor of household decision-making power.

Household Decision-Making and Contraceptive Use

Hypothesis 3, relating household decision-making to contraceptive use, is tested in Models 8 and 9 shown in Table 9. Model 8 replicates Model 4 using the 1997-2000 dataset with individual fixed effects and a community-level measure of microfinance program availability, but adds the household decision-making index as a covariate. If the association between microfinance program availability and contraceptive use found in Model 4 operates through household decision-making, then I should find this effect attenuated when the household decision-making variable is included. Based on the results from Model 7, it is not surprising that I find no such attenuation. The coefficients for microfinance program availability, desire for more children and their interaction remain very close to those in Model 4. However, the coefficient for the decision-making index is also positive and significant, suggesting that an increase of one standard deviation in the index is association with a 17 percent increase in the odds of contracepting, net of other covariates.

The comparison is very similar for Models 9 and 5 which use the individual-level measure of program participation. While the coefficients for program participation, desire for more children and their interaction do not change significantly, the household decision-making index is positive and significant. In both Models 8 and 9, the effect of age on contraceptive use

is mildly attenuated when decision-making authority is added; the effects of average per capita income at the community level also diminish and lose their marginal significance in Models 8 and 9.

Conclusion

The international development community has shown keen interest in and enthusiastic support for microfinance programs in recent decades. With its emphasis on poverty alleviation, family welfare and women's empowerment, the practice of microfinance certainly offers considerable promise for improving the health and livelihood of many of the world's poor. Because of the substantial human and financial resources devoted to microfinance programs around the world, researchers, funders, and practitioners have an obligation to make sure that programs achieve their desired outcomes effectively and efficiently. This paper has attempted to add to the microfinance program evaluation literature in three key areas.

First, I explore in more detail the specific mechanisms linking microfinance programs to contraceptive use. In doing so I find compelling evidence that the effect of microfinance programs on contraceptive use, at least in Indonesia, is moderated by desire for more children. This is a departure from much of the microfinance literature that links participation to decreased fertility preferences and increased contraceptive use. While I find that higher levels of household decision-making are associated with contraceptive use, I find no evidence that the microfinance program effect on contraception operates through household decision-making. It would be fruitful in future studies to explore the two other hypothesized pathways between microfinance programs and reproductive health outcomes, namely the New Home Economics framework and social influence and diffusion models.

Second, I emphasize the importance of accounting for selection bias at the individual and community level. One way this can be accomplished is through fixed-effect models for longitudinal data that include both program availability and program participation data. Without such controls, biased parameter estimates and standard errors lead to incorrect conclusions about the relationships between microfinance programs and various health and demographic outcomes. Future studies in this area could capitalize on more detailed contraceptive histories, data from more than two time periods, and more sophisticated measures of both program participation (e.g. borrowing versus time spent in community groups) and household decision-making. Instrumental variables approaches also warrant attention.

Third, I extend the literature on microfinance programs and reproductive health outcomes from South Asia to Indonesia, a country with an extensive and diverse history of microfinance programs as well as rapidly changing contraceptive use patterns and significant government investment in family planning. Due to different gender dynamics, cultural influences, economic environments and program approaches to family planning and microfinance program interventions, I find a different dynamic linking credit and savings programs to reproductive health outcomes than has been found in Bangladesh and elsewhere. The demonstrated demand in Indonesia for saving versus credit services merits particular attention, as does the notable increase in desire for more children among IFLS respondents from 1997 to 2000. Future studies that address Indonesia's financial crisis in more detail could assessing how households use microfinance services to cope with economic shocks and perhaps identify microfinance programs as one aspect of broader family formation and household resource allocation strategies.

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Figure 1: Microfinance-Empowerment-Contraceptive Use Model

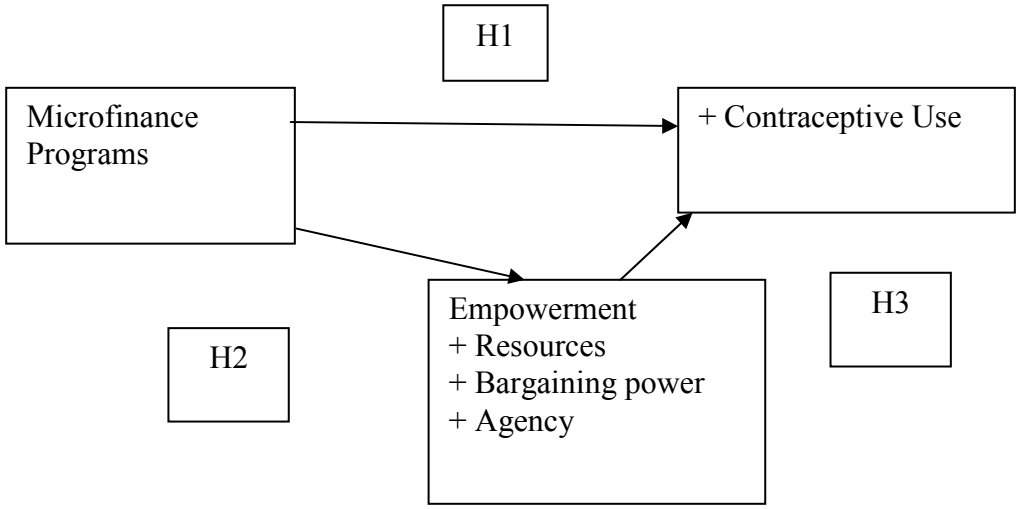

Figure 2: Proportion Reporting Desire for More Children by Educational Attainment, Married Indonesian Women 1993-1997 (N=10,653)

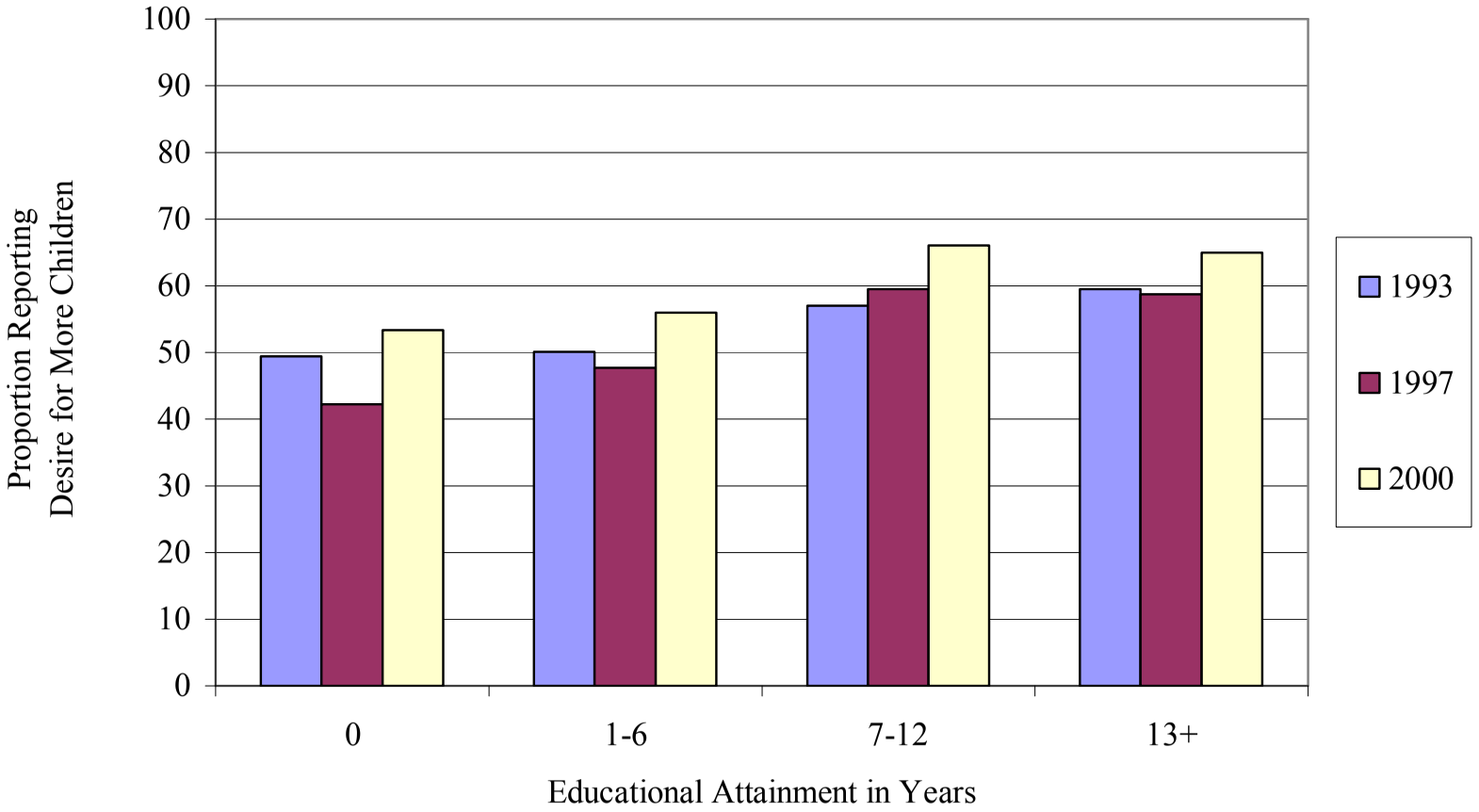

Figure 3: Proportion Reporting Desire for More Children by Age, Married Indonesian Women 1993-1997 (N=10,653)

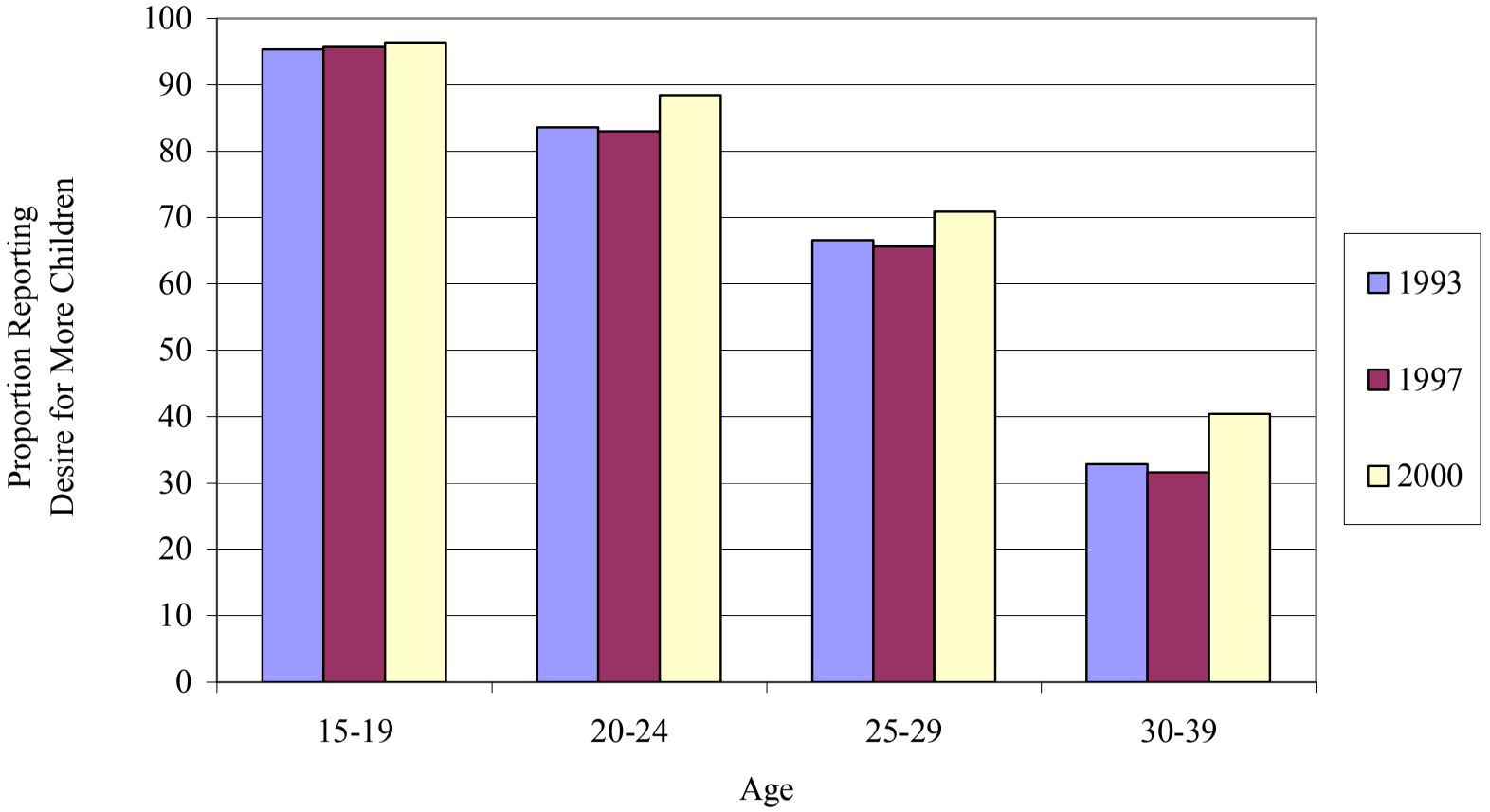

Table 1. Summary Statistics, Married Indonesian Women 15-39, 1993-2000 (N=10,653).

Variable	1993		1997		2000	
	Mean or Proportion	Standard Deviation	Mean or Proportion	Standard Deviation	Mean or Proportion	Standard Deviation
Individual Characterstics						
Current Contraceptive Users	.592	--	.614	--	.591	--
Age	29.6	5.6	29.9	5.9	29.3	6.0
Years of Education	5.8	4.0	6.4	3.9	7.2	4.0
Want More Children	.522	--	.511	--	.601	--
Community Characteristics						
Urban Residence	.473	--	.422	--	.431	--
Microfinance Program Available	.598	--	.896	--	.903	--
Village Midwife Present	.586	--	.620	--	.609	--
N	(3,432)		(3,456)		(3,765)	

Source: Indonesia Family Life Survey (IFLS) Waves 1, 2 & 3

Table 2. Percent Current Contraceptive User by Selected Variables, Married Indonesian Women 15-49, 1993-2000 (N=10,653).

	Percent Currently Using Contraception					
	1993		1997		2000	
	Percent Contraceptors	Percentage Base	Percent Contraceptors	Percentage Base	Percent Contraceptors	Percentage Base
Individual Characteristics						
Age						
15-19	36.2	(127)	47.3	(188)	44.1	(220)
20-24	54.9	(548)	57.3	(517)	53.3	(706)
25-29	60.8	(909)	62.7	(846)	61.0	(922)
30-39	61.4	(1,848)	63.4	(1,905)	62.2	(1,917)
Years of Education						
0	45.0	(409)	49.6	(341)	49.4	(257)
1-6	60.5	(1,983)	62.5	(1,944)	62.0	(1,880)
7-12	62.1	(924)	63.3	(1,045)	58.1	(1,445)
13 or more	65.5	(116)	61.9	(126)	51.9	(183)
Wants More Children						
Yes	48.0	(1,791)	51.0	(1,767)	49.0	(2,264)
No	71.6	(1,641)	72.2	(1,689)	74.4	(1,501)
Community Characteristics						
Microfinance Program(s) Available						
Yes	63.3	(2,048)	61.1	(3,097)	59.6	(3,400)
No	53.3	(1,384)	61.3	(359)	55.3	(365)
Village Midwife Present						
Yes	60.5	(2,010)	61.5	(2,142)	59.3	(2,293)
No	57.6	(1,422)	61.3	(1,314)	59.0	(1,472)
Type of Community						
Urban	63.7	(1,624)	66.3	(1,458)	59.9	(1,623)
Rural	55.2	(1,808)	57.9	(1,998)	58.6	(2,142)
Total	59.4	(3,432)	61.4	(3,456)	59.2	(3,765)

Source: Indonesia Family Life Survey (IFLS) Waves 1, 2 & 3

Table 3. Summary Statistics, Married Indonesian Women 15-39, 1997-2000 (N=6,741).

Variable	1997		2000	
	Mean or Proportion	Standard Deviation	Mean or Proportion	Standard Deviation
Individual Characteristics				
Current Contraceptive Users	.627	--	.602	--
Age	30.0	5.9	29.4	6.1
Years of Education	6.3	4.0	7.2	4.0
Want More Children	.508	--	.596	--
Borrowed from Microfinance Program in Last 12 Months	.070	--	.069	--
Household Decision-Making Index (Standardized)	-.020	.990	-.043	.978
Community Characteristics				
Urban Residence	.429	--	.438	--
Microfinance Program(s) Available	.899	--	.899	--
Village Midwife Present	.577	--	.615	--
N	(3,252)		(3,489)	

Source: Indonesia Family Life Survey (IFLS) Waves 1, 2 & 3

Table 4. Percent Current Contraceptive Users by Selected Variables, Married Indonesian Women 15-39, 1997-2000 (N=6,741)

	Percent Currently Using Contraception			
	1997		2000	
	Percent Contraceptors	Percentage Base	Percent Contraceptors	Percentage Base
Individual Characteristics				
Age				
15-19	50.0	(172)	42.0	(195)
20-24	57.8	(467)	54.7	(636)
25-34	65.2	(796)	62.8	(855)
35-49	64.0	(1,897)	62.8	(1,803)
Years of Education				
0	50.6	(324)	49.4	(235)
1-6	63.6	(1,827)	63.1	(1,750)
7-12	64.7	(983)	59.0	(1,337)
13 or more	63.6	(118)	53.9	(167)
Wants More Children				
Yes	52.4	(1,648)	49.8	(2,078)
No	73.2	(1,604)	75.5	(1,411)
Borrowed from MF Program in Last 12 months				
Yes	67.5	(228)	71.4	(241)
No	62.3	(3,252)	59.4	(3,248)
Community Characteristics				
Microfinance Program Available				
Yes	62.4	(2,922)	60.7	(3,138)
No	64.9	(330)	55.8	(351)
Village Midwife Present				
Yes	62.1	(1,878)	60.3	(2,147)
No	63.5	(1,374)	60.1	(1,342)
Type of Community				
Urban	67.2	(1,395)	61.0	(1,527)
Rural	59.3	(1,857)	59.6	(1,962)
Total	**62.7**	**(3,252)**	**60.2**	**(3,489)**

Source: Indonesia Family Life Survey (IFLS) Waves 2 & 3

Table 5. Summary Statistics by Microfinance Borrowing Status, Married Indonesian Women 15-39, 1997-2000 (N=6,741).

	1997 Mean/Proportion		2000 Mean/Proportion	
Variable	Borrowers	Non-Borrowers	Borrowers	Non-Borrowers
Individual Characteristics				
Current Contraceptive Users	.675	.623	.714	.593
Age	31.8	29.9	31.9	29.2
Years of Education	8.1	6.2	9.2	7.0
Wants More Children	.434	.512	.465	.605
Aware of Microfinance Program in Community	1.00	.682	1.00	.702
Household Decision-Making Index (Standardized)	.334	-.047	.376	-.074
Community Characteristics				
Urban Residence	.548	.420	.597	.426
Microfinance Program(s) Available	.859	.901	.946	.896
Village Midwife Present	.517	.582	.577	.618
N	(228)	(3,024)	(241)	(3,248)

Source: Indonesia Family Life Survey (IFLS) Waves 2 & 3

Table 6. Effect Parameters for Determinants of Contraceptive Use, Married Women Age 15-39, Indonesia, 1993-2000 (N=10,653)

	Model 1: Community Fixed Effects		Model 2: Community Fixed Effects with Interaction		Model 3: Community Fixed Effects with Interaction, Kukesra Program	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Individual Characteristics						
Age (Reference: 15-19)						
20-24	1.521	(.000)	1.518	(.000)	1.522	(.000)
25-29	1.791	(.000)	1.789	(.000)	1.793	(.000)
30-39	1.298	(.012)	1.297	(.012)	1.300	(.011)
Years of Education (Reference: 0)						
1-6	1.807	(.000)	1.808	(.000)	1.804	(.000)
7-12	1.881	(.000)	1.888	(.000)	1.884	(.000)
13 or more	1.564	(.001)	1.569	(.001)	1.570	(.001)
Wants More Children (1=Yes)	.324	(.000)	.414	(.000)	.339	(.000)
Year (Reference: 1993)						
1997	1.074	(.220)	1.068	(.262)	1.124	(.072)
2000	1.033	(.572)	1.034	(.569)	1.110	(.167)
Community Characteristics						
Microfinance program(s) available	0.996	(.960)	1.201	(.058)	--	--
KUKESRA[a] program available	--	--	--	--	.971	(.751)
Village Midwife present	.984	(.714)	.981	(.658)	.975	(.560)
Urban	1.119	(.667)	1.128	(.645)	1.115	(.676)
Interaction						
Wants more children *						
Microfinance program available	--	--	.732	(.004)	.891	(.203)

[a] KUKESRA is a woman-focused savings/credit programs initiated by the Indonesian Family Planning Coordinating Board (BKKBN) in 1995.

Source: Indonesia Family Life Survey (IFLS) Waves 1, 2 & 3

Table 7. Effect Parameters for Determinants of Contraceptive Use, Married Women Age 15-39, Indonesia, 1997-2000 (N=6,741).

Variables	Model 4: Logistic Regression, Individual Fixed Effects, Microfinance Availability		Model 5: Logistic Regression, Individual Fixed Effects, Microfinance Participation	
	Odds Ratio	p-value	Odds ratio	p-value
Individual Characteristics				
Age (Reference: 15-19)				
20-24	2.196	(.025)	2.340	(.015)
25-29	2.884	(.019)	3.113	(.012)
30-39	1.770	(.289)	1.924	(.224)
Years of Education (Reference: 0)				
1-6	.992	(.980)	1.080	(.824)
7-12	1.130	(.844)	1.247	(.722)
13 or more	.228	(.147)	.225	(.140)
Wants more children (1=Yes)	.757	(.488)	.334	(.000)
Year (1=2000)	..662	(.134)	.677	(.157)
Borrowed from Microfinance Program in Last Year (1 = Yes)	--	--	2.13	(.052)
Community Characteristics				
Microfinance program available	1.63	(.108)	--	--
Village Midwife present	.802	(.288)	.814	(.322)
Log(Average per capita expenditure)	1.911	(.076)	1.834	(.095)
Urban	1.247	(.751)	1.148	(.842)
Interactions				
Wants More Children * Borrowed from Microfinance Program	--	--	.315	(.025)
Wants More Children * Microfinance Program Available	.384	(.014)	--	--

Source: Indonesia Family Life Survey (IFLS) Waves 2 & 3

Table 8. Effect Parameters for Determinants of Household Decision-Making[a], Married Women Age 15-39, Indonesia, 1997-2000 (N=6,741).

Variables	Model 6[b]: OLS Regression, "Naïve"		Model 7: OLS Regression, Individual Fixed Effects	
	Coefficient	p-value	Coefficient	p-value
Individual Characteristics				
Age (Reference: 15-19)				
20-24	.375	(.000)	.402	(.000)
25-29	.694	(.000)	.526	(.000)
30-39	.970	(.000)	.402	(.016)
Years of Education (Reference: 0)				
1-6	.064	(.383)	-.092	(.433)
7-12	.034	(.649)	-.224	(.197)
13 or more	-.095	(.381)	-.309	(.284)
Year (1=2000)	(dropped)	--	-.064	(.416)
Borrowed from Microfinance Program in Last Year (1 = Yes)	.309	(.000)	.035	.639
Community Characteristics				
Village Midwife present	-.011	(.813)	.009	(.878)
Log(Average per capita expenditure)	.178	(.007)	.288	(.005)
Urban	.067	(.175)	.140	(.408)

[a] The dependent variable is the standardized household decision-making index, (mean = 0 and standard deviation = 1), standardized across all 1997 and 2000 respondents who completed the household decision-making module.
[b] Model 6 also controls for province, parameters not shown
Source: Indonesia Family Life Survey (IFLS) Waves 2 & 3

Table 9. Effect Parameters for Determinants of Contraceptive Use, Married Women Age 15-39, Indonesia, 1997-2000 (N=6,741).

Variables	Model 8: Logistic Regression, Individual Fixed Effects, Microfinance Availability		Model 9: Logistic Regression, Individual Fixed Effects, Microfinance Participation	
	Odds Ratio	p-value	Odds ratio	p-value
Individual Characteristics				
Age (Reference: 15-19)				
20-24	2.057	(.040)	2.185	(.026)
25-29	2.658	(.032)	2.857	(.021)
30-39	1.671	(.343)	1.808	(.273)
Years of Education (Reference: 0)				
1-6	1.009	(.979)	1.098	(.788)
7-12	1.272	(.703)	1.396	(.595)
13 or more	.267	(.196)	.264	(.189)
Wants more children (1=Yes)	.771	(.519)	.328	(.000)
Year (1=2000)	.672	(.153)	.689	(.179)
Borrowed from Microfinance Program in Last Year (1 = Yes)	--	--	2.158	(.049)
Household decision-making index	1.167	(.023)	1.161	(.027)
Community Characteristics				
Microfinance program available	1.709	(.080)	--	--
Village Midwife present	.809	(.307)	.821	(.341)
Log(Average per capita expenditure)	1.766	(.123)	1.696	(.151)
Urban	1.130	(.859)	1.041	(.953)
Interactions				
Wants More Children * Borrowed from Microfinance Program	--	--	.312	(.024)
Wants More Children * Microfinance Program Available	.369	(.011)	--	--

Source: Indonesia Family Life Survey (IFLS) Waves 2 & 3