Preliminary Findings on migrants-nonmigrant differentials in contraceptive discontinuation and contraceptive switching behavior in Indonesia

Hui-Peng Liew

Mississippi State University, USA

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*Corresponding author. 103 Research Blvd., Social Science Research Center, Mississippi State University, MS 39762-5287. Email: hpl13@msstate.edu. Phone: 662-325-9543. Fax: 662-325-7966.

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Abstract

Understanding the contraceptive use dynamics among women migrants is considered important especially to a country like Indonesia that is undergoing demographic, social, economic and political changes and experiencing an increasing female-dominated migration during the last few decades. Using the 2000 wave of Indonesian Family Life Survey (IFLS3), this study hopes to further complement studies that seek to analyze the relationship between migration and contraceptive discontinuation / method switch in Indonesia. Several demographic and socioeconomic variables are significant predictors of contraceptive discontinuation and contraceptive switching, although the magnitudes of such effects vary across different migrant experiences. The major conclusion from the multilevel multinomial logistic regression is that migrants are less likely than non-migrants to discontinue use of the same method and to switch to a different method when time-varying individual characteristics are taken into account. The results of this study will contribute important foundational knowledge about the extent of contraceptive use dynamics by women of different migration experiences in Indonesia. This knowledge will provide guidance to policymakers to employ effective means to incorporate migration and issues that are sensitive to women migrants in their family planning and reproductive health programs.

Preliminary Findings on migrants-nonmigrant differentials in contraceptive discontinuation and contraceptive switching behavior in Indonesia

Introduction and Review of Relevant Literature

To date, the bulk of demographic literature in most developing countries including Indonesia is replete with studies of migration-fertility linkage (Hiday, 1978; Lee and Farber, 1984; Hervitz, 1985; Khan, 1988; Lee and Pol, 1993; White et al., 1995; Landale and Hauan, 1996; Goldstein et al., 1997; Singley and Landale, 1998; Jensen and Ahlburg, 1999). The impact of migration status on age at marriage (Carlson, 1985; Guest, 1996) and the potential importance of community characteristics on contraceptive use has also been highlighted (Entwisle et al., 1984; Entwisle et al., 1989; Jain, 1989; Entwisle et al., 1996; Mensch et al., 1996; Magnani et al., 1999; Steele et al., 1999; Zhang et al., 1999; Ilene and Bollen, 2000; Amin et al., 2002; Stephenson and Tsui, 2002; Thang and Anh, 2002; Muhwava 2003).

In Indonesia, there is a burgeoning body of literature that has focused independently on either internal migration (McNicoll 1968 and 1982; Hugo 1982; Alatas 1993; Rogers, Muhidin, Jordan and Lea 2004) or contraceptive use (Freedman, Khoo, and Supraptilah 1981; Ross and Poedjastoeti 1983; Joesoef, Baughman, and Utomo 1988; Lerman, Molyneaux, Moeljodihardjo and Pandjaitan 1989; Hull 1998; Tuladhar, Donaldson, and Noble 1998; Molyneaux and Gertler 2000; Becker and Ahmed 2001; Frankenberg, Sikoki, and Suriastini 2003; Schoemaker 2005). To the best of my knowledge, only one study (Arifin 2003) attempts to examine the determinants of contraceptive discontinuation in Bali, Indonesia.

The literature review by Hugo (1982) suggests that the bulk of population mobility in Indonesia involves circular migration and these migrants have no intention of shifting

permanently to their urban destinations. Women also constitute a large part of migratory flow in Indonesia and there are twice as many female migrants as men (ICAD 2004). The automation of agriculture ("green revolution") in the 1970s forced these migrants (especially women) to leave rural areas to seek work in factories, construction sites and plantations inside the country and beyond (ICAD 2004). This type of migration often goes unrecorded because the criteria used to define migrants in the census excluded most short-term and short-distance movers (Alatas 1993). Thus the topics of contraceptive switching and discontinuation of internal migration has not yet been subject of systematic sociological research in most developing countries including Indonesia. This is mainly because the national censuses and the Indonesian Demographic and Health Survey gave very simple questions about place of birth and place of current residence.

The causal direction of the relationship between migration and the timing of marriage and birth is complex and the characteristics underlying the effects of migration on fertility cannot be fully understood. Current transition to lower fertility may be attributed largely to contraceptive use among different categories of migrants because it is likely that different categories of migrants may attach different attitudes and values towards reproductive behavior and fertility control. It is possible that certain characteristics of women can change due to migration because women migrating to different destinations may use and be exposed to different contraceptive behaviors and this may prompt migrants to adapt certain fertility behaviors and patterns of fertility control. If the factors associated with fertility proximate determinants (e.g. contraceptive use) are ignored, the estimated effect of migration on fertility can be biased. Because of the well-established role of migration in the timing of births and marriage, this account should be qualified by understanding the characteristics underlying the effects of migration on contraceptive use.

In order to fill this research void, this study hopes to further complement studies that seek to analyze the relationship between migration and contraceptive discontinuation / method switch in Indonesia. Understanding the contraceptive use dynamics among women migrants is considered important especially to a country like Indonesia that is undergoing demographic, social, economic and political changes and experiencing an increasing female-dominated migration during the last few decades. Specifically, it addresses three main objectives:

1. To look at the role of various factors proposed in the literature in accounting for the likelihood of discontinuing the same method or switching to a different method for migrants and non-migrants.
2. To determine whether or not there are migration effects on the likelihood of discontinuing the same method or switching to a different method after controlling for respondent's individual characteristics, quality of the family planning program and the degree of infrastructure development in the community.
3. To examine whether the effect of respondent's individual characteristics, quality of the family planning program and the degree of infrastructure development in the community on the likelihood of discontinuing the same method or switching to a different method differs among women of different migration experience.

To address these questions, I will use a multilevel multinomial logistic regression to access the impact of individual, community and programmatic factors on the likelihood of discontinuing the same contraceptive method or switching to a different contraceptive method. The empirical work of this proposed project will be based on the third wave of Indonesian Family Life Survey (IFLS3) conducted in 2000.

Background on Contraceptive Use in Indonesia

Economic development in Indonesia was speeded up during the past three decades (Frankenberg, Sikoki and Suriastini 2003). The level of urbanization also increased in tandem with industrialization and export-led manufacturing (Frankenberg et al. 2003). These efforts were largely successful and gross domestic product increased by almost 5 percent per year (Frankenberg et al. 2003). In addition, the country achieved nearly universal enrollment in primary school and a reduction of infant mortality rates by about two-thirds (Frankenberg et al. 2003).

At the same time, Indonesia's total fertility rate has dropped to near replacement level in a generation. The TFR dropped from 5.9 in the late 1960's to 2.8 in 1997 (Frankenberg et al. 2003), with Java and Sumatra showing the largest declines (McNicoll 1982). Several aspects of the Indonesian society may have facilitated this decline in fertility. Indeed, Hull (2002) has documented some of these important determinants: social and economic change, increase in educational attainment, increase in women's labor force participation, increase in age at first marriage, and a vigorous and organized family planning program.

In Indonesia, President Suharto instituted a population policy in the late 1960s to achieve national development goals (Samosir 1992). Under the Indonesia's National Family Planning Coordinating Board (BKKBN), the government's objective was to educate women about family planning, to promote small family norms and to provide high quality contraceptive services (Hull 1987; Jensen 1996; Frankenberg et al. 2003). The primary program-supported methods are oral contraceptives, injectables, implants, IUDs, male and female sterilization and condoms (Frankenberg et al. 2003). The program was first introduced in the most populous provinces of Java and Bali and later spread to the remaining provinces (Samosir 1992; Jensen 1996).

In 1987, the Family Planning Self-Reliance and Blue Circle Campaign programs began to turn Family Planning responsibilities over to communities and individuals (Samosir 1992; Frankenberg et al. 2003; Schoemaker 2005). Between 1980 and 1987, the contraceptive use rate rose from 27 to 48% (Samosir 1992). The proportion of married women obtaining modern contraceptive methods from the private sector jumped from 22% to 63% from 1991 to 2000, while the proportion obtaining methods from public sector fell from 51% to 28% (Schoemaker 2005). The proportion using village delivery posts and health posts supported by non-governmental organizations (NGOs) also dropped (Schoemaker 2005). Java and Bali had the highest contraceptive user rates (Samosir 1992; Jensen 1996). Educated women were more likely to use contraceptives than uneducated women, especially in Outer Java-Bali regions (Frankenberg et al. 2003; Schoemaker 2005). In some regions, the husband's education affected contraceptive use (Frankenberg et al. 2003). Muslim women were less likely to use contraceptives than other women in Bali and Outer Java-Bali (Frankenberg et al. 2003). Even though urban women had the highest use rates, the FP program was more successful in rural areas (Frankenberg et al. 2003). Despite the early success of the national Family Planning program and a dramatic increase in contraceptive use over the last 30 years, the contraceptive distribution and pricing mechanisms in place were affected by the Asian Economic Crisis in the late 1990s because BKKBN is no longer able to fill health center's requests for supplies (Frankenberg et al. 2003). Such program decentralization and the diminishing role of the public sector as a service provider may lead to lower use among poor women (Schoemaker 2005).

Background on Migration in Indonesia

Indonesians have traditionally been in constant movement over time (Rogers et al. 2004). Migration within and across the regions has been both voluntary and involuntary. Some

communities are well-known as the highly mobile ethnic groups, such as Minangkabau and Batak in Sumatra, Bugis and Makassarese in Sulawesi, Banjarese in Kalimantan, and Madurese in Java. Through transmigration policy, many Indonesian families who resided in the densely settled regions (in particular Java and Bali) were resettled to lower population density regions (i.e. islands of Sumatra, Kalimantan, Sulawesi, Papua and other islands) (Rogers et al. 2004). Indonesian policies of forced migration spanned nearly a century, over both colonial and post-colonial eras (Rogers et al. 2004).

Over time the volume of migration tends to increase with the level of urbanization and development in Indonesia (Rogers et al. 2004). The percentage of total population living in provinces other than their place of births increased from around 5% in 1971 to 10% based in 1995 (Rogers et al. 2004). Rural-urban migration increased from 17.18% in 1971 to 22.38% in 1980, and to 30.93% in 1990 (Alatas 1993). Between 1971 and 1990 the increase amounted to 20.34% in Jakarta, Surbaya, Bandung, Medan, and Semarang (Alatas 1993). Mega-cities appear and the number of rural population starts to decline (Rogers et al. 2004). The rural population in Indonesia has declined in absolute terms and the percentage of the population living in urban areas rose from 17% in 1971 to nearly 42% in 2000 (Rogers et al. 2004).

In the mean time, inter-provincial migration increased in Indonesia from 5.8 million in 1971 to 10.2 million in 1980 and to 14.8 million in 1990 (Alatas 1993) even though the levels of population mobility vary strikingly at the regional level (Rogers et al. 2004). Some regions are already in the relatively late stages of mobility transition, while others are still in the early stages (Rogers et al. 2004). For example, most of the provinces of Sumatra and Kalimantan experienced net positive migration in which in-migration exceeded out-migration (Alatas 1993). In addition, urbanization has reached 50% or more in Jakarta (100%), West Java (50%), Yogyakarta (58%),

Bali (50%), and East Kalimantan but there is also a decrease in rural to urban movement and an increase in commuting (especially among male population) in these regions (Rogers et al. 2004).

Indonesian workers also migrate to other countries as overseas documented and undocumented migrant workers and foreign workers from various countries also came to Indonesia (Rogers et al. 2004). The number of people registered as overseas migrant workers increased considerably from 5,624 in the period 1969-1973 to 1,461,236 in 1994-1999 (Rogers et al. 2004). Most of these individuals were unskilled workers and went to the Middle East, Southeast Asia (i.e. Malaysia and Singapore), and East Asia (i.e. Korea, Taiwan and Japan) countries (Rogers et al. 2004).

In short, migration is becoming more multifaceted in terms of the types of movement taking place within and across Indonesia and its neighboring countries. Due to socioeconomic and political changes, globalization processes, transportation and communication improvements, and the proliferation of migration networks, the significance of female migration has also increased and while the significance of rural to urban migration has decreased (Rogers et al. 2004).

Research Methodology

The exact methods and procedures that will be utilized in this study are still being examined, developed and refined. The selection of the variables, the construction of the model, and the choice of statistical methods will be closely linked to the ultimate practical value of the research. The model (or models) used in this study will be consistent with models from previous research so that current knowledge can be built upon and enhanced. At the same time, new techniques with the potential to provide additional insights will be examined.

Data Source and Measures

The Indonesian Family Life Survey (IFLS) is a collaborative effort between RAND and the University of Indonesia. It is an on-going longitudinal survey in Indonesia. The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 of the 27 provinces in the country. The first wave of the IFLS (IFLS1) was conducted in 1993/94 by RAND in collaboration with the University of Indonesia. The second waves, IFLS2 and IFLS2+, were conducted in 1997 and 1998, respectively, by RAND in collaboration with UCLA and the University of Indonesia. The third wave, IFLS3, fielded on the full sample in 2000 was a collaborative effort between RAND and the University of Gadjah Mada.

In the first wave of data (IFLS1), 7,224 households were interviewed, and detailed individual-level data were collected from over 22,000 individuals. In the second wave of data (IFLS2), 94% of IFLS1 households and 91% of IFLS1 target individuals were re-interviewed. IFLS3 was a follow-up all households, all 1993 "main" respondents, all 1993 household members born before 1967, sample of other 1993 household members.

IFLS3 offers several strengths for the purpose of analytical framework. In addition to collecting current information on most topics and a longitudinal perspective, individuals were interviewed in-depth about their life histories on a number of life course domains, including migration, marriage, contraceptive use, childbearing patterns, occupational and job changes, educational attainment, and so forth. At the community-facility level, information was gathered from village leaders and heads of village women's groups in each of the 321 enumeration areas (EAs) where the households were located. Questions were asked regarding community characteristics (transportation, water and sanitation, history of schools, and availability of health

facilities), nurses, midwives, and paramedics (facility management and family planning history, vignettes on types of care), and traditional health practitioners (buying or making herbal medicines or using services of traditional practitioners, rituals, and incantations). One disadvantage of the survey is that it does not provide much information on international migration.

In this study, the empirical work will be based on women's life history data collected from the 2000 Indonesian Family Life Surveys (IFLS3). This study will add to a small but growing body of research that uses life history to analyze the relationship between migration and contraceptive use. The ability to precisely locate the timing of contraceptive use or non-use relative to migrant trips provided by the retrospective life-histories represent an important advancement over earlier studies of migration and contraceptive use that relied on aggregate or individual-level data with incomplete information on the timing of migration and fertility-related events. Following Steele, Goldstein and Brown's (2004) logic of reasoning, periods of non-use while a woman is pregnant are excluded. Following Steele and Diamond (1999), the episode is treated as censored if a woman stops using a method because of menopause, infrequent intercourse (proxied by absence of husband), or divorced / widow. The analysis is limited to ever married women aged 15-49 whose information on age, duration of contraceptive use, the number of living children, education, sector of employment, and a valid community ID is available. The final analysis sample consists of 56,271 episodes and 1,020 women.

Dependent Variables. This study utilizes multilevel multinomial logistic regression to model the likelihood of discontinuing the same method or switching to a different method. The model takes the following functional form:

$$\log \frac{h_{ijk}^{(r)}(t)}{h_{ijk}^{(0)}(t)} = \alpha^{(r)}(t) + \beta^{(r)} x_{ijk}^{(r)}(t) + u_j^{(r)}$$, where

$h_{ijk}^{r}(t)$ is the conditional probability of experiencing a discontinuation of the same method or a switch to a different method (j = 1 for discontinuation, j = 2 for switch[1], 0 = for censored cases) for a married woman *i* at community *k* at month *t* since the start of contraceptive use, given that she has not experienced an event or has been censored prior to month *t*. $\alpha^{(r)}(t)$ is a set of dummy variables to control for time dependence (months). $\beta^{(r)}x_{ijk}^{r}(t)$ is a set of predictors at the event, woman and community levels. In this study, a contraceptive method switch is defined to have occurred in one of the two circumstances: 1) when a women reported having used different methods in consecutive months and 2) if a period of nonuse is followed by a switch to a different method. The frequency of method-switching is likely to be underestimated in this study because reverting to the use of the same method after a period of nonuse is not considered to be switching. The estimates from bivariate logit models were used as starting values for the multilevel multinomial logistic regression.

Key Independent Variables. Four categories of variables will be used as predictors of the three birth outcome variables in this study: 1) migration experience, 2) respondent's individual characteristics, 3) measures of the quality of the family planning program and 4) the degree of infrastructure development.

The first category consists of measures of the woman's migration experience. I use information from the migration history to divide the women's migration experience into three categories: never migrated, once migrated and repeatedly migrated. The *never-migrated* included in the analyses are individuals who have never moved since age 12. The *once-migrated* are

[1] In this study, contraceptive method switch incorporates switching from 1) one modern temporary method (pill, IUD, implant, diaphragm, injection, etc.) to another modern temporary methods, 2) a modern temporary to a traditional (rhythm, herbs, massage, etc.) method and 3) a modern temporary method to a permanent method (sterilization). This is because only 14 individuals apply to scenarios 2 and 3.

individuals who moved out of the local community only once since age 12. *2+ times migrated* are individuals who have moved repeatedly since age 12. Those who never migrated constituted the reference category. By this definition, 199 women are classified as repeated migrants, 113 as one-time migrants and 708 as non-migrants.

The second category includes individual's age, duration of contraceptive use, period of contraceptive use, the number of living children, education, and sector of employment. Among these variables, duration of contraceptive use, period of contraceptive use, and the number of living children are time varying variables while the rest are not. *Age* and *duration of contraceptive use* are treated as continuous variables. *Duration of contraceptive use squared* and *age squared* are included in the model to fit a quadratic function of time. Following Manning (2001), *period of contraceptive use* serves as a proxy to examine the effects of the Asian Economic Crisis on contraceptive discontinuation and switch and is a dummy variable, coded 1 if the respondent used contraceptive after January 1998 and 0 if otherwise. The *number of living children* is indicated by four dummy variables: no children, one child, two children, and three or more children, with those having one living child serving as the reference category. *Education* is indicated by dummy variables for up to a primary education and secondary education and beyond, with those who have up to a primary education serving as the reference category. *Sector of employment* will be indicated by three dummy variables: not working, agricultural (construction / agricultural / manual work) and non-agricultural occupations, with those who not working serving as the reference category.

The third category of is measures of *quality of the family planning program*. To capture the effects of this measure, a factor score has been created from the following variables: number

of visiting to the village, number of family planning assistants located in the village, number of staff who visited Posyandu and the number of health post located in the village.

The final category of variables is a measure of the *degree of infrastructure development*. To capture the effects of this measure, a factor score has been created from the distances (in kilometers) to the nearest bus stop / terminal, market, phone, post office, bank, and district / provincial capital.

With these variables, four models will be estimated. The first (baseline) model includes migrant status. The second model adds age and duration effects. Building on the second model, the third model adds individual time-varying characteristics and the final model adds spouse's individual time-constant characteristics, quality of family planning program and degree of infrastructure development.

Results

Descriptive Statistics

Before discussing the results of the multivariate analysis, it is important to note some differentials observed in the original sample of ever married women. Table 1 presents descriptive statistics of migrants and non-migrants. On average, non-migrants and repeated migrants are slightly older than one-time migrants. Comparing the two groups on the basis of education, the 2000 ILFS suggests that migrants are relatively more educated than non-migrants. The difference becomes more vivid when we look at the education categories. While only about 8% of the non-migrants possess secondary education and beyond, the same figures for one-time migrants and repeated migrants are 29.2% and 53.27% respectively. Regarding the sector of employment, Table 1 documents that a slightly higher percentage of non-migrants engaging in agriculture occupations. While about 15% of the non-migrants engage in non-agricultural occupations, the

same figures for one-time migrants and repeated migrants are 13% and 11% respectively. Table 1 also documents a higher percentage of one-time migrants engaging in non-agricultural occupations. While about 42% of one-time migrants engage in non-agricultural occupations, the same figures for repeated migrants and non-migrants are 34% and 35% respectively.

Migrants have longer duration of contraceptive use than non-migrants. On average, the average duration of contraceptive use for non-migrants is nearly 22 months, compared with 25 months and nearly 27 months for one-time migrants and repeated migrants. Regarding the number of living children, Table 1 documents a somewhat higher percentage of migrants having two or more children and a somewhat higher percentage of non-migrants being childless. Table 1 also documents a somewhat higher percentage of migrants continue to use contraception after January 1998.

When compared to non-migrants, migrants are relatively more likely to discontinue use of the same method or to switch to a different method at all durations even though the differences is less pronounced at longer durations. The probabilities of discontinuation and switching are slightly lower for one-time migrants when compared to repeated migrants. Cumulative probabilities of women's discontinuing use of the same method and switching to a different method in figures 2 and 3 are consistent to those from the life table analysis presented in Table 2. Table 3 suggests that a considerable amount of movement occurs within the same method type. Table 3 also suggests that less than one percent of movement occurs among the switch between pill and IUD / implant / injectibles.

Multivariate analysis

The results for the multilevel multinomial logistic regression will be presented in Table 4. In the first part of the analysis, migrants and non-migrants are combined into one model. In the

second part of the analysis, three separate but identical models (3 and 4) estimated separately for non migrants, one-time and repeated migrants

All women regardless of their migration experience

Model 1 estimates the impact of migrant type on the likelihood of discontinuing using of the same method or switching to a different method. The results in models 1 indicate that migrants are less likely than non-migrants to discontinue use of the same method (although the difference is only marginally significant for moved only once). The effect of migration on the likelihood of discontinuing using of the same method becomes insignificant when controls for duration of contraceptive use and age are included in model 2. On the contrary, the effect of repeated migration on the likelihood of switching to a different method becomes positive and significant when such controls are included in model 2. The results in models 2 indicate that those who moved repeatedly since age 12 are more likely than non-migrants to switch to a different method. The results in models 2 also indicate that duration of contraceptive use has a negative effect both discontinuing and switching and age has a positive effect on switching.

A comparison of the coefficients between models 2 and 3 indicates that the addition of time-varying individual characteristics (period of contraceptive use, contraceptive method and the number of living children) in model 3 do not affect the statistical significance of duration of contraceptive use but does changes their magnitudes. The effect of age on the likelihood of discontinuing using of the same method becomes positive and significant once individual time-varying individual characteristics are taken into account. The effect of migration on the likelihood of discontinuing using of the same method and switching to a different method becomes negative and significant once individual time-varying individual characteristics are taken into account. The number of living children has a different effect on discontinuing and

switching among childless women and those with two or more children. Childless women are less likely to discontinue use of the same method or to switch to a different method when compared to women migrants with one living child. By contrast, women with two and three living children are more likely to discontinue use of the same method or to switch to a different method when compared to women migrants with one living child. There is, however, no evidence that the period of contraceptive use is significantly related to the likelihood of discontinuing using of the same method or the likelihood of switching to a different method. A comparison of the coefficients between models 2 and 4[2] indicates the addition of time-constant individual characteristics (level of education, sector of employment), quality of family planning program, and degree of infrastructure development do not affect the statistical significance of duration of contraceptive use does changes their magnitudes. The effect of age on the likelihood of discontinuing using of the same method becomes significant once individual time-constant individual characteristics are taken into account. The effect of age and repeated migration on the likelihood of switching to a different method becomes insignificant once individual time-constant individual characteristics are taken into account. Agricultural employment is positively related to the likelihood of discontinuing using of the same method. Women who engage in construction / agricultural / manual work are more likely to discontinue use of the same method when compared to women who were not employed at the time of the survey. There is, however, no evidence that having at least a secondary education and engaging in non-agricultural employment is significantly related to the likelihood of discontinuing using of the same method or the likelihood of switching to a different method. There is also no evidence that quality of

[2] Earlier specifications of model 4 also included religion (coded 1 if Islam and 0 if otherwise). However, the term was later dropped because it is not a statistically significant predictor of the likelihood of discontinuing using of the same method and the likelihood of switching to a different method.

health center / family planning program and the degree of infrastructure development in a community are significantly related to the likelihood of discontinuing using of the same method or the likelihood of switching to a different method.

Separate models by migration experiences

The results in Table 5 suggests that for migrants and non-migrants alike, childless women are less likely to discontinue use of the same method or to switch to a different method and women with two or more children are more likely to discontinue use of the same method or to switch to a different method. The results in Table 5 also suggest that older non-migrants and one-time migrants are more likely to discontinue use of the same method or to switch to a different method when duration and period of contraceptive use are controlled.

The results in Table 6 suggests that non-migrants and one-time migrants engaging in agricultural employment are more likely to discontinue use of the same method or to switch to a different method when compared to their counterparts who were not employed at the time of the survey. The results in Table 6 also suggest that older one-time migrants are less likely to discontinue use of the same method when education, sector of employment, quality of family planning program and degree of infrastructure development in a community is controlled.

Conclusion

Several demographic and socioeconomic variables are significant predictors of contraceptive discontinuation and contraceptive switching, although the magnitudes of such effects vary across different migrant experiences. The major conclusion from the multilevel multinomial logistic regression is that migrants are less likely than non-migrants to discontinue use of the same method and to switch to a different method when time-varying individual characteristics are taken into account. Duration of use has a negative effect on both discontinuing

and switching. This can be attributable to their greater experience in contraceptive use. Age has a negative effect on discontinuing when time-constant individual characteristics are taken into account (Model 3) and a positive effect on both discontinuing and switching when time-varying individual characteristics are taken into account (Model 4[3]).

For migrants and non-migrants alike, childless women are less motivated to discontinue use of a contraceptive method or to switch to a different method. As family size increases, women are more likely to have achieved their fertility desires and are therefore more and women with two or more children are more likely to discontinue use of the same method or to switch to a different method. Non-migrants and one-time migrants engaging in agricultural employment are more likely to discontinue use of the same method or to switch to a different method when compared to their counterparts who were not employed at the time of the survey. Nevertheless, the difference is not statistically significant for migrants and non-migrants who engaged in construction / agricultural / manual work at the time of the interview.

Implications

Collectively, these results are strongly consistent with previous studies that examined the determinants of contraceptive use. Three separate but identical models (3 and 4) estimated separately for non migrants, one-time and repeated migrants also revealed that the direction of effects for discontinuing and switching tends to be the same women of different migration

[3] Some supplementary analyses also were done to re-estimate model 4 by including only education, sector of employment, the number of family planning worker visits to the village, the number of family planning assistants located in the village and distance to the nearest district capital (in kilometers). The results indicate that education and sector of employment are negatively related to the likelihood of discontinuing using of the same method and the number of family planning worker visits to the village is negatively related to the likelihood of switching to a different method. This is probably attributable to the high correlation among education and sector of employment variables.

groups, although the magnitudes vary. Thus, it is reasonable to assume that general efforts to increase the contraceptive accessibilty will have a beneficial impact for all groups.

There are at least three interrelated limitation in the analysis that dictate caution in the interpretation of its results. First, the long-term effect of the Asian Economic Crisis cannot be observed with the 2000 IFLS and therefore, the analysis probably underestimated the contribution of Asian Economic Crisis in declining contraceptive usage. Second, the 2000 IFLS cannot be used to assess whether the durations of contraceptive use and the likelihood of discontinuing the same method or switching to a different method differs between people who migrated within Indonesia and those who migrated abroad. Once more recent, detailed and sufficient data become available, researchers will need to focus on how migrating to a foreign country play a critical role in contraceptive usage among migrants. Finally, the 2000 IFLS cannot be used to assess whether these women used contraceptives to limit or to space births. The inconclusiveness of research findings in this study points to the pressing need for more studies to be conducted in order to understand impacts of factors which cannot be examined fully in this paper.

While the analysis of the 2000 IFLS do not allow for firm conclusions, they nevertheless suggest a number of issues for further investigation. Despite the limitations of the data, this study will contribute important foundational knowledge about the extent of contraceptive use dynamics by women of different migration experiences in Indonesia. It is evident that the design of effective and efficient policies requires a more comprehensive knowledge of the determinants of migration and contraceptive use. In the context of declining fertility, the assessment of whether the extent of contraceptive use dynamics differs by different migration status categories would have important policy implications for both individuals and society at large. In addition,

Indonesia has a high concentration of internally mobile population and there is widespread evidence that these individuals are at increased risk for poor health and HIV infection (ILO 2002; ICAD 2004). In many developing countries, regions reporting higher seasonal and long-term mobility also have higher rates of HIV infection (ICAD 2004). In Indonesia, the National AIDS Commission reported that about 10 percent of migrant workers tested HIV positive (Montlake 2003). Although there is limited data on HIV/AIDS, the rapid spread of HIV/AIDS is likely among migrants because of the lack of condom use by certain groups (e.g. Indonesians in Malaysia) who have a religious opposition to condom use (Simonet 2004). This knowledge will provide guidance to policymakers to employ effective means to incorporate issues that are sensitive to women migrants in their family planning and reproductive health programs.

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Figure 1: Conceptual Framework

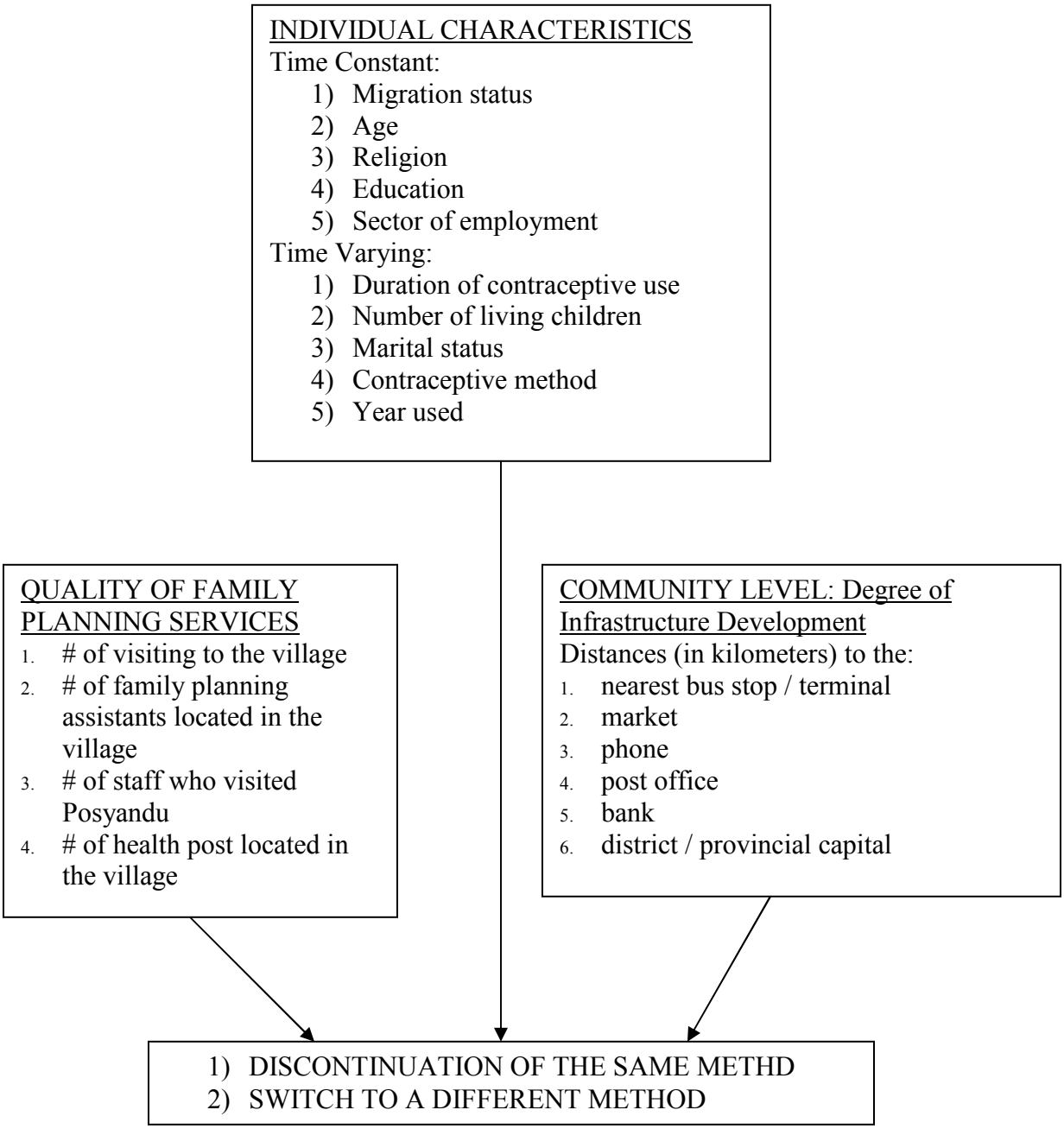
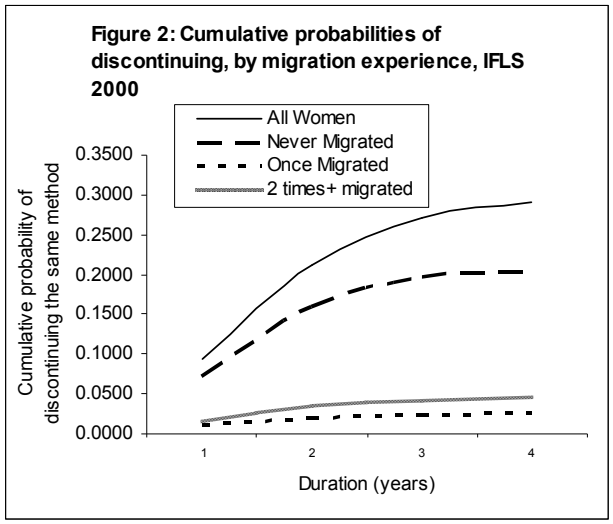


Table 1: Variable Descriptions, percentages, and means, IFLS 2000

Migration Status	All Women	Never Migrated	Once Migrated	2 times+ Migrated
Time Constant				
Age	30.45	30.56	29.53	30.58
Level of Education				
Up to primary	80.78%	91.95%	70.80%	46.73%
Secondary and beyond	19.22%	8.05%	29.20%	53.27%
Sector of employment				
Agricultural	14.61%	15.06%	13.27%	10.55%
Non-agricultural	35.78%	35.31%	42.48%	33.67%
Not working	49.61%	49.63%	44.25%	55.78%
Time Varying				
Duration (months)	23.10	21.75	25.10	26.81
No. of Living Children				
None or one child	33.67%	40.46%	25.41%	14.03%
One child	42.70%	43.41%	46.92%	37.75%
Two children	12.78%	8.15%	12.92%	29.32%
More than three children	10.85%	7.98%	14.74%	18.90%
Used after 1998	24.95%	23.13%	28.75%	29.31%

Table 2: Multiple Decrement Life Table Estimates of Transition Probabilities, IFLS 2000

	Duration (months)				
	0-11	12-23	24-35	36 and over	N
All Women					
Continue Use	0.9042	0.7864	0.7248	0.7055	1,020
Discontinue	0.0951	0.1161	0.0607	0.0188	
Switch	0.0007	0.0017	0.0010	0.0005	
Never Migrated					
Continue Use	0.9258	0.8384	0.8013	0.7927	708
Discontinue	0.0730	0.0864	0.0367	0.0084	
Switch	0.0012	0.0010	0.0004	0.0002	
Once Migrated					
Continue Use	0.9897	0.9807	0.9749	0.9729	113
Discontinue	0.0102	0.0089	0.0058	0.0019	
Switch	0.0001	0.0001	0.0001	0.0001	
2 times+ migrated					
Continue Use	0.9842	0.9648	0.9582	0.9534	199
Discontinue	0.0157	0.0191	0.0065	0.0046	
Switch	0.0001	0.0003	0.0001	0.0002	



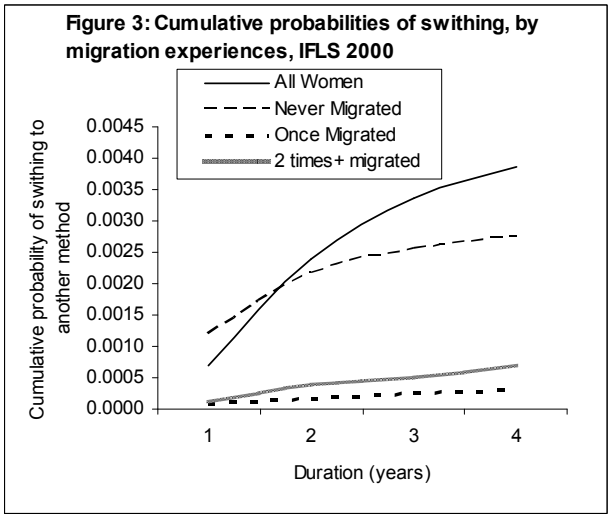


Table 3: Percentage Distribution of Episodes by Origin and Destination Method

All Women							
Method	Destination						
Origin	Pill	IUD/Implant/Injectible	Other Reversible	Sterilization	Traditional	None	All
Pill	93.93%	0.74%	0.01%	0.00%	0.00%	5.32%	100.00%
IUD/Implant/Injectible	0.49%	94.56%	0.01%	0.01%	0.00%	4.92%	100.00%
Other Reversible	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Traditional	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Non Migrants							
Method	Destination						
Origin	Pill	IUD/Implant/Injectible	Other Reversible	Sterilization	Traditional	None	All
Pill	94.10%	0.58%	0.02%	0.00%	0.00%	5.30%	100.00%
IUD/Implant/Injectible	0.45%	94.33%	0.00%	0.02%	0.00%	5.21%	100.00%
Other Reversible	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Traditional	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Once Migrated							
Method	Destination						
Origin	Pill	IUD/Implant/Injectible	Other Reversible	Sterilization	Traditional	None	All
Pill	94.36%	1.02%	0.00%	0.00%	0.00%	4.62%	100.00%
IUD/Implant/Injectible	0.55%	94.44%	0.04%	0.00%	0.00%	4.97%	100.00%
Other Reversible	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Traditional	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2+ Times Migrated							
Method	Destination						
Origin	Pill	IUD/Implant/Injectible	Other Reversible	Sterilization	Traditional	None	All
Pill	92.97%	1.14%	0.00%	0.00%	0.00%	5.89%	100.00%
IUD/Implant/Injectible	0.60%	95.31%	0.02%	0.00%	0.00%	4.06%	100.00%
Other Reversible	0.00%	0.00%	50.00%	0.00%	0.00%	50.00%	100.00%
Traditional	0.00%	0.00%	0.00%	0.00%	94.87%	5.13%	100.00%

Table 4: Multivariate Analysis, IFLS 2000

	Model 1		Model 2		Model 3		Model 4	
	Non-use	**Switch**	**Non-use**	**Switch**	**Non-use**	**Switch**	**Non-use**	**Switch**
Constant	0.0598	-4.2956***	2.3873***	-6.7562***	3.5965**	-4.9835**	3.2375***	0.5345
Migration Experience								
Never migrated (ref.)								
Once migrated	-0.2415*	-0.2636	0.0021	0.0745	-1.1314***	-1.0050**	-0.0323	-0.1593
2 times+ migrated	-0.2917**	-0.0156	0.05037	0.3529**	-2.0950***	-1.0444***	0.0879	0.0352
Age (years)			-0.0141	0.3435***	0.2719**	0.3750**	-0.0671**	-0.1234
Age Squared (years)			0.0002	-0.0059***	-0.0057***	-0.0076**	0.0009**	0.0014
Education								
Up to primary								
Secondary and beyond							0.0330	0.1835
Sector of employment								
Not working (ref.)								
Agricultural							0.1969**	0.0199
Non-agricultural							0.0456	0.0784
Duration (months)			-0.1190***	-0.1437***	-0.1218***	-0.2340***	-0.1210***	-0.1489***
Duration Squared (months)			0.0008***	0.0010***	-0.0012**	-0.016***	0.0008***	0.0011**
Number of living children								
None					-5.4208***	-1.7977***		
One (ref.)								
Two					2.8782***	2.2698***		
Three or more					5.2675***	6.0182***		
Period of contraceptive use								
Before 1998 (ref.)								
After 1998					-20.1165	0.1727		
Program-level								
Index of quality of health center / family planning program							-0.0191	0.0291
Community-level								
Degree of infrastructure development							0.0146	-0.0596

Note: * Significant at 0.10, ** Significant at < 0.05, *** Significant at < 0.001

Table 5: Reanalysis of Model 3 by Migration Experience, IFLS 2000

	Never Migrated		Once Migrated		2+ times Migrated	
	Non-use	**Switch**	**Non-use**	**Switch**	**Non-use**	**Switch**
Constant	3.2075*	-4.9298**	3.4063**	-3.1665	4.9382**	-4.6933**
Age (years)	0.2499**	0.2486*	0.2374**	0.2370*	0.1441	0.3443**
Age Squared (years)	-0.0016**	-0.0073**	-0.0050**	-0.0055**	-0.0036**	-0.0073***
Duration (months)	-0.1071***	-0.2281***	-0.1074***	-0.2289***	-0.1094**	-0.2296***
Duration Squared (months)	-0.0002***	0.0014**	-0.0002***	0.0014**	-0.0002***	0.0014***
Number of living children						
None	-5.3792***	-1.7851***	-5.3732***	-1.8459***	-5.3984***	-1.8217***
One (ref.)						
Two	2.8462***	2.5573***	2.8411***	2.4939***	2.8538***	2.4765***
Three or more	5.3089***	6.4417***	5.3032***	6.3598***	5.3101***	6.5688***
Year of contraceptive use						
Before 1998 (ref.)						
After 1998	-19.4333	0.1480	-19.9103	0.1118	-21.1039	0.1052

Note: * Significant at 0.10, ** Significant at < 0.05, *** Significant at < 0.001

Table 6: Reanalysis of Model 4 by Migration Experience, IFLS 2000

	Never Migrated		Once Migrated		2+ times Migrated	
	Non-use	**Switch**	**Non-use**	**Switch**	**Non-use**	**Switch**
Constant	2.4802***	-2.8268***	3.1921***	-2.5568***	3.0109***	-3.3306***
Age (years)	-0.0199	0.0970	-0.0640**	0.0814	-0.0527*	0.1334
Age Squared (years)	0.0002	-0.0021	0.0009**	-0.0019	0.0007	-0.0027**
Education						
Up to primary						
Secondary and beyond	0.0657	0.1883	0.0698	0.2166	0.0642	0.1810
Sector of employment						
Not working (ref.)						
Agricultural	0.1808**	-0.1105	0.1952**	-0.0699	0.1874	-0.0952
Non-agricultural	0.0341	0.0089	0.0439	-0.0321	0.0402	0.0299*
Duration (months)	-0.1205***	-0.1480***	-0.1213***	0.1488***	-0.1211***	-0.1488***
Duration Squared (months)	0.0008***	0.0011**	0.0008***	-0.0011**	0.0008***	0.0011**
Program-level						
Index of quality of health center / family planning program	-0.0196	0.0217	-0.0187	0.0195	-0.0191	0.0179
Community-level						
Degree of infrastructure development	0.0168	-0.0448	0.0143	-0.0498	0.0149	-0.0449

Note: * Significant at 0.10, ** Significant at < 0.05, *** Significant at < 0.001