The demographic and socioeconomic determinants of contraceptive use in Indonesia

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Abstract

Three decades ago, Ronald Freedman (1981) heralded the widespread adoption of modern contraception in Indonesia as surprising, given the relatively low level of socioeconomic development. He found modest differentials in contraceptive use by socioeconomic status and region, but concluded that the major influence was the impact of a vigorous family planning program in a society motivated to reduce childbearing in the face of Malthusian population pressures. In this study, I replicate and extend Freedman's analysis with a comparison of the levels and determinants of contraceptive use in Indonesia in 1976 and 1993 based on the Indonesian Fertility Survey and the Indonesian Family Life Survey. Similarly to Freedman, I find that use remains high across all strata; however, there are interesting declines for highly educated women and women in the highest SES category in 1993. Overall, I find a 30 percentage-point increase in contraceptive use over the thirty year time span. In order to explain the difference, I conduct a "statistical experiment" to see how much of the observed change can be explained by modernization as measured by the rapid rise in female education over the period. I find that only a small fraction of the rise in contraceptive use can be explained by changing educational composition and conclude that other societal factors, and Indonesia's family planning program, in particular, is the primary reason for the rapid rise in contraceptive use.

Introduction

Fertility trends in Indonesia have fluctuated over several hundred years from low fertility and low population density in the Age of Commerce to high fertility and high population density during the colonial occupation and a reduction of fertility during the

demographic transitions of the 1960s. Presently, the total fertility rate of Indonesia hovers around the replacement rate, with just over two children per couple[1]. The decline in fertility can be attributed to several factors, one of which is the family planning program.

Indonesia is considered a model for family planning and for efforts to reduce the fertility rate for many countries in the developing world, as the country experienced a sharp decline in the fertility rate in the mid to late twentieth century despite the absence of significantly improved economic conditions. One might conclude from this situation that perhaps modernization and industrialization do not have to be necessary preconditions for fertility decline. This paper will focus on the period after the 1960s, with particular attention to the use of modern contraceptives for fertility regulation. I explore socioeconomic and demographic factors influencing contraceptive use in 1976 and 1993, and conclude that factors related to modernization, such as female educational attainment, have lesser effects on the likelihood of using modern contraception than factors such as the family planning programs.

Indonesian Population History

In order to understand the societal factors influencing modern contraceptive use, one must also explore the period leading up to the implementation of the family planning programs. During the colonial period, the Dutch forced Indonesians into labor-intensive agriculture that necessitated increased larger families. At this time, the agricultural system experienced what Clifford Geertz refers to as an "agricultural involution" (1963). Borrowing concepts from anthropologist Alexander Goldenwiser, Geertz describes the agricultural involution as, "…culture patterns, which, having reached what would seem to be a definitive form, nonetheless fail either to stabilize or transform themselves into a

[1] The UN Population division estimates the TFR for Indonesia at 2.3 between 2000-2005.

new pattern, but rather to continue to develop by becoming internally more complicated" (80-81). In the case of Indonesia, Geertz describes the Javanese cane worker who "remained a peasant at the same time that he became a coolie, persisted as a community-oriented household farmer at the same time that he became an industrial wage laborer" (89). In order to continue levels of production acceptable to Dutch standards, the Indonesians had larger families, as more children were necessary for higher rates of agricultural production in a society devoid of modernization. Larger family sizes and sustained population growth became problematic for islands of Inner Indonesia such as Java, which Geertz describes as possessing a population so dense that the land would appear not to be able to sustain further population growth, and that the growing population could potentially exceed the amount of farmland available. In other words, Java had reached its Malthusian "carrying capacity."

Table 1 shows the total fertility rates (TFR) for Indonesia between 1950 and 2005. While this paper primarily focuses on the period between 1976 and 1993, it is important to note the trends in fertility that occurred before the family planning movement. In 1945, Indonesia gained independence from the Dutch after a brief period of harsh Japanese rule. The TFR in 1950 represents post-independence, post depression fertility, which remained high despite tough economic conditions. The period between 1955 and 1960 marked a period of stable fertility from a TFR of 5.49 in 1950-55 to 5.67 to 1955-60. Based on Table 1, it is evident that 1960 marks the beginning of the fertility decline in Indonesia, and the period from 1960-1995 represents a 55% decrease in the TFR. This paper will address the demographic and socioeconomic factors related to this fertility decline, namely contraceptive use.

Table 1: Total fertility rates for Indonesia, 1950-2000

Period	Total fertility	Absolute Difference	% Change
1950-1955	5.49		
1955-1960	5.67	0.18	**3.28%**
1960-1965	5.62	-0.05	**-0.88%**
1965-1970	5.57	-0.05	**-0.89%**
1970-1975	5.30	-0.27	**-4.85%**
1975-1980	4.73	-0.57	**-10.75%**
1980-1985	4.11	-0.62	**-13.11%**
1985-1990	3.40	-0.71	**-17.27%**
1990-1995	2.90	-0.50	**-14.71%**
1995-2000	2.55	-0.35	**-12.07%**

** Source*: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2005 Revision*, http://esa.un.org/unpp.

Table 2 displays the TFR for each region of Indonesia from 1971 to 1994. In 1971, the TFRs for Sumatra ranged from a low of 6.18 (West Sumatra) to a high of 7.20 (North Sumatra). These rates are extraordinarily high, even compared to Indonesia's TFR of 5.61. What is more remarkable is the decline in TFR from 1971 to 1994 across all regions. The TFR in Jakarta decreases from 5.18 to 1.90, and Yogyakarta also reduces from nearly 5 children to below replacement level as well. Indonesia as a whole drops from 5.61 children to 2.85, and rapidly approaches replacement level fertility. This drop in the TFR can be attributed to a number of changes that occurred over time in Indonesia, and this paper will focus on patterns in contraceptive use and the family planning movement as related to modernization.

Table 2: Total Fertility Rate (TFR) by province: 1971, 1980, 1985, 1990, 1994

	Total Fertility Rate (TFR)				
Province	**1971**	**1980**	**1985**	**1990**	**1994**
North Sumatra	7.20	5.94	5.13	4.29	3.88
West Sumatra	6.18	5.76	4.81	3.89	3.19
South Sumatra	6.33	5.59	4.78	4.22	2.87
Lampung	6.36	5.75	4.80	4.05	3.45
DKI Jakarta	5.18	3.99	3.25	2.33	1.90
West Java	6.34	5.07	4.31	3.47	3.17
Central Java	5.33	4.37	3.82	3.05	2.77
Yogyakarta	4.76	3.42	2.93	2.08	1.79
East Java	4.72	3.56	3.20	2.46	2.22
Bali	5.96	3.97	3.09	2.28	2.14
Nusa Tenggara Barat	6.66	6.49	5.74	4.98	3.64
South Kalimantan	5.43	4.60	3.74	3.24	2.33

South Sulawesi	5.71	4.88	4.13	3.54	2.92

From Biro Pusat Statistik, Source: 1971, 1980, 1990 Population Census, 1985 Intercensal Population Surveys, 1991 and 1994 Indonesia Demographic and Health Survey

Population Density and *Transmigrasi*

In the previous section it is noted that Clifford Geertz (1963) argued that continuing high fertility created a situation where the rural areas of Java faced Malthusian pressures, causing abject poverty. Gavin Jones affirms Geertz's assertion and addresses the labor force in Java, claiming that at the beginning of the 1960s agriculture in Java "had essentially exhausted its capacity to absorb further increases in the rural workforce" (1984). During the same time, President Sukarno remarked that Indonesia's population problem was not that of excessive growth, rather of "unbalanced" distribution. In other words, it was not that Indonesia was growing too rapidly, but instead that the majority of the population was concentrated in the Inner Islands of Java, Bali, and Madura (Hugo 1987). As a result, President Suharto, Sukarno's successor, enacted *transmigrasi*, or transmigration, that moved Indonesians from the Inner Islands to the Outer Islands, in the 1970s and 1980s. The main focus of population redistribution concentrated on the island of Java, the largest and most densely populated of the three Inner Islands.

In 1977, 63% of Indonesia's population lived on the island of Java, which is 7% of the land mass of Indonesia, roughly the size of Louisiana (Hull et al. 1977). By 1995, 60% of Indonesia's population resided on the island of Java, which is not a significant reduction in the population distribution (Biro Pusat Statistik, 2009). In other words, transmigration had relatively no impact on fixing the problem of unequal population distribution.

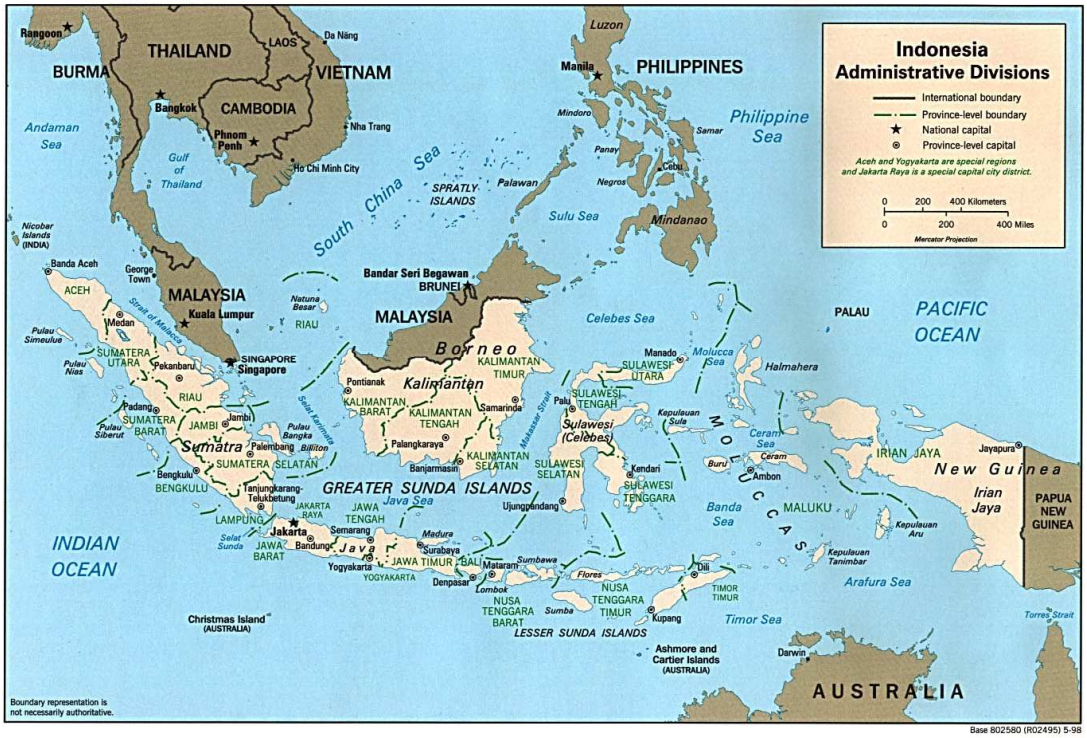

Figure 1: Regional Map of Indonesia

*Source: United States Central Intelligence Agency, map no. (R02495)5-98Regions and Translations: Sumatera Utara (North Sumatra), Sumatera Barat (West Sumatra), Sumatera Selatan (South Sumatra), Lampung, Jawa Barat (West Java), Jakarta Raya (Jakarta), Jawah Tengah (Central Java), Yogyakarta, Jawa Timur (East Java), Bali, Nusa Tenggara Barat (West Nusa Tenggara), Kalimantan Selatan (South Kalimantan), Sulawesi Selatan (South Sulawesi)

Table 3 displays the population density per square kilometer for each of the provinces of Indonesia included in this study. In both 1971 and 1995, South Kalimantan possessed the lowest population density, with 45 (1971) and 77 (1995) people per square kilometer, whereas Jakarta possessed the highest density of 7,762 (1971) and 12,495 (1995). While population density is not the only factor influencing contraceptive use, one would imagine that the Malthusian pressures and extreme poverty experienced on Java would prompt higher contraceptive use rates than on the Outer Islands of Sumatra, Kalimantan, Nusa Tenggara Barat, and Sulawesi.

Table 3: Population density per square kilometer, by province and all Indonesia, 1971-1995

	Population Density per sq. km			
Province	**1971**	**1980**	**1990**	**1995**
North Sumatra	93	118	145	157
West Sumatra	56	68	80	87
South Sumatra	33	45	61	70
Lampung	83	139	181	200
DKI Jakarta	7,762	11,023	12,495	13,768
West Java	467	693	765	848
Central Java	640	742	834	867
Yogyakarta	532	609	678	920
East Java	576	690	814	706
Bali	381	444	500	521
Nusa Tenggara Barat	109	135	167	181
South Kalimantan	45	55	69	77
South Sulawesi	71	83	96	104
Indonesia	**62**	**77**	**93**	**101**

From Biro Pusat Statistik, Source: 1971, 1980, 1990, 2000 Population Census, and 1995 Intercensal Population Census

Another solution to Indonesia's rapidly growing population and "unbalanced" population distribution was a family planning program established by the government in 1971. This program sought to reduce fertility in Indonesia by providing modern contraceptives and other services to married women. Initially, the family planning program only served the Java-Bali region, but later expanded to the Outer Islands as well. Prior to the establishment of the programs, a survey from Jakarta in 1968 showed that three-quarters of both married men and women at reproductive age claimed not to know any method of fertility regulation (McNicoll and Singarimbun 1986). At this point in Indonesian history, the TFR was rather high, and fertility regulation did not occur, most likely as a result of lack of knowledge of contraceptive methods. The above study might not capture the fertility regulation that actually occurred, since men and women might not view abstinence and other traditional methods as strategies for controlling fertility.

Still, the TFR in Java remained lower than in Outer Indonesia, perhaps because the population density was so high and Malthusian pressures were more prevalent in Java than in Outer Indonesia. Abject poverty occurred as a result of overpopulation of the farm land, leaving agricultural workers no choice but to regulate fertility in order to escape

these dire economic circumstances. This most likely indicates a latent demand for fertility control, whereby modern contraceptives were widely accepted once they became available in Inner Indonesia more so than in Outer Indonesia. While it is difficult to assess exactly how and when family size preferences change, one might note that the decrease in wanted family size became part of the "calculus of choice" (Coale 1973) when couples also had the means and the knowledge to control fertility. It seems logical that familiarity with the use of contraception contributed to the decline in the family size, since the same survey from Jakarta in 1968 was administered a decade later in 1979, and reported that over 80 percent of married women under the age of 50 reported having heard of at least one method of family planning (McNicoll and Singarimbun 1986). By 1993, over 90% of women had heard of some method of contraception (Indonesian Family Life Survey 1993). The family planning movement in Indonesia provided resources for women to obtain both contraceptives in addition to information about fertility regulation, a combination which greatly reduced fertility and increased both the knowledge and use of contraceptives. The next section will discuss the family planning program in more detail, and provide more evidence for its success in Indonesia.

Background on the Family Planning Program

The Family Planning Program, known in Indonesia as the National Family Planning Coordinating Board (BKKBN), possessed two general objectives at the beginning: 1) to provide contraceptive services to couples who wish to limit their fertility; and 2) to convince all couples, whether or not they are currently practicing family planning, and those who are not yet married, that fertility limitation and smaller families positively affect the development of their communities and their nation as a

whole (Sumbung et al. 1981). The goals of the program have not changed significantly since its inception.

The family planning programs instituted primarily by the Suharto regime (the New Order[2]) could have been one of the significant contributing factors to the fertility decline in Indonesia. Suharto acknowledged the threat of Malthusian pressures and pushed the ideals of family planning after Sukarno supported the continuation of larger families to reap the benefits of the natural resources of Indonesia, continuing with the ideas of the Dutch. Sukarno's ideologies of the larger family perpetuated the issues of significantly high population density on Java and Bali, whereas Suharto's policies sought to eradicate the issue.

There are several arguments related to the effectiveness of family planning programs in general, but one is an issue of endogeneity. Do programs reduce fertility or did a preexisting decline in fertility create a demand for a program? While this paper does not specifically address this problem, the effects of family planning programs in Indonesia remain an important aspect for the consideration of fertility control within the country. Suharto and other government officials would claim that the program was a large success; but other factors need to be considered when examining the family planning programs in Indonesia.

The New Order made controlling fertility a priority, replacing the Old Order's (Sukarno) ideology that inhibited family planning through political Islam and nationalist economic planning (Hull 2002). Perhaps one of the most significant effects of the practice of family planning in Indonesia is that it became accepted by all political,

[2] Suharto's regime is commonly referred to as "the New Order", which replaced "the Old Order" of the Sukarno dictatorship.

religious, and social groups (Hull 2002). As a result, the family planning practices were widespread throughout the archipelago and became community activities: village rulers distributed birth control and women in the village promoted the use of contraception to non-contraceptors. In fact, much of the success of the family planning movement in Bali was attributed to the involvement of the *banjar*, or community organization, which held members of the community responsible for using contraception or for convincing others to become contraceptive users (Freedman 1981).

Ideational shifts within villages usually occurred from influence from the New Order Government, which drew upon of concepts such as *gotong royong* (mutual assistance) and *musjawarah-mufakat* (consultation-consensus), and used these ideas to promote the ideas and practices of family planning within villages. Hull (1987) claims that these two Indonesian concepts have affected peasants throughout history, and as a result, made them predisposed to follow the advice of their village leaders and observe village practices, and are subordinate to higher forms of government. As a result, the idea of bringing village leaders into the family planning effort could have been an instrumental factor in the success of the programs.

As the economic conditions of the 1970s became increasingly favorable, influences of Western consumerism permeated society, and mortality continued to decline, the government realized that an attitudinal change would affect the results of the family planning program as much, if not more, than a structural change in the program. During this time period, the government promoted the “small, happy, and prosperous family” and emphasized “family quality rather than family quantity” to religious leaders who valued larger families (Hamijoyo 1994a). Additionally, in the early 1980s, the

family planning movement broadened the scope of what was considered “family planning” to extend to nutritional programs for children as well as immunization programs for both the mother and her children. The government also viewed the effects of the family planning program beyond the scope of the regulation of fertility, and considered involvement as a contribution to Indonesian society. According to Sumbung et al (1981):

> Instead it became recognized that acceptance is based on “beyond family planning” factors which are predicated on an overall improvement of various other aspects of the individual’s life, such as his economic, social, and spiritual well being in addition to his physical wellbeing. Consequently, family planning came to be viewed more as a general development issue…and directly linked the national development priorities and activities which envisage an overall improvement in the quality of life of the people and the creation of a just and proper society.

As noted in the above quote, family planning became an issue for all Indonesians, and the government began to rely heavily on the people to carry out the joint mission of improving society through cooperation and *gotong royong*, the concept of mutual assistance.

In sum, contraceptive use in Indonesia could have been one of the most significant factors contributing to the fertility decline. In the 1960s at the beginning of the decline, there was relatively little information on the use of modern methods of birth control, but as women became aware of contraceptive use, the total fertility rate began to decline at a rapid rate, indicating a latent demand for fertility control. For example, the TFR decline was less than 1% per five year time period from 1960 (TFR=5.62) to 1970 (TFR=5.57), the inception of the family planning programs. From 1970 to 1980, the TFR decreased much more rapidly, with a 5% decrease from 1970-1975 and an 11% decrease from 1975-1980. The implementation of family planning programs from the government and the spread of ideology as to how and when to use birth control also significantly

contributed to the fertility decline. The use of contraception also marked the end of the period of "natural" fertility control and began the period of "controlled" fertility in Indonesia. On the other hand, some critics of the family planning program argue that the coercive nature of the program, as in the case of West Sumatra, which would not promote civil service workers unless he or she had become a family planning program acceptor, also contributed to the increased use, and that controlled fertility was forced in some circumstances rather than accepted willingly. The extent to which these coercive processes occurred is not entirely known, and one can assume that the family planning program's overall influence on the reduction of fertility in Indonesia was strong.

Theories of Demographic Transition

For many years, social scientists have debated the validity of theories explaining reproductive behavior and contraceptive choices among women. While this paper addresses contraceptive use in Indonesia, I will begin with a discussion of fertility and the Demographic Transition Theory (DTT) and address several angles of the debate on theories explaining the demographic transition. It is important to note *why* women choose to regulate their fertility even before assessing which women practice fertility regulation and which method they use. Davis and Blake (1959) discuss several intermediate variables[3] influencing fertility regulation, from factors such as marriage, infecundability, contraceptive use and duration of the fertile period. While each of the aforementioned factors is important in addressing fertility control, this paper concentrates on one particular intermediate variable: contraceptive use.

[3] Bongaarts (1978) expounds upon these intermediate variables with tools for analysis that he refers to as "proximate determinants." Henceforth, the use of "proximate determinants" and "intermediate variables" will be interchangeable.

The demographic transition is described as the process by which there is as a switch from high birth rates and high death rates to low birth rates and low death rates. This transition occurs when the rapidly decreasing mortality rates are followed by declining fertility rates. This paper will rely upon the theories of Davis and Blake (1959) and Bongaarts (1978), which provide biological and behavioral circumstances for an individual's regulation of fertility to provide evidence to larger social factors influencing significant fertility reduction.

The most prominent early explanations for the demographic transition originated from two leading theorists: Kingsley Davis and Ansley Coale. Davis (1963) explains his theories behind fertility control that "faced with a persistent high rate of natural increase resulting from past success in controlling mortality, families tended to use every demographic means possible to maximize their new opportunities and to avoid relative loss of status" (362). Coale stated three preconditions for fertility control: 1) Fertility must be within the calculus of conscious choice; 2) Reduced fertility must be advantageous; 3) Effective techniques of fertility reduction must be available (1973). This paper will address both theories of fertility regulation as a source of economic and social gain, but in particular, Coale's acknowledgement of the availability of effective fertility reduction techniques in the context of Indonesia.

Many theorists (including Davis and Coale) believe that fertility reduction is an assessment of the costs and benefits of having children. Richard Easterlin (1975) develops a framework for the supply and demand of children using economic theory. For Easterlin, the demand for children is strongly related to modernization theories, implying that improved economic conditions and increased levels of female education create a

larger demand for children. The supply factors are related to the biological factors that hinder natural fertility. Bryant (2007) provides a more complete explanation for the fertility decline, “Fertility falls because socioeconomic change modifies the incentives to have children, new ideas about childbearing diffuse through society, and women achieve better access to contraceptive methods” (122).

Similarly, Ronald Lee (2003) notes that the demographic transition is also tied to the opportunity costs of children, whose involvement in education rather than to the economic contributions of the family, coupled with the rising value of time from more highly educated parents, creates smaller family sizes. As noted later in the paper, the Indonesian model of fertility decline does not necessarily follow these same guidelines, as more highly educated women and women in higher socioeconomic categories actually have more children than those less educated and in lower economic brackets. Lee also references the quality-quantity tradeoff, whereby women have fewer children so that they can devote more resources to each of their children. This idea of the “small and prosperous family” was promoted by the Indonesian government from the beginning of the family planning movement in Indonesia.

Cleland and Wilson (1987) challenge the economic theory of fertility decline and find evidence in support of fertility decline as a function of ideational theory and the spread of cultural ideas. They summarize demographic transition theories and state that, “the most pervasive theme in transition theory is that the modernization of societies changes the economics of childbearing in such a way that a large number of children become disadvantageous to parents. Fertility decline is thus seen as a rational, though perhaps lagged, accommodation to changes in objective economic circumstances” (6-7).

In the end, they conclude that the fertility decline occurs in two phases: 1) an initial decline where birth control eliminates excess fertility and 2) complex and poorly understood factors determine the level of controlled fertility (30). This paper will address the fertility decline and attempt to identify factors behind contraceptive use, another complex issue.

In the case of Indonesia, Maralani and Mare (2005) who assess the consequences of mother's education on their offspring, suggest that women with an intermediate level of education historically possess the highest number of children, meaning that education is not necessarily linearly related to the number of children a woman has. This implies a non-linear relationship between family size and levels of education. While this paper does not assess the TFR over time, I find that that more highly educated women are less likely to use contraception in the 1990s, and since contraceptive use and fertility are closely related, this raises an interesting question between fertility theories and modernization theories.

In a re-examination of the DTT, Ronald Freedman (1979) offers several conclusions about the fertility decline, most importantly that "high levels of Western-type modernization are not a necessary condition for fertility decline" (15). He references his findings from Indonesia as an example, and states that "Malthusian pressures plus consumer and educational aspirations, but little progress by conventional development indicators" are the reasons for Indonesia's fertility decline. Freedman provides a closer examination of Indonesia as a case study in a later article (1981) which will be discussed later in this paper.

Hirschman (1994) evaluates several of these theories in his review of the literature on fertility and the demographic transition. He asserts, "The basic flaw in the demographic transition theory, in my opinion, is the assumption that there is a single monolithic pattern of modernization that could be indexed by any socioeconomic variable…the real theoretical challenge is to specify more clearly what aspects of modernization are linked to fertility change" (220). One plausible explanation for this is the diffusion of ideas and increased lines of communication. In a country such as Indonesia, which possesses vast cultural and geographic diversity, it is not surprising that there are regional variations in contraceptive use rates. Diffusion theory could provide some evidence to explain these regional variations, but as Hirschman cautions, "rapid changes in wide geographic areas do not necessarily mean that a common cultural system is an essential prerequisite for the diffusion of information or for changes in reproduction" (224). I provide evidence that while there are differing use rates across Indonesia, use in general increases significantly over time for every province in the Java-Bali region, so diffusion theory provides one plausible explanation for explaining the variation.

Caldwell (1976) bridges demand theory with ideation theory in his description of intergenerational wealth flows in developing and developed societies. Caldwell states that "it is the direction and magnitude of intergenerational wealth flows or the net balance of the two flows—one from parents to children and the other from children to parents" that should be viewed as fundamental issues in the demographic transition (344). In a society where the wealth flow exists from child to parent (e.g. Yoruban society, using Caldwell's example), having more children is advantageous in societies where children add to

agricultural production, and when they can be used to increase status and power in society, for example though dowries in marriage. Parent to child wealth flows, as practiced in Europe and other parts of the West, have disadvantageous consequences for having larger numbers of children, as wealth can only spread to a smaller number of children depending on one's economic situation.

In sum, several theories attempt to explain the demographic transition involving economic theories related to the costs and benefits of children due to factors related to modernization. Also prevalent are ideational theories which use culture and the diffusion of ideas as the basis for fertility regulation. These theories will also be tested while examining contraceptive use in later sections of this paper.

Figure 2 displays Bongaarts' model of the determinants of fertility. This paper will address some of these factors including the cost/benefits of children and the use of birth control. The monetary cost of birth control is not commonly examined in Indonesia, as contraceptives are heavily subsidized and usually affordable for women in all socioeconomic categories. Limitations to this paper are that fertility preferences, demand for birth control, and unmet need are not addressed. Other studies related to contraceptive use (Freedman et al 1981) address fertility preferences, and since I primarily investigate factors related to contraceptive use, I do not assess unmet need in this paper due to lack of data, but believe it is a very important factor in examining fertility and contraceptive use. Figure 2 also presents a framework for analyzing contraceptive use, beginning with the two main factors I will use to describe use in Indonesia: modernization and family planning programs.

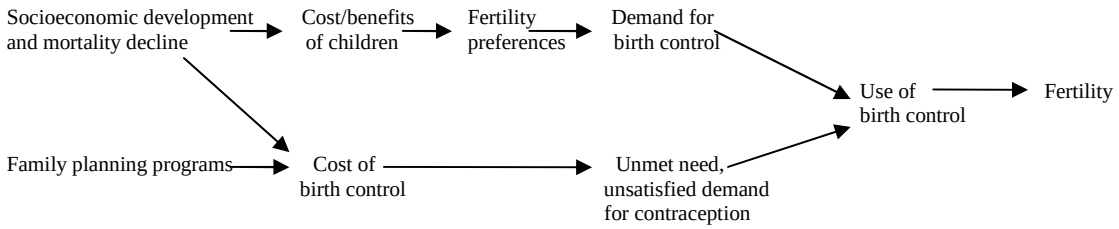

Figure 2: Analytic framework for the determinants of fertility (from Bongaarts 2006)

Summary

Using the 1976 Indonesian Fertility Survey, Ronald Freedman et al.[4] (1981) proclaimed that levels of modern contraceptive use were high throughout all demographic groups of Indonesia, particularly in comparison to a recent study conducted on the socioeconomic determinants of contraceptive use in Thailand (Cleland et al. 1979). The results for use in 1993 substantiate Freedman's assertion, as use rises to above 50% for women in all socioeconomic groups. The authors further concluded that region of residence, or province, was the strongest predictor[5] of modern contraceptive use, followed by the number of living children. They also conclude that factors related to modernization, such as female education and socioeconomic status, had lesser effects on contraceptive use. While these results are rather surprising, and somewhat counterintuitive, the conditions for the family planning program in Indonesia substantiate these findings.

Both Freedman (1981) and Hull et al. (1977) assert that the success of the family planning movement in certain regions can largely be attributed to Malthusian pressures creating the need for the regulation of fertility. These assertions follow closely to those of Geertz (1963) a decade earlier. The involvement of both the governmental sector and the

[4] This paper shall be referred to by only the first author, Freedman, as it is cited repeatedly throughout the article.
[5] The authors use standardized eta coefficients to measure which variable possessed the "strongest" effects on contraceptive use.

private sector also contributed to the success of the family planning program. In 1970, the government invested $1.3 million (USD) with $3 million from private donors for the National Family Planning Coordinating Board (BKKBN). In 1976-77 the number rose to $28.5 million, and in 1977-78 it rose to $34.3 million (Hull et al. 1977).

Finally, the strength of the relationship between number of living children and contraceptive use shows that Indonesian women use contraceptives as a tool for family planning, from relatively no use during the first birth interval to moderately high use from the second birth interval and beyond. This behavior aligns with the idea of the "small, happy, and prosperous family" promoted by the government (Hamijoyo 1994).

These high levels of contraceptive use contributed to a significant decrease in the total fertility rate (TFR) for Java-Bali, from 4.6 in 1975 (Freedman 1981) to 2.5 in 1991 (Kasmiyati and Kantner 1998). As a result of this sharp decline in fertility, one would expect dramatic increases in contraceptive use across all socioeconomic and demographic categories. This paper updates and extends Freedman's analysis of contraceptive use using the 1993 Indonesian Family Life Survey. My analysis for 1993 examines beyond the Java-Bali region to all of Indonesia[6], and attempts to uncover the groups that lag behind in contraceptive use, women in the lowest socioeconomic group in the 1970s, and women in the lowest and highest socioeconomic groups in the 1990s.

[6] Limitations in the 1976 data do not permit an analysis of all of Indonesia, as only the Java-Bali possessed family planning programs during that year, and therefore the data set only includes the Java-Bali region.

Data and Variables

Data

This study includes a replication and extension of Freedman et al. (1981) in addition to the examination of data representative of Indonesia nearly twenty years later. To replicate Freedman's study, I use the 1976 Indonesian Fertility Survey (IFS), part of the World Fertility Survey of the same year. The data include 9,155 ever-married women between the ages of 15-49, and 5,787 women exposed to the risk of pregnancy[7]. The data were obtained from the Java-Bali region only, and did not include women from the Outer Islands.

The Indonesian Family Life Survey (IFLS) is a longitudinal survey with four waves ranging from 1993-2007. The analysis for this paper will only include Wave 1 from 1993 (IFLS1). IFLS1 encompasses 13 provinces, and extends beyond the Java-Bali region limited by the IFS. The data set consists of both a household questionnaire from 7,730 households and a fertility questionnaire, which consists of 4,981 ever-married women between the ages of 15-49. For my study, I assess only the 2,040 women at the risk of pregnancy[8] in the Java-Bali region and the 3,274 for all of Indonesia.

Variables

Use of a Modern Contraceptive

[7] Defined by Freedman as those currently married, not pregnant and not reporting a fecundity impairment, and by this author as currently married and living with the husband, not pregnant, not infecund, not breastfeeding, not experiencing postpartum amenorrhea or practicing postpartum abstinence.

[8] This number was derived after removing 92 women who had proxy interviews and therefore did not answer many of the questions on contraceptive use, 277 who were not currently married and most likely did not engage in sexual relationships (widowed, divorced, or separated), 150 women living in different households than their husbands, 240 women who were pregnant, 806 women who claimed a fecundity impairment, 36 who were breastfeeding, 92 women experiencing post partum amenorrhea, and 14 practicing postpartum abstinence.

The dependent variable for this study is the use of a modern contraceptive. The sections on multivariate logistic regression and pooled time series analysis use a dichotomous variable measuring either use or nonuse of a modern contraceptive. For the section on decomposition, predicted probabilities were generated for the percentage of women using modern contraception.

Region

As mentioned earlier, the IFS only possesses provincial divisions from the Java-Bali region: Jakarta, West Java, Central Java, Yogyakarta, East Java, and Bali. Data on contraceptive use for Outer Indonesia were not available until the early 1980s, when the program was extended to the outer regions. The IFLS includes data from thirteen regions of Indonesia: North Sumatra, West Sumatra, South Sumatra, Lampung, Jakarta, West Java, Central Java, Yogyakarta, East Java, Bali, Nusa Tenggara Barat (NTB), South Kalimantan, and South Sulawesi.

The results of Freedman's study showed that region was the strongest predictor of contraceptive use. This evidence is supported by Hull et al. (1977), who provide a descriptive analysis of the differences between the family planning programs across Indonesia. The authors describe the variety of family planning programs that emerged as a result of the cultural diversity within Indonesia, and differing attitudes towards the process of family planning. While cultural and economic production related to regional variation is not the single cause of differential fertility in Indonesia, it strongly affects attitudes towards family planning and therefore influences how programs within each region are run. Bali, a region characterized by its high overall use rates of modern contraceptives, also possesses a large proportion of women using the IUD. Hull and Hull

describe Bali as a Hindu society accepting of examinations of females by male doctors, and has a high use of methods such as the IUD (1977). They argue that more traditional Islamic regions such as West Java (the Sundanese ethnic group), view the IUD as a form of abortion and also would not allow a male to perform an examination on a female. This observation from 1977 was confirmed with Freedman's analysis that showed a 19% modern contraceptive use rate for West Java in 1976. In 1993, West Java's use rate increased to 63.2%, for a 224% increase over the twenty-year time period. This increase was the largest experienced by any region; however, an exploration of the attitudinal and programmatic changes that contributed to this increase are beyond the scope of this paper.

Concerning the labor market, Outer Indonesia is characterized by agricultural work, where larger families were desired and proved economically beneficial. Additionally, as noted earlier, the population density of Outer Indonesia was sparser, so these women did not face similar Malthusian pressures to women from Inner Indonesia. Essentially, the combination of the lack of access to family planning programs and the desire for a larger family produce lower contraceptive use rates for Outer Indonesia. Lower use rates, such as those in Nusa Tenggara Barat, are a result of several factors influencing Outer Indonesia. Hull et al. (1977) described the early stages of the family planning program in the Outer Islands, claiming that while Java-Bali experienced an average number of 7,000 married women per clinic, the number for the Outer Islands was 9,000 women per clinic (1977). Fewer clinics per woman in Outer Indonesia is one other factor influencing lower contraceptive use rates in the region.

Outer Indonesia is also characterized by a greater number of agricultural workers, and since circular migration to cities is common, spousal absence in this region is a regular occurrence. Perhaps this absence is one of the factors that lead to lower contraceptive use rates, as couples who are separated for longer periods of time have no need for contraception. In addition, the more restricted position of women in a more traditional Islamic society could contribute to lower use rates. While use is lower in Outer Indonesia (55.6%) compared to Inner Indonesia (66.5%) in 1993, one must note that regional variations such as educational composition, husband's occupation, and family size and age composition, largely affect contraceptive use.

Number of Living Children (NLC)

Since marriage is the catalyst for family formation and the sample used in this study examines only currently married women, it is important to study how contraceptive use relates to the regulation of family size. In order to analyze the differences between family formation choices, the variable "number of living children" (NLC) is examined. Given that the family planning program was instituted in order to help women regulate their fertility and control their family size, NLC should possess a strong effect on contraceptive use. Additionally, since a preliminary analysis of the effects of NLC on contraceptive use shows that use increases dramatically from the first birth interval to the second birth interval in both 1976 and 1993, the importance of NLC on contraceptive use should be noted.

NLC is divided into the following categories: 0, 1, 2, 3+. The categories were chosen after an examination of the proportion of women using contraceptives of women with more than three births, and there was not enough variability to warrant more

categories than the aforementioned ones. For example, women with 3, 4, 5, 6, and 7 children all exhibited contraceptive prevalence rates between 60% and 70%, and significant differences were not observed between these groups. Concerning the construction of the variable, the IFLS uses a composite variable for number of living children ("number of live births"), which is a combination of the number of biological daughters living with the woman, the number of biological sons living with the woman, the number of biological sons living outside the household, and the number of biological daughters living outside the household[9].

As postulated by Freedman, factors of modernization only modestly affect contraceptive use in the Java-Bali region in 1976. While there are no comprehensive data sets related to fertility and contraceptive use on all of the regions of Indonesia during the time period, one can assume that Freedman's results are generalizable to the rest of the country based on other studies related to fertility during the same time period (Hull and Hull 1977). Instead, factors such as region and number of living children strongly affect contraceptive use. Other literature at the time of Freedman's study (Hull and Hull 1977) indicates that women in higher socioeconomic categories were more likely to use contraception, since they claim that the family planning program possesses an "elite and clinic bias." Additionally, theories consistent with demographic transition theory and other theories related to modernization would indicate that smaller families would be desired in periods of economic growth and increased female educational attainment, where women would prefer careers to childbearing.

[9] While it is not explicitly stated, the "number of live births" in this case implicates that this is the number of live births at the time the survey was administered, since the woman is asked about children currently either living in her household or outside of her household.

Table 4 shows contraceptive use by the number of living children for both the Java-Bali region and all of Indonesia in 1993. This table clearly indicates that women in the first birth interval are not using contraception, and that contraceptive use really begins in the second birth interval.

Freedman's numbers for 1976 were strikingly similar, with use increasing from 2% in the first birth interval to 19% in the second interval, and 33% in the third (1981). Furthermore, the table shows that in Indonesia, marriage is the process by which women begin the childbearing process, and women use little to no contraception before their first child, increasing use for the purpose of birth spacing. The evidence of birth spacing is apparent based on the increased use of contraceptives with the increase in the NLC. This provides strong evidence that modern contraceptives are used in Indonesia as a method for fertility regulation, and can be seen as a contribution to declining fertility.

Table 4: Percent Using Modern and Traditional Contraceptives by Number of Living Children, IFLS 1993

	Java-Bali		
Children	**Modern**	**Traditional**	**N**
0	13.9	0	101
1	61.3	4.3	445
2	72.6	4.2	500
3+	61.9	4.9	994
		Total:	**2040**
	All Indonesia		
Children	**Modern**	**Traditional**	**N**
0	10.9	0.6	156
1	57.0	4.2	642
2	69.8	4.2	735
3+	64.7	4.4	1741
		Total:	**3274**

Age

In Table 5, women were tabulated in 5-year age categories from 15-19 to 45-49 years of age. Very little variation across age is observed in both data sets, although contraceptive use and by age shows increased variation controlling for the NLC.

Freedman presented evidence that use rates for women under 30 substantially increase when controlling for NLC, whereas use rates for women over 30 decrease as age and NLC increase (1981). These results are consistent with women in 1993, shown in Table 5 below, which shows contraceptive use rates by age and current parity.

Table 5: Percent using modern contraception, women at the risk of pregnancy, by age, controlling for NLC, 1993 IFLS†

	Number of Children					
Age	**0**	**1**	**2**	**3+**	**Total (%):**	**Total (n):**
13-19	33.3	66.7	-	-	**50**	**62**
20-24	7.4	76.8	72.7	65.5	**67.9**	**277**
25-25	-	66.2	81.5	63.7	**69.1**	**466**
30-34	-	46.7	74.6	76.6	**69**	**509**
35-39	-	13.8	64.1	69.6	**62.7**	**405**
40-44	-	-	57.7	65.8	**60.4**	**230**
45-49	-	-	-	60.7	**57.1**	**91**
Total (%):	**13.9**	**61.3**	**72.6**	**70.8**		
Total (n):	**101**	**445**	**500**	**994**		**2040**

† Cells with less than 25 women are censored.

Wife's Education[10]

Education in Indonesia is compulsory for the first nine years of a student's education, with 6 years of primary school and 3 additional years of middle school. After middle school, students must pay for their education, and therefore a significant drop in educational enrollment occurs for those who cannot afford a high school education and beyond. Improvements in the educational system occurred simultaneously with the beginning of the family planning program.

For purposes of this study, wife's education was divided into the following categories: no schooling, 1-3 years primary, 4-6 years primary, graduated primary, some junior high, graduated junior high, some senior high, graduated senior high, and college/university. Levels of education were measured by highest level of educational

[10] Freedman's educational categories were as follows: None, Some primary, Primary, ≥Jr. high. I expanded these categories to fit the IFLS data using the IFS data, and although there are few women in the college/university category for 1976 (n=68), the results for contraceptive use were not changed, as use increased with higher levels of educational attainment.

attainment, and counted only completed grade levels. Wife's education is noted as a form of modernization and also a marker for socioeconomic status, particularly for the 1976 IFS data which does not contain additional indicators for socioeconomic status such as expenditures or other measures of standard of living.

Table 6: Educational Attainment by Region, Java-Bali 1976 IFS†

Level of Educational Attainment

Province	No Education	1-3 Years: Grade	4-6 Years: Grade	Graduated Grade	Some Jr. High	Graduated Jr. High	Some Sr. High	Graduated Sr. High	College/Univer.	N	%
DKI Jakarta	41.1	8.3	5.5	18.0	2.7	9.8	1.8	10.2	3.7	902	15.6%
West Java	51.4	17.3	5.4	17.9	1.6	2.5	-	2.6	-	1213	21.0%
Central Java	53.3	17.9	8.3	11.2	1.9	3.4	-	2.5	-	1162	20.1%
Yogyakarta	64.9	8.0	6.7	10.3	-	3.1	-	3.6	-	615	10.6%
East Java	55.6	14.5	9.4	12.4	1.5	3.5	-	2.1	-	1281	22.1%
Bali	67.3	10.3	7.2	10.4	-	-	-	-	-	614	10.6%
Total (%):	**54.1**	**13.7**	**7.2**	**13.8**	**1.7**	**4**	**0.8**	**3.6**	**1.2**	**5787**	**100%**
Total (n):	**3129**	**791**	**417**	**797**	**98**	**232**	**44**	**210**	**69**		

†Cells with less than 15 women are omitted

Table 7: Educational Attainment by Region, 1993 IFLS†

Level of Educational Attainment

Province	No Education	1-3 Years: Grade	4-6 Years: Grade	Graduated Grade	Some Jr. High	Graduated Jr. High	Some Sr. High	Graduated Sr. High	College/Univer.	N	%
North Sumatra	6.6	20.7	14.9	18.7	7.9	10.8	-	17.4	-	241	7.4%
West Sumatra	-	19.8	14.4	16.2	10.2	10.2	-	16.2	-	167	5.1%
South Sumatra	-	20.0	17.2	17.9	-	11.0	-	11.7	-	145	4.4%
Lampung	12.6	34.4	19.9	18.5	-	-	-	-	0	151	4.6%
DKI Jakarta	**5.2**	**12.3**	**9.2**	**21.5**	**5.5**	**12.3**	**4.9**	**21.8**	**7.4**	326	10.0%
West Java	**13.4**	**19.5**	**13.2**	**30.1**	**-**	**8.1**	**-**	**9.2**	**2.8**	568	17.3%
Central Java	**7.9**	**25.4**	**13.5**	**29.9**	**-**	**8.5**	**-**	**9.0**	**-**	355	10.8%
Yogyakarta	**-**	**15.9**	**9.6**	**26.8**	**-**	**11.5**	**-**	**13.4**	**10.8**	157	4.8%
East Java	**14.4**	**17.8**	**12.6**	**30.4**	**4.3**	**7.8**	**-**	**8.5**	**-**	437	13.3%
Bali	**30.5**	**21.3**	**-**	**16.2**	**-**	**7.6**	**-**	**13.7**	**-**	197	6.0%
NTB	31.9	20.0	-	13.0	-	8.1	-	8.6	-	185	5.7%
South Kalimantan	11.4	27.8	14.8	17.0	-	9.1	-	10.8	-	176	5.4%
South Sulawesi	23.7	20.1	10.7	16.6	-	-	-	10.7	-	169	5.2%
Total (%):	**12.8**	**20.5**	**12.4**	**23.3**	**5.1**	**8.8**	**2.1**	**11.7**	**3.3**	3274	100%
Total (n):	**418**	**670**	**407**	**762**	**168**	**289**	**68**	**384**	**108**		

†Cells with less than 15 women are omitted

Tables 6 and 7 display educational attainment levels by regions of Indonesia. For 1993, the least educated regions are Bali (30.5% with no schooling) and Nusa Tenggara Barat (31.9% with no schooling). Both of these regions are characterized by a higher percentage of rural populations (59.9% for Bali and 73.6% for NTB), which could be one factor influencing the lower levels of education. The most highly educated regions are Yogyakarta (10.8% with a college education) and Jakarta (7.4% college education). In 1976, the educational composition was vastly different across the entire Java-Bali region. For each region except Jakarta, over 50% of the women had no schooling, and only Jakarta possessed a notable segment of women who were college educated (only 3.7%). This change in educational composition from over half of women with no schooling in 1976 to one-quarter graduating from grade school in 1993, will be one of the modernization factors in question for the increase in contraceptive use over time.

Table 8: Percent of Women in Levels of Educational Attainment By Economic Quintile, 1993 IFLS†

	Quintile					
Education	1	2	3	4	5	**N**
No Education	23.7	18.4	12.4	8.3	-	**250**
1-3 Years: Grade	25.6	25.1	20.3	16.1	10.3	**386**
4-6 Years: Grade	14.5	14.6	12.6	10.8	6.1	**234**
Graduated Grade	29.3	31.4	31.3	27.4	17.2	**554**
Some Jr. High	-	-	4.0	4.9	6.1	**77**
Graduated Jr. High	-	4.9	8.6	13.2	12.4	**183**
Some Sr. High	-	-	-	-	4.4	**37**
Graduated Sr. High	-	-	9.1	14.4	27.7	**240**
College/Univer.	-	-	-	3.2	13.1	**79**
Total (n):	**317**	**370**	**453**	**471**	**429**	**2040**

† Cells with less than 15 women are omitted

Table 8 displays women's levels of educational attainment by economic expenditure quintile in 1993, showing inequalities within the educational system based on class. This table provides insight on how educational attainment levels and socioeconomic status are closely related since educational attainment is used as a proxy

for SES later in the paper. Most women in the lowest economic quintiles do not possess more education than junior high, and women in the highest economic quintile are more likely to have completed at least senior high. It is also important to note the low number of women who possess no education in the highest economic quintile (n=12). The relationship between economic class and contraceptive use will also be addressed later in the paper.

Husband's Occupation

Husband's occupation was divided into the following categories: professional and clerical, sales and service, manual labor, and farming. Categories for unemployed husbands and husbands who have other occupations are also included in the multivariate analysis. The largest number of women have husbands in the agricultural field in 1976 (n=2,679, 46.3%), and manual labor in 1993 (n=627, 30.7%). Agricultural workers make up 27.4% of the sample in 1993.

Socioeconomic status (SES) as household expenditures

The data for expenditures and standard of living are only available in the household file for the IFS, which was not used in my analysis. On the other hand, categories for household expenditures were accessible for the IFLS, and I used the household expenditure quintile as my measure for SES. Household expenditures were reported for the woman's current living situation with her husband, children, and any other family members living in the household. Table 9 shows the percentage of women using modern contraceptives based on expenditure quintiles. It is interesting to note that women in the highest economic quintile are less likely to use modern forms of contraception than women in any other economic quintile.

Table 9: Percent using modern contraception by expenditures quintile (1993 IFLS)		
Quintile	**% Modern**	**N**
1	59.9	**317**
2	65.1	**370**
3	70.6	**453**
4	71.1	**471**
5	58.8	**429**
Totals (%):	**65.5**	
Totals(n):	**1337**	**2040**

Contraceptive Use Rates: A Preliminary Comparison

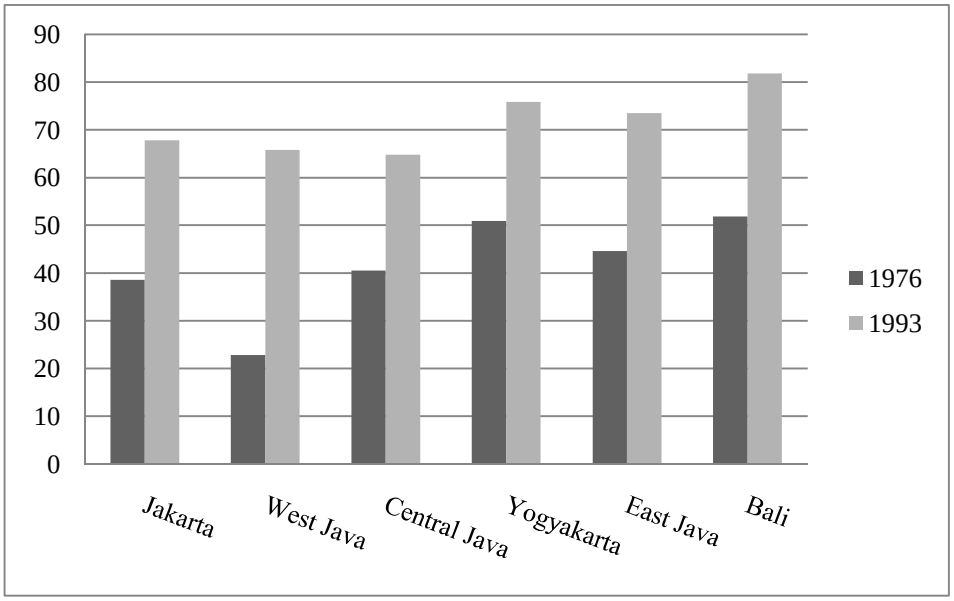

Figure 3: Total Contraceptive Use (Modern and Traditional Methods) for the Java-Bali Region (1976 and 1993)

1976

The Contraceptive Prevalence Rate (CPR) for the Java-Bali region in 1976 was 31.9%[11]. In other words, 32% of women at the risk of pregnancy, aged 15-49, practiced

[11] This number was obtained from the author's calculations of the IFS. Freedman's calculation is 32.5%.

some form of modern contraception[12] at this time. Using the IFS data, Freedman (1981) concludes that region was the strongest predictor of contraceptive use in 1976. According to Table 10, which displays the relationships between the independent variables and contraceptive use, Bali exhibits the highest CPR with 50.8%, and West Java exhibits the lowest use, with 19.5% of women using a modern contraceptive.

While traditional contraceptive use is not the main focus of this paper, it is important to note the high use of traditional contraception in Yogyakarta in 1976. At the time, 28% of women were using traditional methods and only 23% reported using modern methods. Figure 3 shows the percentage of women using all contraceptive methods (both modern and traditional), situating Yogyakarta at the second highest overall use rate, at 50.9%, only one percentage point below Bali. The modern and traditional use rates from Bali are quite different from those of Yogyakarta, with a 50.8% use rate for modern contraceptives and a mere 1% rate for traditional contraceptives; therefore, the overall contraceptive use rates between the two regions explain two drastically different situations.

Hull et al. (1977) also note the high levels of traditional contraceptive use in Yogyakarta, and assert that women from Yogyakarta commonly practice prolonged breastfeeding and abstinence as forms of contraception. These claims are supported by the IFS data, which show that women from Yogyakarta practice abstinence more than any other contraceptive method, both modern and traditional. A possible reason for the

[12] Modern contraceptives from the 1993 data are defined as use of at least one of the following methods: pill, 1 month injection, 2 month injection, 3 month injection, diaphragm, condom, IUD, implant, tubal ligation, or vasectomy. Traditional contraceptives from the 1993 data include use of one of the following: rhythm, coitus interruptus, herbs, massage, or other methods. In 1976, modern contraceptives are: pill, IUD, other fem sci., condom, female sterilization, male sterilization, and injection. Traditional methods are: douche, rhythm, withdrawal, abstinence, herbs, massage, uterus inversion, and other methods.

high use of traditional contraceptives in Yogyakarta is that since women oftentimes provide a significant amount of the economic support for their husbands, they have more control over their choice of contraceptives and family size (Hull et al. 1977). While prolonged breastfeeding, abstinence, and other forms of traditional contraceptives were common across Indonesia in the 1970s, it appears that women in Yogyakarta applied traditional methods in place of modern methods as a form of fertility control.

Diffusion theory would support the idea that region would strongly predict contraceptive use, as regional differences could be attributed to the transmission of information and resources from the family planning programs. Freedman claims that the strength of the regional variable can be attributed to cultural differences between regions; but more largely cultural differences that lead to differential patterns in fertility and reproductive patterns. Additionally, Freedman argues that differences in the family planning programs, as measured by the number of family planning clinic hours per 1,000 women 15-49 years old, also contributes to the regional variations of contraceptive prevalence rates. Freedman finds that the number of hours the family planning clinics are open and available to women in each region yields roughly the same order as the contraceptive prevalence rate for the regions. While this finding could potentially lead to a possible explanation for regional differences, one should also consider that it is a result of a response to a preexisting demand based on regional cultural differences (Freedman 1981:14).

After region, the strongest predictor of contraceptive use in Freedman's analysis is the number of living children. Table 10 shows that modern contraceptive use increases with each additional child. Only 2.2% of women with no children use modern

contraceptives, compared with 42.1% of women with 3 or more children. The steady and moderate increase in use after 1 child provides evidence that women use contraceptives to stop fertility, rather than necessarily using it for birth spacing, with the exception of the first birth interval, where the use rates increase from 2.2% to 19.4% in the first birth interval.

Age also shows differential patterns in contraceptive use. Use rates are the highest for women aged 25-29, 30-34, and 35-39. Women in the aforementioned age categories are more likely to use contraception than women in the older categories (40-44 and 45-49), because older women are not at as high of a risk of pregnancy as younger women. Biologically, women between 40-45 and 45-49 are at a lesser risk of pregnancy, but also reasons such as prolonged abstinence due to spousal separation (either voluntary or involuntary) and lower rates of coital frequency keep modern contraceptive use rates lower in these older age categories. Wife's education shows an increasing use pattern for increasing levels of educational attainment. Women with no schooling possess the lowest modern contraceptive use rate, at 28.8%, and women with a senior high school education and above have contraceptive use rates between 40% and 45%. Interestingly enough, there is a slight drop in contraceptive use from women who have attended some senior high (45.5%) to those who have graduated from senior high (42.9%) to those who have attended college or a university (40.6%). This drop in contraceptive use, while seemingly small, will be addressed in greater detail later in the paper.

An examination of husband's occupational status reveals that women whose husbands are professional/clerical workers have the highest contraceptive use rate (41.5%). Women whose husbands are in manual labor and sales and service have equally

low contraceptive use rates, at 28.6% and 26.3% respectively. Wives of farmers have higher contraceptive use rates than the previous two categories, with 33.7% use. To explain the “high” use rates among the faming community, Freedman (1981) indicates that these rates are the result of the success of the family planning programs in the transmission of information and materials into these communities, in addition to the “latent readiness” of these communities to use modern contraception when they had previously regulated fertility using traditional methods. Since the rural areas were largely affected by Malthusian pressures, the acceptance of modern contraceptives was logical.

1993

In 1993, the contraceptive prevalence rate for the Java-Bali region rose to 65.5%. Use rates for all of Indonesia were 61.2%. Within the Java-Bali region, Bali had the highest contraceptive use rate (78.2%) and Jakarta possessed the lowest use rate (58.6%). West Java, Central Java, East Java and Yogyakarta had similar use rates slightly over 60%. Provinces of Outer Indonesia also exhibit high use rates as well, with a high of 65.5% in South Sumatra. The lowest rates are recorded in South Sulawesi, with 35.5%. Reasons for low use in South Sulawesi could be explained by higher percentages of agricultural workers or perhaps that this region does not face the same Malthusian pressures as regions like Jakarta, which already posses a very high population density.

Concerning traditional contraceptive use, in 1993, Yogyakarta possessed a 14% traditional contraceptive use rate, which was 5 percentage points higher than the second highest region, Jakarta. Traditional contraceptive use for other regions the Java-Bali region is below 5% for Bali, West Java, East Java, and Central Java, and therefore does

not contribute to overall use totals for those regions as much as it does for regions such as Yogyakarta and Jakarta.

Modern contraceptive use for women with no children was at a low of 13.9%, and women who had 2 children had a 72.6% use rate. During the first birth interval, use rates increased from 13.9% to 61.3%, evidence that women are using contraceptives for birth spacing. Women with 3 or more children had a 69.1% use rate, and the high use rates for women with 2 or more children also indicates that contraceptives in 1993 are used for birth spacing and also for stopping fertility.

There does not appear to be large variations in contraceptive use between age categories. Women aged 15-19 have the lowest contraceptive use, at 50%, but these women represent a small proportion of the sample and should not be treated as representative of all 15-19 year olds in the population, since marriage at this age is not common in 1993, and married women in this category are most likely to be unrepresentative the total population of the in terms of fertility. The second lowest group is 45-49 year olds, with a 57.1% use rate. Lower use rates are expected in this age category, as many women do not feel they are at the risk of pregnancy at this age and do not find the necessity to practice contraception. Highest use rates for women are between the ages of 20-24, 25-29, and 20-34, the most likely ages for childbearing.

Concerning wife's education, women who did not attend school have the lowest contraceptive use rates (54.4%). Women with a college education and those who have completed senior high have the second lowest use rates, with 57.0% and 56.8%, respectively. These rates do not appear to be significantly different from one another, but could potentially possess a significant difference between other categories, such as

women with no education or women with primary school education. Women who have graduated primary school and those that have graduated from junior high have the highest use rates, at 72.2% and 72.7%. Otherwise, there does not appear to be a distinct pattern of education and contraceptive use, as women from primary school through senior high possess use rates between 60% and 70%.

Women whose husbands are professional or clerical workers have the highest contraceptive use rates, at 69.2%. The next highest contraceptive users are women whose husbands are manual laborers, at 67.6%, followed by sales and service professionals, at 63.6% and lastly agricultural workers at 62.6%. The difference between all fields is less than 10%, so it does not appear that differences husband's occupation will significantly predict contraceptive use.

1976 and 1993

The contraceptive prevalence rate increased from 32% use in 1976 (Freedman 1981) to 66% use in 1993 (Indonesian Family Life Survey 1993). Use of a modern contraceptive increased significantly from 1976 to 1993 for all regions of the Bali-Java region, and Bali possessed the highest modern contraceptive use both in 1976 and 1993. While Yogyakarta possessed high traditional contraceptive use rates in both 1976 and 1993, use of modern contraceptives was much lower than the other Java-Bali regions in 1976 and, with the exception of Bali, equaled that of other regions in 1993.

Contraceptive use increased for women who have no children from 1976 to 1993, but one can clearly notice that few married women with 0 children are using contraception. For both years, there is a large gap in percentage points for contraceptive use between women who have no children and women with 1 child. The 1976 data show

more evidence for using contraception to stop having children, whereas that 1993 data show evidence for birth spacing as well as stopping fertility. In 1976 there was a 17.2 percentage point increase in modern contraceptive use for women with 0 children (2.2%) to women with 1 child, whereas in 1993 the percentage point difference was 47.4 (from 13.9% for 0 children to 61.3% for 1 child). This indicates that women in 1993 are using contraception for birth spacing, since use increases dramatically from 0 children to 1 child, whereas in 1976 there is a gradual increase as the number of living children increases.

Age shows a similar pattern for 1976 and 1993, with women in their 20's and 30's exhibiting the highest contraceptive use. Women in their teens and late 40's show lower use rates because of their biological position in the ages of eligible fertility, with women in their teens beginning childbearing and women in their late 40's ending the process of childbearing. For this reason, these two categories will not receive a significant amount of focus later in the paper.

Despite the change in educational composition, women who have no schooling have the lowest percentages of contraceptive use in both 1976 and 1993. Women who attend college/university also possess lower use rates, although the drop in percentage points is much higher in 1993 than in 1976. In 1976, women who had the highest use rates were ones that had some senior high, whereas in 1993 women who graduated primary school had the highest use rates. For both years, there does not appear to be a linear relationship between educational attainment and contraceptive use. This is a result of women in middle educational attainment categories, such as those who have graduated

from primary school, possessing the highest levels of contraceptive use, and women in the highest educational categories possessing among the lowest use rates.

The effects of husband's occupational status on contraceptive use changes over time. For both 1976 and 1993, women whose husbands are professional or clerical workers have the highest contraceptive use. In 1976, the second highest group is women whose husbands are farmers. In 1993, wives of farmers drop to the lowest contraceping group; however, the differences in contraceptive use rates between all four of the occupational categories are smaller than in 1976.

Table 10: Percentage of Women Using Modern Contraceptive Methods, from 1976 Indonesian Fertility Survey (IFS) and the 1993 Indonesian Family Life Survey (IFLS), Java-Bali Regions

Region	IFS	IFLS	N (IFS)	N (IFLS)	% Difference	% Change
Inner Indonesia						
Jakarta	26.5	58.6	902	326	**32.1**	**121.1**
W. Java	19.5	63.2	1213	568	**43.7**	**224.1**
C. Java	35.3	62.5	1162	355	**27.2**	**77.1**
Yogyakarta	23.0	61.8	615	157	**38.8**	**168.7**
E. Java	39.5	71.9	1281	437	**32.4**	**82.0**
Bali	50.8	78.2	614	197	**27.4**	**53.9**
Outer Indonesia						
North Sumatra		45.6		241		
West Sumatra		60.5		167		
South Sumatra		65.5		145		
Lampung		64.9		151		
NTB		56.8		185		
South Kalimantan		66.5		176		
South Sulawesi		35.5		169		
No. of Living Children						
0	2.2	13.9	638	101	**11.7**	**531.8**
1	19.4	61.3	1102	445	**41.9**	**216.0**
2	33.8	72.6	1050	500	**38.8**	**114.8**
3+	42.1	69.1	2997	994	**27**	**64.1**
Wife's Age						
15-19	11.8	50.0	568	62	**38.2**	**323.7**
20-24	28.3	67.9	1168	277	**39.6**	**139.9**
25-29	35.9	69.1	1163	466	**33.2**	**92.5**
30-34	38.9	69.0	1049	509	**30.1**	**77.4**
35-39	37.0	62.7	975	405	**25.7**	**69.5**
40-44	32.8	60.4	592	230	**27.6**	**84.1**
45-49	24.3	57.1	272	91	**32.8**	**135.0**
Wife's Education						
No Schooling	28.9	54.4	3129	250	**25.5**	**88.2**
1-3 yrs. Primary	31.0	60.1	791	386	**29.1**	**93.9**

4-6 yrs. Primary	34.1	67.1	417	234	**33**	**96.8**
Graduated Primary	35.8	72.2	797	554	**36.4**	**101.7**
Some Jr. High	35.7	63.6	98	77	**27.9**	**78.2**
Graduated Jr. High	40.5	72.7	232	183	**32.2**	**79.5**
Some Sr. High	45.5	56.8	44	37	**11.3**	**24.8**
Graduated Sr. High	42.9	68.3	210	240	**25.4**	**59.2**
College/University	40.6	57.0	69	79	**16.4**	**40.4**
Husband's Occupational Status						
Professional and Clerical	41.5	69.2	745	268	**27.7**	**66.7**
Sales and Service	26.3	63.6	1137	412	**37.3**	**141.8**
Manual Labor	26.8	67.6	1161	627	**40.8**	**152.2**
Farming	33.7	62.6	2679	559	**28.9**	**85.8**

Multivariate Analysis

1976

As a replication of Freedman's study, I run a multivariate logistic regression for both the 1976 IFS data and the 1993 IFLS data to examine the net effects of socioeconomic and demographic factors on contraceptive use. Table 11 displays odds ratios for the results of the multivariate regression for the 1976 data[13]. Regional differences persist for contraceptive use, with significant coefficients that remained even after controlling for all of the other independent variables. Bali is the region with the highest use, with women in most other regions less than half as likely to use contraception as women in Bali. These differences are statistically significant when controlling for all other independent variables as well. Women from East Java are approximately two-thirds as likely as women in Bali to use modern contraception, and controlling for other variables, East Java is the only region to increase in the likelihood of use.

[13] While these methods replicate those of Freedman, one should note that the regression equation is slightly different, omitting factors influencing SES, therefore yielding different estimates. Freedman also does not report the results of his regression equation, but instead converts his results into the predicted probabilities for "percent using a modern method" adjusted for the other variables.

Women aged 30-34 experience the highest contraceptive use rates. This relationship changes in the model controlling for region, women's education, and husband's occupation, where women in the 20-24 and 25-29 year age categories have higher use rates than women aged 30-34. In this model, women aged 20-24 possess the highest use rates, with a significant difference from women aged 30-34. Despite the higher use rates for women in the 25-29 year age category, there is a nonsignificant difference between this category and the 30-34 year age category. The slight drop in contraceptive use for women aged 45-49 most likely indicates that women in this age category are probably not at risk for pregnancy due to lack of sexual activity. These results confirm that women in 1976 were also using contraception for the purpose of family planning, and that younger married women who desired children were not contracepting. Since these data only represent currently married women, one cannot examine whether women also delay marriage to delay childbearing, but since nonmarital fertility is virtually nonexistent in Indonesia, this is another plausible theory to explain the low use of contraceptives among young women, who delay marriage and then marry for the purpose of starting a family.

Based on Table 11, contraceptive use increases with education, although when controlling for all of the independent variables, there does not appear to be a significant difference between many of the educational attainment categories. Significant differences are observed between women with no education or 1-3 years of primary education, and also for those who have either some senior high or have completed senior high school, compared to the referent category of women who have completed primary schooling.

Women who have attended college or a university possess a nonsignificant relationship with those who have completed primary school.

Results from husband's occupation indicate that women whose husbands work in professional or clerical fields are most likely to use contraception, although significance for this category disappears in the fully saturated model. The significance most likely disappears since the effects of other SES indicators such as educational attainment, renders the effect of husband's occupation insignificant. Women whose husbands work in manual or sales/service fields are about three quarters as likely to use contraception as women whose husbands work in agriculture, and a significant difference between agricultural workers and manual and sales/service workers is also observed in the model controlling for all of the independent variables.

The results for NLC indicate significantly different patterns for women in each parity interval, with 1 child as the referent category. After 2 or 3 children, the likelihood of contraceptive use increases, and is significantly higher than the use after 1 child. The relationship holds when all other independent variables are added to the model; however, the likelihood of contraceptive use slightly increases net of all the other variables for women with 2 and 3 or more children.

1993

For 1993, I run two separate multivariate regression analyses, the first for the Java-Bali region, which I will compare to the results from 1976, and the second a set of models for all of the regions of Indonesia included in the 1993 IFLS data. The regressions for the 1993 data include one extra model, Model 5, which adds the expenditure quintile variable to the saturated model. The addition of this variable to Model 4 adds very little

to the existing model, with few changes in significance levels or coefficients for each of the independent variables, and adds only 1% to the explanation of the variance. On the other hand, it important to note differences between women in the different socioeconomic categories, and these differences will be addressed in this section.

Java-Bali

Table 12 displays the results for the odds ratios from a multivariate regression for the Java-Bali region for 1993. Bali is the region with the highest contraceptive use rates, with women from Bali more than three times more likely to use contraceptives than women from Jakarta, the referent category. Women from East Java are over two times more likely to use contraception than women from Jakarta, and women from West Java are approximately one-third more likely to use contraception than women from Jakarta, controlling for all other independent variables. Nonsignificant differences are observed between Jakarta and West Java and Yogyakarta.

Controlling for all of the independent variables, significant differences are observed across many of the age categories in reference to women aged 30-34. Women aged 20-24 are one and a half more likely to use contraceptives than women aged 30-34 Women aged 35-39 and 40-44 are about two-thirds less likely to use contraception, and women aged 45-49 are half as likely to use contraception. For the 25-29 year age category, nonsignificant results are reported, most likely because women in this age category are in a similar stage in the process of childbearing, and use contraceptives for the purpose of birth spacing at a similar rate as women in the 30-34 year age category.

Net of all other variables, women who completed primary school are significantly more likely to use contraceptives than women with no schooling, 1-3 years of primary

school, 4-6 years of primary school, some senior high, and those who have attended college/university. The largest differences exist between women who have not completed any schooling, who are two-thirds less likely to use contraception than women who have completed primary school. Interestingly enough, there is a nonsignificant difference between women who have completed primary school and women who have attended college or university when controlling for all of the independent variables, including economic expenditures (Model 5). Models 2 and 3 show a significant difference ($p<.01$) between women who have completed primary school and those with a college/university education, and Model 4, which controls for region, age, husband's occupation and NLC, shows a significant difference ($p<.10$) between women who have completed primary school and those who have attended college/university. Additionally, the odds ratios for contraceptive use increase .51 in Model 2 to .61 in Model 4 from women in who have attended college or university, which indicates that each time new variables are added to the model, the differences between these two groups of women lessen.

Significant differences between wives of farmers and wives of professional/clerical workers and manual workers are observed in Model 3, which controls for region, age and level of educational attainment, but the significance between these variables is lost in Models 4 and 5, the fully saturated model and the model that adds expenditures. So, controlling for all of the independent variables, husband's occupation does not possess significant variations in contraceptive use.

Women with 1 child are much less likely to use contraceptives than women with two or more children and about 90% more likely to use contraceptives than women with no children. Controlling for all of the independent variables, the odds of contraceptive

use greatly increases for women who have two or three or more children. These results indicate that the more children women have, the more likely they are to use contraception, since controls such as age and levels of education might pull the likelihood of contraceptive use in a bivariate relationship downward. For example, older women and women in the lowest educational categories are more likely to have more children, but are also less likely to use contraception. Controlling for these factors in the model allows one to see the effect of the number of children on contraceptive use without these types of relationships, and indicates that women who have more children are even more likely to use contraception in the multivariate model than when examining the bivariate relationship. These results provide further evidence that women in 1993 are using contraceptives as a method for stopping fertility when the desired number of children is attained.

Concerning expenditure quintiles, women in the first and fifth expenditure are approximately two-thirds less likely than women in the third economic quintile to use contraception. This difference remains significant when controlling for all of the independent variables. This finding is curious, in that women in the highest socioeconomic category are significantly less likely than women in the middle category to use contraception. Reasons for the drop in contraceptive use for women in the highest SES category, such as the use of traditional contraceptives rather than modern contraceptives, and the lack of effectiveness of the family planning movement in Jakarta, will be discussed later in the paper.

Inner and Outer Indonesia

Patterns for all of Indonesia, including the Outer Islands, follow closely with those of the Java-Bali region for 1993. Bali remains the region with the highest contraceptive use rates. Some regions of Outer Indonesia, such as Lampung, South Sulawesi, and South Kalimantan, possess significantly higher contraceptive use rates than Jakarta. North Sulawesi possesses significantly lower contraceptive use rates, and women from this region are approximately half as likely to use contraception as women from Jakarta, which possesses the second lowest use rates in Indonesia. Concerning the other variables, Age, Education, Husband's Occupation, NLC, and Expenditure Quintiles all yield similar results to the Bali-Java region, and the results can be observed in Table 13.

Table 11: Odds Ratios for Modern Contraceptive Use, Eligible Women at the Risk of Pregnancy, Java-Bali, 1976 IFS

Variables		Bivariate Estimates					
			1	**2**	**3**	**4**	**N**
Region[a]							
	West Java	0.67***	0.71	0.82*	0.78**	0.83	**1213**
	Central Java	1.51***	1.58	1.89***	1.76***	1.85***	**1162**
	DI Yogyakarta	0.83	0.81	0.97	0.87	1.06	**615**
	East Java	1.81***	1.89	2.29***	2.13***	2.63***	**1281**
	Bali	2.87***	2.79	3.62***	3.29***	3.71***	**614**
Age[b]							
	15-19	0.21***	0.21	0.20***	0.20***	0.69**	**568**
	20-24	0.62***	0.62	0.57***	0.57***	1.29**	**1168**
	25-29	0.88	0.87	0.80**	0.80**	1.16	**1163**
	34-39	0.92	0.92	0.98	0.98	0.79**	**975**
	40-44	0.77**	0.79	0.86	0.84	0.64***	**592**
	45-49	0.50***	0.54	0.60***	0.60***	0.44***	**272**
Women's Education[c]							
	No Schooling	0.73***		0.53***	0.54***	0.56***	**3129**
	1-3 Years Primary	0.81**		0.71***	0.71***	0.76**	**791**
	4-6 Years Primary	0.93		0.77*	0.79*	0.81	**417**
	Some Jr. High	1.00		0.91	0.89	0.93	**797**
	Graduated Jr. High	1.22		1.08	1.04	1.14	**98**
	Some Sr. High	1.50		1.55	1.43	1.76*	**44**
	Graduated Sr. High	1.35*		1.28	1.12	1.48**	**210**
	College/University	1.23		1.07	0.88	1.49	**69**
Husband's Occupation[d]							
	No Work	0.83			1.31	1.26	**37**
	Professional/Clerical	1.39***			1.21*	1.09	**745**
	Sales/Service	0.70***			0.77***	0.73***	**1137**
	Manual	0.72***			0.77***	0.72***	**1161**
	Other	1.09			1.28	1.27	**28**
Number of Living Children							
	0	0.09***				0.09***	**638**
	2	2.12***				2.14***	**1050**
	3+	3.01***				3.67***	**2997**

Log Likelihood	-3405.24	-3359.53	-3345.44	-3102.29
Pseudo R^2	0.06	0.07	0.08	0.14
BIC	-43220.49	-43242.59	-43227.46	-43687.76

[a] Region reference group is Jakarta

[b] Age reference group is women age 30-34

[c] Education reference group is Graduated Primary

[d] Husband's Occupation reference group is Agriculture

[e] Number of Living Children reference group is 1 child

* p<.1; **p<.05; ***p<.01

Table 12: Odds Ratios for Modern Contraceptive Use, Eligible Women at the Risk of Pregnancy, Java-Bali, 1993 IFLS

Variables	Bivariate Estimates	Models					
		1	**2**	**3**	**4**	**5**	**N**
Region[a]							
West Java	1.21	1.25	1.34**	1.40**	1.38**	1.34*	**568**
Central Java	1.18	1.20	1.24	1.35*	1.38*	1.36	**355**
DI Yogyakarta	1.14	1.18	1.16	1.21	1.25	1.17	**157**
East Java	1.80***	1.77***	1.93***	2.09***	2.25***	2.26***	**437**
Bali	2.53***	2.63***	3.43***	3.71***	3.67***	3.31***	**197**
Age[b]							
15-20	0.45***	0.44***	0.35***	0.36***	1.25	1.28	**62**
20-24	0.95	0.94	0.79	0.81	1.46**	1.47*	**277**
25-29	1.00	0.98	0.95	0.96	1.12	1.12	**466**
35-39	0.76**	0.76**	0.77*	0.77*	0.68*	0.69**	**405**
40-44	0.69**	0.69**	0.72**	0.73*	0.62***	0.63***	**230**
45-49	0.60**	0.58**	0.61**	0.61**	0.46***	0.48***	**91**
Women's Education[c]							
No Schooling	0.46***		0.35***	0.37***	0.36***	0.37***	**250**
1-3 Years Primary	0.58***		0.53***	0.55***	0.51***	0.52***	**386**
4-6 Years Primary	0.79		0.78	0.79	0.72*	0.73*	**234**
Some Jr. High	0.67		0.65	0.62*	0.65	0.66	**77**
Graduated Jr. High	1.02		1.03	0.96	1.01	1.01	**183**
Some Sr. High	0.51**		0.60	0.56*	0.49**	0.53*	**37**
Graduated Sr. High	0.83		0.82	0.77	0.99	1.04	**240**
College/University	0.51***		0.51***	0.48***	0.61*	0.69	**79**
Husband's Occupation[d]							
No Work	1.05			1.20	1.43	1.38	**83**
Professional/Clerical	1.34*			1.41*	1.23	1.21	**286**
Sales/Service	1.04			1.08	1.06	1.00	**412**
Manual	1.25*			1.28*	1.17	1.10	**559**
Other	1.30			1.46	1.29	1.24	**70**
Number of Living Children[e]							
0	0.10***				0.11***	0.10***	**101**
2	1.67***				2.11***	2.09***	**500**

	3+	1.41***				2.54***	2.54***	**994**
Economic Quintile[f]								
	1	0.62***					0.65**	**317**
	2	0.78*					0.84	**370**
	4	1.02					1.11	**471**
	5	0.59***					0.68*	**429**
Log Likelihood			-1287.99	-1261.79	-1256.68	-1178.60	-1170.59	
Pseudo R^2			0.02	0.04	0.04	0.10	0.11	
BIC			-12878.81	-12870.25	-12816.54	-12949.83	-12935.38	

[a] Region reference group is Jakarta

[b] Age reference group is women age 30-34

[c] Education reference group is Graduated Primary

[d] Husband's Occupation reference group is Agriculture

[e] Number of Living Children reference group is 1 child

[f] Economic Quintile reference group is the 3rd quintile

* p<.1; **p<.05; ***p<.01

Table 13: Odds Ratios for Modern Contraceptive Use, Eligible Women at the Risk of Pregnancy, All Indonesia, 1993 IFLS

Variables	**Bivariate Estimates**	**Models**					
		1	**2**	**3**	**4**	**5**	**N**
Region[a]							
North Sumatra	0.59***	0.58***	0.59***	0.65**	0.60***	0.58***	**241**
West Sumatra	1.08	1.11	1.13	1.19	1.15	1.14	**167**
South Sumatra	1.34	1.30	1.37	1.49*	1.33	1.37	**145**
Lampung	1.30	1.34	1.54**	1.73**	1.55*	1.62**	**151**
West Java	1.21	1.26	1.34**	1.40*	1.40**	1.37**	**568**
Central Java	1.18	1.20	1.23	1.32*	1.37*	1.37*	**355**
DI Yogyakarta	1.14	1.16	1.14	1.18	1.24	1.17	**157**
East Java	1.80***	1.78***	1.92***	2.05***	2.26***	2.32***	**437**
Bali	2.53***	2.64***	3.42***	3.63***	3.70***	3.32***	**197**
NTB	0.93	0.93	1.20	1.27	1.18	1.17	**185**
South Kalimantan	1.40*	1.47**	1.67**	1.78***	1.87***	1.80***	**176**
South Sulawesi	0.40***	0.39***	0.46***	0.50***	0.43***	0.43***	**169**
Age[b]							
15-20	0.42***	0.37***	0.29***	0.30***	1.06	1.09	**97**
20-24	0.82*	0.79*	0.68***	0.70***	1.26	1.29*	**444**
25-29	1.03	0.99	0.95	0.96	1.15	1.15	**756**
35-39	0.79**	0.78**	0.78**	0.78**	0.71***	0.71***	**628**
40-44	0.67***	0.66***	0.69***	0.69***	0.61***	0.61***	**377**
45-49	0.61***	0.59***	0.61***	0.61***	0.48***	0.50***	**149**
Women's Education[c]							
No Schooling	0.41***		0.35***	0.36***	0.34***	0.36***	**418**
1-3 Years Primary	0.61***		0.56***	0.58***	0.54***	0.54***	**670**
4-6 Years Primary	0.74**		0.74**	0.74**	0.70**	0.70**	**407**
Some Jr. High	0.59***		0.62***	0.59***	0.58***	0.56***	**168**
Graduated Jr. High	0.85		0.88	0.83	0.87	0.86	**289**
Some Sr. High	0.58**		0.67	0.62*	0.62*	0.61*	**68**
Graduated Sr. High	0.76**		0.76**	0.70**	0.91	0.90	**384**
College/University	0.60**		0.56***	0.51***	0.68	0.75	**108**
Husband's Occupation[d]							

No Work	1.02		1.04	1.16	1.11	**123**
Professional/Clerical	1.51**		1.43**	1.30*	1.23	**417**
Sales/Service	1.17		1.10	1.21	1.02	**805**
Manual	1.26***		1.16	1.10	1.01	**1012**
Other	1.44*		1.40	1.29	1.24	**96**
Number of Living Children[e]						
0	0.09***			0.09***	0.09***	**156**
2	1.74***			2.12***	2.10***	**735**
3+	1.38***			2.60***	2.61***	**1741**
Economic Quintile[f]						
1	0.57***				0.59***	**609**
2	0.73***				0.74**	**657**
4	1.02				1.03	**701**
5	0.64***				0.67***	**604**
Log Likelihood	-2097.40	-2061.35	-2055.51	-1936.23	-1921.23	
Pseudo R^2	0.0368	0.0533	0.0552	0.1100	0.12	
BIC	-22150.42	-22157.77	-22101.72	-22316.01	-22313.64	

[a] Region reference group is Jakarta
[b] Age reference group is women age 30-34
[c] Education reference group is Graduated Primary
[d] Husband's Occupation reference group is Agriculture
[e] Number of Living Children reference group is 1 child
[f] Economic Quintile reference group is the 3rd quintile
* p<.1; **p<.05; ***p<.01

Changes in Contraceptive Use from 1976 to 1993

Overall contraceptive use increased from 1976 to 1993 and the relationships within region, age, education, husband's occupation, and NLC changed as well. Regional differences persisted between 1976 and 1993, although the relationship between Jakarta and other provinces in the Java-Bali region changed slightly. In 1976, Jakarta exhibited higher contraceptive use rates than West Java, but the differences were not statistically significant. In 1993, Jakarta possessed the lowest contraceptive use rates of the entire Java-Bali region, significantly lower than Bali, East Java, and West Java. Jakarta's rates were even significantly lower than regions of Outer Indonesia such as Lampung and South Kalimantan.

In 1976, 20-24 year old women were using contraceptives at significantly higher rates than women in the 30-34 year old age category. All other age categories, with the exception of 25-29 year olds, were using contraceptives at a significantly lesser rate than 30-34 year old women. In 1993, 25-29 year old women possessed the highest odds of using contraceptives net of all the other variables.

The effect of women's education also changed over the twenty-year time period. In 1976, women who graduated from senior high had significantly higher odds of using contraceptives than women who graduated primary school. In 1993, women who graduated from primary school had significantly higher contraceptive use rates than most other educational attainment categories, including no schooling, 1-3 years primary, 4-6 years primary, some senior high, and college/university (Model 4). The effects of adding the household expenditures in Model 5 rendered the odds of use nonsignificant between women who had a graduated primary school and those who attended college/university.

Concerning husband's occupation, women whose husbands were farmers were significantly more likely to use contraceptives than women whose husbands were in the sales/service and manual labor categories. Other observed differences were nonsignificant between occupational categories. In 1993, there were no significant differences between women whose husbands were farmers and any other occupational category net of all of the independent variables.

NLC shows a similar pattern for both 1976 and 1993. Women who have no children are significantly less likely than women with 1 child to use modern contraceptives. Women with 2 or 3 or more children are significantly more likely to use modern contraceptives, and for the 1993 data, the odds of contraceptive use doubles net

of all the other independent variables. This sharp increase indicates that most women, regardless of other characteristics such as age and educational attainment level, are more likely to use contraception as the number of children they have increases.

Economic Quintile, Population Density and Modern Contraceptive Use

If theories related to the demographic transition (Caldwell 2004) explain reasons for declining fertility as increasing economic development and female education, why do these data present slightly contradictory results, with decreased use in the higher socioeconomic categories? One theory is that many women sustain prolonged periods of spousal absence, particularly women in the lower SES categories. The method I used to establish eligible women using the 1993 data included women not currently living in the same household as their husband, but did not include those who might be experiencing spousal separation due to circular migration (for either the woman or the husband) or other opportunities for increased potential in the labor market.

Additionally, Hull and Hull (1977) explain reasons for higher fertility among women in the highest SES categories, citing lower incidences of divorce and therefore less “time lost” in childbearing. The authors also claim that there was a significantly higher incidence of child mortality among women in lower SES categories, so they were less likely to use contraceptives in order to attain the desired family size. While this claim supports my hypothesis that women use contraceptives as a tool for family planning, improvements in health care, particularly for women and children, created a smaller differential in infant mortality in the 1990s. As a result, the number of live births across socioeconomic groups increased, and should have therefore diminished the difference

between women in the highest and lowest groups for contraceptive use levels to attain the desired number of surviving children. Essentially, Hull and Hull indicate that lower fertility was common among the Indonesian poor even in the 1970s, but their analysis of contraceptive use was an incomplete prospective, since the data they employed from 1972 (from Maguwoharjo, Java) had little information on modern contraceptive use from the beginnings of the family planning movement.

Another plausible explanation is the economic theory of fertility as consumption, that the rich can afford more children and therefore have more children. This theory would also support high contraceptive use for women in the lowest economic quintile, since they are unable to afford children and must take measures to prevent additional births. There are several critics of this theory (Blake 1968, Turchi 1975, Bagozzi and Van Loo 1978, Schultz 1973), and further exploratory analysis of the data reveals contrary results. Thirty percent of women in this economic category live in Jakarta, the region possessing the lowest use rates in Inner Indonesia, and is also among the lowest regional use rates for all of Indonesia as well. Whether Jakarta has such low use rates because of the demographic makeup of the city, or whether there is an issue with the family planning program is beyond the scope of this paper, but a noteworthy issue to examine. While possessing the lowest contraceptive use rates other than the lowest expenditures category, the women in the fifth quintile have the highest use rates for traditional contraceptive use, with a 7.9% use rate. The use of traditional contraceptives could be the main factor for lowering fertility, since women in the highest expenditure category have fewer children than any other category. While the difference is very small (2.74 children for women in the third quintile and 2.47 for women in the fifth), use of traditional contraceptives in the

place of modern ones is one explanation for the nearly equal number of children for women in each category. In sum, it is possible to explain lower contraceptive use rates for women in the fifth quintile based on the following characteristics: 1) Traditional contraceptives could replace modern use for women in this category; 2) The family planning movement in Jakarta, where many of these women reside, might be less effective than other regions, as evinced by lower overall use rates in this province; 3) Economic theory of consumer goods does not apply to women in this category, as these women have fewer children, on average, than women in any other economic quintile.

Another possible explanation for low use in the higher SES categories is the attitude towards birth control. Hull et al. (1977) note that many middle-class women in Jakarta practiced rhythm and avoided the IUD for fear of side effects. Also, the use of the IUD in Jakarta was seen as a status symbol: only the poor and uneducated, who are not disciplined enough to practice rhythm should use the IUD, whereas the rich and the educated can continue using rhythm as an effective form of birth control. While no evidence exists to test this theory, it could potentially explain some of the variation in modern contraceptive use patterns.

Concerning population density, one would assume that since Jakarta possesses the highest population density, it should also possess the highest contraceptive use rates to control fertility. Since the region possesses a population density 93% higher than the second densest region, Yogyakarta, one would assume that a region such as Jakarta should exhibit use rates considerably higher than the ones presented in the data for 1993. While the number of people per square kilometer increases in Jakarta, the rate at which the density increases declines over time. For example, the rate of increase from 1971 to

1980 is 30%; from 1980 to 1990 it decreases to 12%, and from 1990 to 1995, it decreases again to a 9% increase in density. Furthermore, Jakarta's annual average population growth rate decreases from 2.42% from 1980-1990 to a 0.17% increase from 1990-2000 (Biro Pusat Statistik, 2009). This dramatic change is also remarkable due to the lack of contraceptive use. Possible explanations for this discrepancy are that the 1993 data do not include abortions or abstinence as forms of contraception. McNicoll and Singarimbun (1986) and Hull (1987) state that many woman do not consider postpartum abstinence, or abstinence in general, a form of fertility regulation, so previous data collected on contraceptive use underreported use rates for abstinence. Perhaps this is why the IFLS excludes abstinence from the data collection. For this reason it is possible that women are increasingly practicing abstinence or abortions to limit births, rather than the other forms listed. Additionally, since many of the women in the sample who are highly educated reside in Jakarta, it is possible that these women are delaying marriage to older ages due to educational opportunities or a desire to enter the labor market, and limit contraceptive use because they enter marriage later and desire children throughout the remainder of their reproductive years[14]. Lastly, similarly to my suggestion related to expenditures, the family planning program in Jakarta might not be serving much of the wealthier, highly educated population, many of whom receive contraceptives from family doctors; another reason which might account for their lower use rates.

[14] In Jakarta, 29.2% of women (n=94) graduated from senior high or attended college or university. The next region with the closest educational composition is Yogyakarta, with 24.2% of women graduating from senior high or attending college or university (n=38), which is a significantly smaller number of women than that of Jakarta (data not shown).

Does modernization explain the differences in contraceptive use over time?

Decomposing the effects of modernization

Using similar methods to Samuel Preston and his paper on mortality (1975), I will test Freedman's assertion that modernization does not appear to play a large factor in the use of modern contraceptives in Indonesia, and that use was high across all socioeconomic strata, by removing the effects of modernization to account for differences in contraceptive use rates between 1976 and 1993. Preston examines the effects of income on life expectancy in both developed and developing countries throughout the twentieth century by decomposing the effects of a country's initial income from the early twentieth century and measuring the expected gain in life expectancy from a 20% increase in income, using estimates from the 1960s. After this process, he finds that changes in life expectancy were only marginally explained by changes in national income levels, and concludes that countries at every income level do not experience a significant decrease in mortality as a result of economic gains, but rather improvements in health technology.

This section replicates Preston's methods of decomposition using the IFS and IFLS data sets, and employing educational attainment as a proxy for modernization. Table 14 shows the contraceptive use rates based on the decomposition of regression equations for both 1976 and 1993 using the independent variable of education.
The original regression equations for contraceptive use are based on logistic regression equations, therefore the equations for the predicted values for 1976 using the Beta coefficient from 1993 and the predicted values for 1993 using the Beta coefficient for 1976 are as illustrated in Equations 1 and 2.

Equation 1: Predicted value for contraceptive use for 1976, decomposing the effects of educational composition from 1993

$$\hat{\pi}_{1976} = e^{(\alpha_{1993} + \sum \beta_{Education(1993)} x_{Education(1976)})} / 1 + e^{(\alpha_{1993} + \sum \beta_{Education(1993)} x_{Education(1976)})}$$

Equation 2: Predicted value for contraceptive use for 1993, decomposing the effects of educational composition from 1976

$$\hat{\pi}_{1993} = e^{(\alpha_{1976} + \sum \beta_{Education(1976)} x_{Education(1993)})} / 1 + e^{(\alpha_{1976} + \sum \beta_{Education(1976)} x_{Education(1993)})}$$

Betas were obtained from the logistic regression equations from each respective year, and the values for x were calculated using the proportion of the sample in each level of educational attainment. So, for example, to find the predicted probability for 1993, I multiply the Beta value for women with no education in 1976 (-0.57) times the proportion of uneducated women in 1993 (.123) and add this to the corresponding values for each level of educational attainment. The sum of these values, added to the alpha value from 1976 represents the parts of the equations (1 and 2) in the parenthesis. Tables 1 and 2 in the Appendix display all of the values used to calculate the equations.

Table 14: Decomposition of the effects of education on contraceptive use, 1976 and 1993

		Contraceptive Rate		
		Pop. Composition Year		
		1976	1993	Diff. from Modernization
Equation for	**1976**	31.7	35.3	**3.6**
the Year	**1993**	60.2	65.5	**5.3**
Total Change= 1993-1976				**33.8**

Table 14 shows the predicted contraceptive use rates for 1976 using the population composition from 1993 and the predicted values for 1993 using the population composition from 1976. According to this table, if the effects of educational attainment levels ("modernization") were removed, or educational composition from 1993 is applied

to the 1976 data, the contraceptive use rate for eligible women will increase from 31.7 percent using to 35.3 percent using, a 3.6 percent increase. When the educational composition of 1976 is applied to the 1993 data, contraceptive use rates decrease from 65.5% to 60.2%, a 5.3 percentage point decrease. Based on these two equations, changes in levels of education account for an average of about a 4.5 to 5 percentage point change in the level of contraceptive use. Since there was an overall increase in the contraceptive use rates of about 30 percentage points from 1976 to 1993, the small share explained by changes in educational composition does not provide strong evidence for modernization as a significant factor for the increase in contraceptive use. One possible explanation for this is that by 1993, education became universal in Indonesia, as evinced by the dramatic decrease in women with no education in 1993. When education increased across all SES strata, the effects of increased education, particularly when combined with SES advantage, were lessened. Instead, another factor such as the family planning program is a plausible explanation for the increase in use over time.

Gertler and Molyneaux (1994) examined the period of 1982-1987, a period where Indonesia experienced a 32% decrease in the total fertility rate, and assessed the proximate determinants of fertility that contributed to this rapid decline. Their results show improvements in educational and economic factors, combined with an “adequate contraceptive delivery system” greatly aided the fertility decline during that time period. While I do not find substantial evidence that factors contributing to modernization influence contraceptive use, I do find similar results of increasing contraceptive use from what could be a result of improvements in the family planning programs, and that as use across all SES categories increased, there was a greater demand for family planning

programs, and additionally a need for a greater supply of contraceptives. Raftery et al. (1995) show that family planning programs were successful in Iran because there was a fertility decline before the family planning program began, showing little net effect of the family planning program on the rate of fertility decline. My results could show that while the family planning programs were successful and most likely accounted for a significant amount of the difference in contraceptive use from 1976 to 1993, perhaps it is the demand for these programs that drove the success of the programs. In a sense, this "demand" for family planning programs was different than the "demand" for contraception related to modernization, in that women began to regulate fertility in response to Malthusian pressures and abject poverty; and factors contributing to modernization (i.e. costs and benefits of having children) influenced the Indonesian lifestyle only after family planning programs and *transmigrasi* became prevalent in Indonesia. Prior evidence suggests that Indonesia faced a time in its history when the regulation of fertility was absolutely necessary: Malthusian pressures affected those living in Inner Indonesia, economic times improved and consumerism increased, so the cost of children outweighed the benefits. Having children became a large financial expense, since education was not free, and many parents knew that their children would need an education to compete in the job market. The "latent demand" for contraception in Indonesia in the 1970s and the 1990s created a situation where the family planning movement lowered TFRs, and remained successful over many years.

Period Effect vs. Population Composition

A pooled cross-section time series analysis of the 1976 IFS data (n=5787) and the 1993 IFLS data[15] (n=2040) reveals similar patterns in the data as the aforementioned section on decomposition. First, to test whether there is a significant period effect between 1976 and 1993, I run a bivariate regression with contraceptive use and a dummy variable for year (1976=0, 1993=1). The estimated Beta coefficient for this equation is positive and statistically significant ($p<.001$), indicating that contraceptive use was significantly higher in 1993 than in 1976, and that the 30 percentage point difference in contraceptive use found by the decomposition is also a significant relationship.

Next, I use the pooled data to assess whether the period change is measured by the population composition. To do this, I run a model with all of the independent variables: age, NLC, husband's occupation, education, and region, with a dummy variable for time. Equation 3 below illustrates this model. The results of this model are that the dummy variable shows a decrease from β=1.4 (from the bivariate model) to β=1.33 (Equation 3), a 0.68 difference in the Beta coefficients. This small difference in the coefficients shows that changes in the population composition do not strongly affect contraceptive use.

Equation 3: Pooled cross-section time series equation for the effect of time on contraceptive use, for NLC[16]:

$$\log it(\pi) = \alpha + \beta_{Education} + \beta_{Age} + \beta_{NLC} + \beta_{region} + \beta_{time(1976/1993)}$$

I further test this hypothesis by examining models that assess the likelihood of modern contraceptive use on each independent variable separately (Equation 4) and also

[15] Java-Bali region only (Outer Indonesia omitted for cross-sectional comparison).

[16] For brevity, I have omitted all of the categorical Beta estimates that are included in this equation, and represent each individual independent variable with only one Beta estimate. Results in Table 3 (Appendix) show all beta estimates for each of the independent variables for Equations 3 and 4 (excluding the estimates for Equation 1, since the concern was the value of the Beta coefficient for the dummy variable for time). For example, Age has 6 Beta estimates since there are 7 categories, with one as the referent (30-34).

a model incorporating an interaction term between each independent variable and time (Equation 5).

Equation 4: Pooled cross-section time series equation for the effect of time and population composition on contraceptive use, for NLC[17]:

$$\log it(\pi) = \alpha + \beta_{0NLC_0} + \beta_{2NLC_2} + \beta_{3NLC_3} + \beta_{time}(1976/1993)$$

Equation 5: Pooled cross-section time series equation for the effect of time and population composition on contraceptive use, for NLC, with interaction with time and NLC:

$$\log it(\pi) = \alpha + \beta_{0NLC_0} + \beta_{2NLC_2} + \beta_{3NLC_3} + \beta_{time}(1976/1993) + \beta_{NLC*time}$$

I find no significant differences between model fit for two models (Equation 2 and Equation 3) for any of the variables (Table 3, Appendix), and therefore conclude that the population composition for each of the background variables does not significantly affect contraceptive use over time. For example, the Pseudo R-squared value for the model with female education and a dummy variable for time is .07 and the same value is obtained when an interaction term for year is introduced to the model. The differences in the BIC scores and log-likelihood values are also close in value, exhibiting a nonsignificant difference. These results indicate that there is a period effect on contraceptive use during the two time points, but there is little effect from population composition. In sum, I find that population composition does not significantly affect contraceptive use over time, similar to the results from the decomposition.

Results

Modernization, as measured by change in population composition, does not appear to be the driving factor for the significant increase in contraceptive use over time. Both a pooled time series analysis and decomposing the effects of female education reveal that the population composition does not significantly affect contraceptive use. On

[17] The referent category for NLC is 1 child.

the other hand, strong, significant period effects were observed between the 1976 and 1993 data sets. For these reasons, one can conclude that other exogenous factors, such as the family planning program, more significantly affect use than factors related to modernization.

While there was no significant overall difference between the same variable for two different time points, there were notable variations within the variables between 1976 and 1993. Regional contraceptive use rates changed slightly, with Jakarta exhibiting higher use rates than Yogyakarta and West Java in 1976, and lower rates than both of those regions in 1993. Age differences were observed for 30-34 year-olds, whose use rates were the highest in 1976 and lower than 25-29 year olds in 1993 (although the difference was not significant). In 1976, use rates based on educational attainment were relatively close, and use increased slightly with a woman's level of educational attainment. In 1993, women who graduated from primary school had the highest contraceptive use rates, and use declined after primary education (non-significant differences).

Conclusion

In sum, this paper aims to contribute to the literature by examining the demographic and socioeconomic factors influencing modern contraceptive use in Indonesia, as a continuation to Freedman's study from 1981. The paper also aims to explore the role of contraceptive use in contributing to the fertility decline in Indonesia and test if factors related to modernization, such as female education, contribute to the rise in contraceptive use over time. Since contraceptive use increases from very little use to higher use after the first birth in both 1976 and 1993, I view the use of modern

contraceptives as a significant contribution to the fertility decline and a tool for family planning in a society where marriage is the catalyst for family formation, and non-marital fertility is rare.

Furthermore, I examine the demographic groups which lag behind others in contraceptive use, and explain the reasons for this lag based on social and cultural conditions in Indonesian society. Generally, the groups categorized by lower use belonged to the lowest SES groups, but for the 1993 data, women belonging to the highest SES groups also reported lower use rates for modern contraceptive use than women in middle SES groups. Women in high SES groups are also older, and as a partial consequence, use traditional contraceptives at a higher rate than the other groups.

A comparison of data from 1976 to data from 1993 indicates that modernization only had a marginal effect on contraceptive use, explaining only 5 of the 30 percentage point increase in modern contraceptive use over time. The remaining 25 percentage points could most likely be explained by improvements in the family planning movement, and other societal and attitudinal changes affecting women's perceptions toward contraceptive use and smaller family sizes. What exactly these factors are remains to be explored.

While attitudinal changes are difficult to measure, measuring the "effectiveness" of family planning programs is also challenging. Bongaarts (2006) suggests several issues with the measurement of the effectiveness of family planning programs: 1) the lack of a robust indicator of program strength; 2) the nonlinear relation between program effort on one hand and unwanted fertility and unmet need for limiting births on the other; 3) lack

of experiments. One limitation to this study is that it does not address unmet need, and that this would be an important issue to address when assessing contraceptive use.

Suggestions for further research include an extension of the longitudinal study of contraceptive use in Indonesia, using the 1997, 2001, and 2007 waves of the IFLS. This study can re-test the hypothesis that modernization only marginally affects contraceptive use, and that other factors such as the improvements in the family planning movement, more strongly affect use rates. Furthermore, an update on the paper written by Hull et al. (1977), which examines regional differences between family planning programs, would probably greatly contribute to the literature on contraceptive use in Indonesia, and more strongly support the hypothesis that improvements in the family planning program greatly increase contraceptive use over time. Lastly, a closer examination of marriage as it relates to contraceptive use should be explored. This paper established the importance of contraceptive use as a tool to control fertility, and noted that number of living children largely influenced a couple's decision to use contraception. Since premarital births are not common in Indonesia, marriage, family formation, and contraceptive use are inextricably linked, and factors such as the woman's age at first birth and the desire for more children and unmet contraceptive need should be addressed.

Appendix

Table 1: Estimates of betas and proportions for decompositions

	1976	β	Proportion of Population
Women's Education			
	No Schooling	-0.57	54.1
	1-3 Years Primary	-0.28	13.7
	4-6 Years Primary	-0.21	7.2
	Graduated Primary (Referent)	0.00	13.8
	Some Jr. High	-0.08	1.7
	Graduated Jr. High	0.13	4.0
	Some Sr. High	0.56	0.8
	Graduated Sr. High	0.39	3.6
	College/University	0.40	1.2
Constant (α)		0.18	

	1993	β	Proportion of Population
Women's Education			
	No Schooling	-0.78	12.3
	1-3 Years Primary	-0.54	18.9
	4-6 Years Primary	-0.24	11.5
	Graduated Primary (Referent)	0.00	27.2
	Some Jr. High	-0.39	3.8
	Graduated Jr. High	0.02	9.0
	Some Sr. High	-0.68	1.8
	Graduated Sr. High	-0.19	11.8
	College/University	-0.67	3.9
Constant (α)			

Table 2: Equation values including betas and proportions, 1976 and 1993

Decomposition Equations

	Education (1993 Betas, 1976 Means)			Education (1976 Betas, 1993 Means)		
	β	Means	α	β	Means	α
	-0.78	0.541	0.95	-0.57	0.123	-0.59
	-0.54	0.137		-0.28	0.189	
	-0.24	0.072		-0.21	0.115	
	0.00	0.138		0.00	0.272	
	-0.39	0.017		-0.08	0.038	
	0.02	0.040		0.13	0.090	
	-0.68	0.008		0.56	0.018	
	-0.19	0.036		0.39	0.118	
	-0.67	0.012		0.40	0.039	
% Using:	**0.6024**			**0.3531**		

Table 3: Pooled Time Series Analysis: 1976 and 1993

Variables	Bivariate Relationships (β)	Bivariate Relationships and Interaction Term for Year	Interaction Model with Time and Independent Variables†	N
Region[a]				
West Java	-0.07	0.19		1781
Central Java	0.28***	0.17		1517
DI Yogyakarta	-0.19**	0.13		772
East Java	0.53***	0.59***		1718
Bali	0.92***	0.93***		811
Year††		1.49***		
Pseudo R^2		**0.09**	**0.09**	
Log Likelihood		**-4802.32**	**-4786.80**	
BIC		**-60504.28**	**-60490.50**	
Age[b]				
15-20	-1.64***	-0.80***		630
20-24	-0.53***	-0.05		1445
25-29	-0.13**	0.01		1629
35-39	-0.17**	-0.28**		1380
40-44	-0.33***	-0.37**		822
45-49	-0.68***	-0.51**		363
Year		1.33***		
Pseudo R^2		**0.08**	**0.09**	
Log Likelihood		**-4843.91**	**-4834.45**	
BIC		**-60412.13**	**-60377.26**	
Women's Education[c]				
No Schooling	-0.84***	-0.54***		3379
1-3 Years Primary	-0.41***	-0.30*		1177
4-6 Years Primary	-0.19**	0.24		649
Some Jr. High	-0.11	-0.15		173
Graduated Jr. High	0.15	0.27		415
Some Sr. High	0.04**	-0.44		83
Graduated Sr. High	0.23	0.06		450
College/University	-0.06	-0.43		148
Year		1.25***		
Pseudo R^2		**0.07**	**0.07**	
Log Likelihood		**-4901.83**	**-4893.97**	
BIC		**-60278.37**	**-60222.35**	
Husband's Occupation[d]				
No Work	0.59***	-0.17		120

	Professional/Clerical	0.43***	0.07	1031
	Sales/Service	-0.11*	-0.18	1549
	Manual	0.10*	-0.22*	1788
	Other	0.83***	0.04	98
	Year		1.43***	
Pseudo R^2			**0.07**	**0.07**
Log Likelihood			**-4907.48**	**-4897.66**
BIC			**-60264.06**	**-60238.88**
Number of Living Children[e]				
	0	-2.46***	2.29***	739
	2	0.63***	2.80***	1550
	3+	0.73***	2.63***	3991
	Year		1.44***	
Pseudo R^2			**0.13**	**0.14**
Log Likelihood			**-4583.66**	**-4566.69**
BIC				
Year			**-60959.53**	**-60966.58**

†Only model fit statistics

[a] Region reference group is Jakarta

[††] Year is a dummy variable: 1976=0 (n=5787), 1993=1 (n=2040)

[b] Age reference group is women age 30-34

[c] Education reference group is Graduated Primary

[d] Husband's Occupation reference group is Agriculture

[e] Number of Living Children reference group is 1 child

* p<.1; **p<.05; ***p<.01

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