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## **Contraceptive Use in Java-Bali: A Multivariate Analysis of the Determinants of Contraceptive Use**

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The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in co-operation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development. Substantial support is also provided by the UK Overseas Development Administration.

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# Preface

A central concern of the World Fertility Survey programme is the provision of technical assistance for in-depth analysis of the data collected by the participating countries. A major vehicle for the provision of such assistance has been the organization of workshops on data analysis. These workshops play an important role in providing training to national researchers and at the same time help to promote and successfully complete second-stage analysis projects.

As part of this programme, the WFS and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) organized a Regional Workshop on the Application of Multivariate Analysis Techniques to the Analysis of WFS Data, which took place at the Asian Institute of Technology in Bangkok, Thailand, from 23 September to 23 November 1979.

The workshop was attended by eleven participants from six countries in the ESCAP region: Bangladesh, Indonesia, Korea, Malaysia, Nepal and Thailand. Technical assistance was provided at various stages of the workshop by R. Little, G. Rodríguez, A. Westlake and J. Cleland (WFS), N. Ogawa and J. Rele (ESCAP), J. Palmore (East-West Center, Honolulu) and M. Weinberger (UN Population Division, New York).

The first three weeks of the workshop consisted mainly of intensive instruction in the methodology of multivariate analysis and its application to WFS data, including the use of computer software. The remaining seven weeks were devoted to specific second-stage analysis projects applying multivariate techniques to the data from each participating country. At the end of the workshop, the participants had completed a first draft of their reports. These were finalized at a follow-up meeting held in Bangkok from 18 to 22 August 1980.

A complete set of the reports produced by the workshop participants has been published by ESCAP. However, three reports deemed of greater interest and relevance to other participating countries are also being issued in the *WFS Scientific Reports* series, to ensure a wider circulation. The present study, 'Contraceptive Use in Java-Bali: a Multivariate Analysis of the Determinants of Contraceptive Use' by Budi Soeradji and Sri Harijati Hatmadji is one such report.

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# 1 Introduction

## 1.1 THE POPULATION OF INDONESIA

Indonesia is the largest country in south-east Asia and the fifth most populous country in the world. Its 139 million people (Central Bureau of Statistics, 1979) live on several thousand islands and occupy an area of nearly 800 000 square miles. Nearly two-thirds of its population, however, live on the islands of Java and Bali which constitute less than seven per cent of the country's land area, with the result that these islands are among the most densely settled agricultural regions in the world. This unequal distribution of population has existed since Indonesia was under Dutch rule, when the island of Java was more developed than other islands and as a consequence attracted migrants from other islands (Nitisastro 1970).

Like many other developing countries, Indonesia has a relatively young population. The results of the Indonesia Intercensal Population Survey (or Survey Penduduk Antar Sensus, abbreviated as SUPAS) show that about two-fifths of the Indonesian population are under age 15 and only about ten per cent are 50 years or older. The Republic includes more than 100 ethnic groups, speaking 250 distinct languages. About nine in ten of its people are Muslims and the national language, Bahasa Indonesia, is taught and used as the medium of instruction in all schools.

About five-sixths of Indonesia's people live in rural areas and more than three-fifths are engaged in agriculture. Although several large cities have experienced rapid growth in recent years, Indonesia has not undergone rapid urbanization. Literacy is still low: more than two-fifths of all adults and over half of the adult women are still illiterate. Among younger people, literacy is improving: four-fifths of those aged 15–24 are literate. Nevertheless, only a small proportion—even among the young population—are educated beyond secondary level.

## 1.2 THE POPULATION PROBLEM

The overcrowdedness of Java was recognized by Dutch officials as early as 1802 (Van der Kroef 1956) but the problem was broached only a century later under the colonial government's policy *Cultuurstelsel*. The Dutch—and later the Indonesians themselves—pinned their hopes on population redistribution, first called 'colonization' and then 'transmigration' (population resettlement). This transmigration of population from Java to the other islands, however, has been partially counterbalanced by a flow of people from the outer islands into Java (Hull, Hull and Singarimbun 1977).

Under the charismatic leadership of President Sukarno, continued advocacy of transmigration was considered as the major solution to Indonesia's population problem. As late as 1964 he stated:

My solution [to the population problem] is to exploit more land - because if you exploit all the land in Indonesia you can feed 250 million, and I have only 103 million. . . . In my country the more [children] the better (Krishner 1964).

Sukarno also felt that birth control, specifically contraceptives, threatened his country's morals and could be condoned only for spacing births to preserve a mother's health.

## 1.3 THE FAMILY PLANNING PROGRAMME

In 1957 the scattered efforts of providing information to mothers on child spacing were forged into the voluntary Indonesian Planned Parenthood Association (Perkumpulan Keluarga Berencana Indonesia, abbreviated as PKBI). Despite a lack of government support, the PKBI expanded its services until interrupted by the political and economic turmoil of the mid-1960s, which ended with the transfer of power from Sukarno to Suharto in March 1966. This change to a New Order Government signalled a shift from the prevailing critical, or at best passive, neglect of fertility control to one of tacit support. Thus freed from early restraints, the PKBI re-opened its clinics and over the next two years led the way towards adoption of family planning as official government policy after nearly 20 years of disapproval by post independence regimes.

The adoption of a family planning programme as official government policy was first signified by President Suharto's 1967 signing of the United Nations Declaration on Population, which recognizes determination of the number and spacing of children as a basic human right. This was followed by the establishment of a National Family Planning Institute (Lembaga Keluarga Berencana Nasional) through a presidential order in October 1968. Wholehearted official commitment to family planning came in 1970. Presidential decrees transformed the National Family Planning Institute into the National Family Planning Co-ordinating Board (Badan Koordinasi Keluarga Berencana Nasional, abbreviated BKKBN), reporting directly to the President and fully responsible for all government family planning activities.

The Indonesian family planning programme started as a clinic-based programme. It grew rapidly from just over 50 000 new acceptors annually in 1968–70 to nearly 1.6 million a year in 1974–5 (Suyono 1979). Despite this success, administrators suspected that many of the women who were easy to reach with the message of family planning had already been recruited. Hence, for the programme to continue to expand, those who are not easily reached, such as young eligible couples, needed to be recruited. But if efforts were made to spread the family planning programme throughout the islands in order to reach a greater number of eligible couples, there would be administrative and staffing problems. In addition, the number of IUD acceptors had been declining steadily since the beginning of the

programme, while the proportion of women choosing the pill, condom and foam had been increasing. This suggested that an expanded resupply system had to be created if continuation rates were to remain high (Teachman and Rahardjo 1979). Based on these considerations, the National Family Planning Co-ordinating Board established a system of village contraceptive-distribution centres in 1974 in which the villages took over some of the responsibilities for administration and supply of contraception.

Family planning is now seen as an integral part of Indonesia's development programme. The function of the National Family Planning Co-ordinating Board has also been expanded. The Board not only co-ordinates the family planning programme activities but also national population policy.

## 2 Background Information

### 2.1 DATA ON CONTRACEPTION

With the increasing awareness of the population problem, studies on population phenomena (fertility, mortality, use of contraception, labour force and nuptiality) have also been numerous in Indonesia. The first study in the field of family planning and contraception was conducted by the Public Health Institute in Surabaya covering two sub-districts in East Java (Gille and Pardoko 1966). In 1968, a study on the knowledge of, attitudes towards, and practice of contraception was carried out in Jakarta. Three nationwide surveys have been conducted in the 1970s. (Other local studies have also been conducted, but they are of limited usefulness in the assessment of the national programme because they pertain to small areas and do not represent the whole country.)

The first nationwide survey, the Indonesia Fertility-Mortality Survey, was conducted by the Demographic Institute of the University of Indonesia in 1973. The survey covered the major part of Indonesia and collected a wide range of data on marital history, birth history, knowledge, attitudes and practice of contraception, and some other demographic information. In conjunction with the World Fertility Survey programme, the Central Bureau of Statistics carried out the Indonesia Fertility Survey as a subsample of the Intercensal Population Survey in 1976. The Indonesia Fertility Survey covered the islands of Java and Bali, including the provinces of Jakarta, West Java, Central Java, Yogyakarta, East Java and Bali. The data collected in this survey will be the major source of information for the study reported here. Finally, in 1979 some basic information on fertility and family planning was collected through the National Socio-Economic Survey conducted annually by the Central Bureau of Statistics.

With the information derived from these various surveys, there are many opportunities for analysis of fertility and contraceptive behaviour in Indonesia, which in turn may inform population policy.

### 2.2 USE OF CONTRACEPTION

The percentage of exposed women ever or currently using contraception as of 1976 is presented in tables 1 and 2. The women are classified by current age and number of living children. About half of these exposed women in Java-Bali have ever used contraception, while one-third of the exposed women are currently using a contraceptive method. We may also note that the percentage of exposed women currently using an inefficient method is not high, namely about five per cent. This indicates that family planning acceptors in Java and Bali are more likely to use efficient methods, which is a desirable situation from the point of view of the population policy in Indonesia in general.

Thirty-one per cent of the exposed women aged 15–24

have ever used an efficient method of contraception. This percentage increases to 49 per cent for women aged 25–34 but then decreases for older ages, although the percentage ever using ages at 45–49 is still higher than at ages 15–24. This pattern indicates that, in general, older women are more likely to have ever used a contraceptive method. A similar pattern is also evident for those who are currently using a contraceptive method (the second panel of table 1). For example, the proportion of exposed women aged 15–24 who are currently using an efficient method of contraception

Table 1 Percentage Distribution of Exposed Women According to Ever and Current Use of Contraception by Current Age, 1976

State of contraceptive use	Current age				
	Total	15–24	25–34	35–44	45–49
<i>Ever use</i>					
Any methods	46.1	33.8	53.4	51.3	45.6
Efficient methods	41.7	31.0	48.8	45.7	37.5
Inefficient methods only	4.4	2.8	4.6	5.6	8.1
<i>Current use</i>					
Any methods	36.8	27.2	41.6	42.2	35.8
Efficient methods	31.9	24.4	36.3	35.7	28.4
Inefficient methods only	4.9	2.8	5.3	6.5	7.5

Table 2 Percentage Distribution of Exposed Women According to Ever and Current Use of Contraception by Number of Living Children, 1976

State of contraceptive use	Number of living children				
	≤1	2	3	4	5+
<i>Ever use</i>					
Any methods	23.5	51.9	58.8	55.6	60.2
Efficient methods	20.5	47.3	53.5	49.7	55.1
Inefficient methods only	3.0	4.6	5.3	5.8	5.1
<i>Current use</i>					
Any method	18.4	40.1	46.5	42.8	50.6
Efficient methods	15.9	35.4	40.5	37.0	43.6
Inefficient methods only	2.5	4.7	5.9	5.9	7.1

is 24.4 per cent. This percentage increases to 36.3 per cent for ages 25–34 and then declines for the older ages.

Among exposed women who have less than two living children, 20.5 per cent have ever used efficient methods of contraception. This percentage increases with increasing number of children up to three children and then remains moderately high. A similar pattern holds for women who have ever used any method of contraception and for women who are currently using any or efficient contraceptive methods. Thus the figures in table 2 show that women with greater numbers of living children are more likely to be using contraception.

The findings in tables 1 and 2 support general expectations about the relationship between the use of contraception and women's age and number of living children. Older age and a greater number of living children are both associated with a greater likelihood of contraceptive use.

### 2.3 TRENDS IN USE OF CONTRACEPTION

The Indonesian Family Planning Programme has been considered a success by most observers. Sinquefield and Sungkono (1979), for example, compare the results of the 1973 and 1976 surveys and report that:

Among currently married women aged 15–44, there was a tripling or near tripling between 1973 and 1976 in ever-use of contraception (from 12 percent to 39 percent), in current use (from 11 percent to 28 percent) and in use of modern methods (from 9 percent to 23 percent); use of pills, IUDs and condoms offered by the program more than doubled (from 9 percent to 21 percent). The major influence of the family planning program in this change is clear. Of all who were current users in 1976, 84 percent were using modern methods, 73 percent of users were employing methods obtained from the program; and 88 percent of modern method users were employing a program method (Sinquefield and Sungkono 1979).

Part of a table in their report is reproduced as table 3 here to enable examination of the trend in the use of contraception for each province in Java and Bali. Unfortunately, the figures for Jakarta are not available for the 1973 survey.

The largest increase in the percentage of women who have ever used and who are currently using any methods are shown for Yogyakarta, while the smallest increases are indicated for West Java (see the first and second panels of table 3). Although Bali experienced smaller increases than the other provinces (except West Java), the percentages of Balinese women who have ever used and who are currently using any method are nevertheless high. Furthermore, Bali shows the largest increase in the percentage of women currently using a modern method (see the third panel of table 3). In terms of the proportion currently using a programme method, the figure for Bali is as high as that for Central Java and East Java.

The regional differentials in the proportions using modern contraception in 1976 indicate the differences in the success of family planning programme efforts. The data suggest that the family planning programme has been more successful in Bali than in other provinces.

### 2.4 OBJECTIVES OF THIS STUDY

The results of the Indonesia Fertility Survey were published in two volumes by the Central Bureau of Statistics and the World Fertility Survey in 1979. The first volume of the publication, the Principal Report, provides a description of the survey as well as commentary on the survey findings. Salient results regarding patterns and differentials in nuptiality, fertility, mortality, fertility regulation (family planning), and sex preference are described in detail. The second volume presents the supporting tables.

**Table 3** Percentage of Currently Married Women Aged 15–44 who Are Ever-Users or Current Users of Contraception by Province, 1973 and 1976

Type of use	Java-Bali	West Java	Jakarta	Central Java	Yogyakarta	East Java	Bali
<i>Ever use</i>							
1973	12.4	7.9	NA	11.2	14.0	16.0	26.1
1976	38.7	25.6	36.3	38.6	57.0	48.0	45.9
Increase 1973–6	26.3	15.7	NA	27.4	43.0	32.0	19.8
<i>Current use of any method</i>							
1973	10.5	5.9	NA	9.8	12.8	14.6	23.0
1976	28.0	17.9	29.1	29.8	43.1	33.8	39.1
Increase 1973–6	17.5	11.5	NA	20.0	30.3	19.2	16.1
<i>Current use of modern method</i>							
1973	9.4	5.5	NA	9.3	11.1	13.6	21.0
1976	23.4	14.9	19.9	26.0	19.9	29.2	38.3
Increase 1973–6	14.0	9.4	NA	16.7	8.8	15.6	17.3
<i>Current use of programme method</i>							
1973	8.5	4.2	NA	8.1	8.3	11.5	19.4
1976	20.5	12.1	14.2	23.0	17.8	26.3	33.3
Increase 1973–6	12.0	7.9	NA	14.9	9.5	14.8	13.9

Source: Sinquefield and Sungkono 1979: table 9, p 51

NOTE: NA—not available because the Indonesia Fertility-Mortality Survey did not cover Jakarta.

In conjunction with the publication of the results of the Indonesia Fertility Survey, a seminar attended by population researchers and planners was organized by the Central Bureau of Statistics in March 1979. During the seminar it was acknowledged that the report is excellent. It provides necessary and important description. Nevertheless, two major recommendations emerging from the seminar are worth noting.

- 1 The publication does not give enough references and comparisons with the results of other fertility studies conducted in Indonesia.
- 2 There is a need for in-depth analysis using the survey results.

Given the success of the family planning programme and the availability of information from several sources, a comprehensive study on contraceptive use in Indonesia is sorely needed. This type of study is appropriately done by using a

multivariate technique which enables examination of the effects of various factors on the probability of contraceptive use with the effects of confounding factors controlled. It is the primary aim of the study reported here, then, to present a multivariate analysis on the use of contraception. More specifically, the main objectives of this study are as follows:

- 1 to determine which factors affect contraceptive use; and
- 2 to establish the absolute and relative importance of each variable examined in the explanation of variation in contraceptive use.

Because of the importance of the family planning programme, this analysis is limited to the use of efficient methods (that is 'programme' methods), including the pill, IUD, condom, sterilization, injection and other female scientific methods such as diaphragm, tampon, sponge, foam, tablet, jelly or cream.

## 3 Data and Variable Definitions

### 3.1 SOURCE OF DATA

This study draws primarily on data gathered in the Indonesia Fertility Survey 1976, conducted by the Central Bureau of Statistics in conjunction with the World Fertility Survey programme. The survey is based on a subsample of a larger household enquiry, the Intercensal Population Survey (abbreviated SUPAS). Unlike the larger survey, the Indonesia Fertility Survey only covers the islands of Java and Bali, consisting of six provinces: Jakarta, West Java, Central Java, Yogyakarta, East Java and Bali, and containing about two-thirds of the total population of Indonesia. The sample is distributed as presented in table 4.

To provide estimates at the provincial level and also by type of place of residence, the three small provinces (namely Jakarta, Yogyakarta and Bali) as well as the urban areas of Java and Bali were over-sampled.

Ever-married women aged under 50 were eligible to be interviewed in detail regarding their maternity and marriage histories, knowledge and use of contraception, fertility intentions and preferences, and socio-economic background. The questionnaire is based on the World Fertility Survey core questionnaire, incorporating the fertility regulation, abortion and family planning modules.

The present study covers only the women who reported themselves as exposed to risk of conception at the time of the survey, that is, currently married, non-pregnant women who believed themselves to be fecund, including those who had been sterilized for contraceptive purposes. With these restrictions, the study includes 5637 women from the sample or about 61.6 per cent of those interviewed. The final analysis, however, is limited to 4917 exposed women,

Table 4 Weighted and Unweighted Frequencies for the Sample of Ever-Married Women by Province and Type of Place of Residence

	Unweighted	Weighted
All Java-Bali	9136	9136
<i>Place of residence</i>		
Urban	2922	1432
Rural	6214	7705
<i>Province</i>		
Jakarta	1391	504
West Java	1894	2605
Central Java	1951	2570
Yogyakarta	886	251
East Java	2121	3022
Bali	893	185

the further reduction resulting from missing information on some variables, in particular, a measure of fertility desires (see p 13 below).

### 3.2 DISCUSSION OF VARIABLES EMPLOYED

In accordance with the objectives of this study, we are interested in examining the correlates of current use of an efficient method of fertility regulation. Methods defined as 'efficient' in this study include the pill, IUD, condom, sterilization, injection and other female scientific methods such as diaphragm, tampon, sponge, foam tablet, jelly or cream. Investigation of the use of efficient methods is more directly relevant to the family planning programme than an investigation of the use of all methods, including inefficient ones. Hence, the dependent variable used in this study is current use of efficient methods of contraception.

Although the Indonesia Fertility Survey 1976 collected information on many characteristics of women which might be entertained as possible predictors of contraceptive use, we have limited our study to selected variables, emphasizing in particular a set of individual characteristics. In all, we have chosen twelve independent variables classified into four groups: demographic measures, background measures, socio-economic measures, and family and fertility measures. The list of variables is presented in appendix A, while the construction of variables is described next, especially those constructions which are peculiar to this study. (The rationale for including the variables selected, and the hypotheses relevant to each variable, will be discussed as the findings with respect to each variable are examined in turn in chapter 5 of this report.)

Childhood residence is defined as the type of place (village, town or city) where the woman reports she lived until age 12. Capitals of provinces and regencies are considered cities, while capitals of subdistricts are considered towns.<sup>1</sup> The classification was done by the interviewers based on the place reported by the respondents. However, memory lapse may affect the measurement of this variable because the woman may not accurately report the type of place where she lived as a child. Even if she does recall accurately, the town might have been a capital of a sub-district before the changes of administrative divisions after independence in 1945. Furthermore, it is known from the results of the post-enumeration survey that responses to this question are not consistent from survey to survey: 30 per cent supplied different responses in the survey and the post-enumeration survey (MacDonald, Simpson and Whitfield 1979).

<sup>1</sup> The order of administrative division in Indonesia is province, regency and subdistrict, with the last being the smallest.

The Indonesia Fertility Survey 1976 includes three questions on education:

- i Question 111: 'What was the highest level of school you attended: primary, junior high, senior high, academy or university?'
- ii Question 113: 'Did you graduate from (highest level attended)?'
- iii Question 114: 'Which class did you complete in (highest level attended)?'

Using the information from responses to these three questions, the Principal Report employs the categories of 'no schooling', 'primary incomplete', 'primary completed', 'junior high', and 'senior high and more'. The study presented here employs different categories of educational level because the data file used in the analysis provides only one variable, years of schooling. With this information, it was difficult to adopt the categorization used in the Principal Report. The categories employed in this study are based on years of schooling and labelled according to the level of education. We maintain university and academy as a separate category rather than combining it with senior high school, even though the number of cases in the category is small, because the highly educated subgroup of the population may have completely different fertility regulation behaviour.

Employment status is classified into three categories: 'no work', 'work in the traditional sector', and 'work in the non-traditional sector'. This variable is derived from information on work status and occupational status. Non-traditional workers are those who work for non-relatives for cash payments such as professional, clerical, sales or service workers. Traditional workers are those who work for their own household enterprises, especially in agriculture and manual work.

Unlike the reports of studies on sex preferences in other neighbouring countries (for example Malaysia, Korea, etc), the Indonesia Principal Report indicates that:

For a given family size, women who have children of both sexes are more willing to stop child bearing than those who have only boys or only girls. . .

A closer examination of the data indicates that the preference for a family balanced in terms of the sex of children is stronger than merely wanting at least one child of each sex. The preference appears to be for a more perfect sex balance (p 74).

This study tries to employ both variables, the number of living children and their sexes, by combining them into one variable called sex composition. The variable created has

ten categories, as specified in appendix A.

A final variable noted here is one referring to fertility preferences. Since this variable is expected to be one of the major independent variables in our analysis, we will elaborate its definition in the following section.

### 3.3 DEFINING THE MEASURE OF FERTILITY PREFERENCES

The questions included in the Indonesia Fertility Survey 1976 questionnaire which relate to the respondent's desire to have another child and her ideal family size are phrased as follows:

- 1 'Do you want to have another child sometime?'
- 2 'If you could choose exactly the number of children to have in your whole life, how many children would that be?'

The first question provides information on the desire for future births. This question was asked only to currently married women who reported themselves as fecund. As can be seen from table 5, 2585 women were not married or not fecund, and about 10.4 per cent of the remainder were undecided about desire for a future birth. Hence definite information on desire for a future birth is available only for 5884 women.

The second question provides information regarding the desired number of children a woman would like to have. For this analysis, the desired number of children is contrasted with the number of living children, resulting in a measure of excess fertility. This measure has the following categories: (1) desired less than living; (2) desired equal to living; and (3) desired greater than living. There are cases, however, where the number of desired children either is not reported or is reported indecisively (see the last two columns of table 5). The figures in table 5 indicate that about 5.3 per cent of the ever-married women did not report their ideal family size.

The responses to the two questions on fertility preferences are remarkably consistent, with 90.6 per cent of definite answers to both questions agreeing. Following Shah

<sup>2</sup> For currently pregnant women, the question is: 'Do you want to have another child in addition to the one you are expecting?'

Table 5 Number of Ever-Married Women by Desire for Future Births and Excess Fertility, Java-Bali, 1976

Desire for future births	Total	Excess fertility measure				
		Desired < living	Desired = living	Desired > living	Other answer	Not stated
Wants more	3338	3	21	3168	118	27
Wants no more	2546	383	1584	510	65	4
Undecided	686	24	212	320	109	21
Not currently married or infecund	2585	147	869	1428	110	30
Total	9154	557	2686	5427	401	83

and Palmore (1979), we shall combine the answers to the two questions in a single measure of fertility preferences. For this purpose, we consider only women who gave definite answers to both questions (5669). The categories of the combined variable are shown in table 6

**Table 6** Number of Exposed Women by the Measure of Fertility Desire, Java-Bali, 1976

	Total	Desired > living		Desired ≤ living	
		Wants more	Wants no more	Wants more	Wants no more
N	5669	3168	510	24	1967
%	100	55.9	9.0	0.4	34.7

# 4 Methodology

## 4.1 TECHNIQUE EMPLOYED

The statistical method that has been used for the analysis is multiple regression analysis with dummy variables. In most of the analysis, the multiple regression analysis is operationalized through the use of multiple classification analysis.<sup>3</sup> Three features of multiple classification analysis (MCA) bear mentioning here: (1) it allows the use of a dependent variable which takes the form (for a group of women) of a proportion or percentage; (2) it may be used when some or all of the independent variables are not continuous in nature (that is, categorical); and (3) it provides the effects of each category of the categorical independent variables on the dependent variables. MCA, however, assumes additive effects of independent variables on the dependent variable.

The strategy of the regression analysis employed in this study is a hierarchical one: the effect of each independent variable on contraceptive use is examined after controlling for demographic and causally prior variables.

The hierarchical strategy enables us to obtain the *net* effect of a variable of interest, after controlling other variables entered earlier in the model.

The demographic variables (age, square term of age, number of living children and its square term) are taken as the basic control variables in the model. The order of the variables subsequently entered in the hierarchical regression is: background variables (childhood residence, current residence, and province and language), wife's characteristics (educational level and employment), husband's characteristics (educational level and employment), and family and fertility measures (sex composition of children, number of times married, and fertility desires/preference measure).

A number of considerations motivate the ordering chosen here. The wife's socio-economic status (her education and occupation) is, in part at least, determined by her background. There are more schools in the urban areas, for example, so that in these areas there is greater opportunity for higher educational attainment. Higher educational attainment increases the likelihood of work in non-agricultural or non-traditional jobs. Furthermore, higher educational attainment makes marriage to a better educated husband more likely. Husband's education in turn is likely to affect his occupation.

The socio-economic status of the wife is expected to affect her fertility behaviour and her attitude towards the sex composition of her children. In addition, it has previously been found that a woman's socio-economic status is associated with her marriage stability (Soeradji 1979). Hence, the woman's socio-economic characteristics are thought to affect her family and fertility preferences.

It is worth noting that we do not assume a causal relationship among the demographic characteristics themselves. These variables are considered fundamental control variables, and are therefore introduced prior to all other variables.

## 4.2 ANALYSIS OF VARIANCE

Table 7 presents an analysis of variance derived from a hierarchical regression analysis of current use of an efficient method of contraception on selected wife's characteristics. As mentioned earlier, demographic variables (age and number of living children) are treated as covariates (continuous variables), while the other independent variables take the form of categorical ones. Altogether the model explains 17.2 per cent of the variation in the use of an efficient contraceptive. A large part of the explanation, namely 9.1 per cent, is contributed by the demographic covariates. Such high influence of the demographic variables on the proportion of women currently using an efficient method is not surprising, particularly in societies where family planning programmes have recently been introduced. In the context of recent introduction of contraceptive use, most users will be older women or women at high parities. This, in fact, corresponds to the stages of the family planning programme in Indonesia, where the programme is firstly directed towards women at high parities (two or more children) and later on it is directed towards women at lower parities or young couples. The importance of parity is also indicated by the data in table 7, where the contribution of the number of living children in explaining the variation in current use of efficient methods is higher than the contribution of age.

Three variables considered as background characteristics of women are found to have significant effects on the proportion currently using an efficient method of contraception. Childhood and current residence contribute less than 1 per cent to the total variance, which indicates that differentials with respect to these variables (eg difference in the proportions of urban and rural women currently using an efficient method) are not large. Province and language, however, contribute a larger proportion to the total variance, namely 3.3 per cent, than the background variables mentioned earlier. This indicates that region is more important than type of place of residence. The greater effect of region on contraceptive use is partly explained by the regional differentials in the family planning delivery systems and supplies.

Previous research has indicated that education tends to influence the adoption of contraception. The data in table 7 support this general conclusion, although the contribution of education to the total variance is only 1 per cent for the wife's and husband's educational level respectively. Our data, on the other hand, do not support the hypothesis that employment status affects the adoption of family planning. Both the wife's and husband's employment are shown to have insignificant effects on the proportion of women who are currently using efficient methods of contraception. In

<sup>3</sup> Due to the limitations of the SPSS package programme, no more than five independent variables are used in the construction of any of the MCA tables.

**Table 7** Analysis of Variance from Hierarchical Regression Analysis of Proportion of Current Users of Efficient Methods on Selected Characteristics

Variable(s) added at this step	Addition to			F	R <sup>2</sup>	
	Degrees of freedom	Sum of squares	Mean squares		Partial	Multiple
<i>Demographic variables</i>						
Age	2	35.16	17.58	94.46	.032	.032
Number of living children	2	64.85	32.43	174.22	.059	.091
<i>Background variables</i>						
Childhood residence	2	2.38	1.19	6.40	.002	.093
Current residence	1	1.94	1.94	10.42	.002	.095
Province and language	10	36.17	3.62	19.43	.033	.128
<i>Wife's characteristics</i>						
Educational level	4	4.91	2.28	12.24	.008	.137
Employment	2	0.73	0.36	1.96 <sup>a</sup>	.001	.137
<i>Husband's characteristics</i>						
Educational level	4	6.66	1.67	8.95	.006	.143
Employment	2	0.84	0.42	2.27 <sup>a</sup>	.001	.144
<i>Other variables</i>						
Child composition	9	9.79	1.09	5.85	.009	.153
Times married	1	0.49	0.49	2.63 <sup>a</sup>	.000	.153
Fertility preferences	2	20.46	10.23	54.97	.019	.172
<i>Summary</i>						
Explained	41	188.60	4.60	24.71		.172
Residual	4875	907.34	0.19			
Total	4916	1095.94				

<sup>a</sup>Insignificant at 5 per cent level of significance.

the further analysis, nevertheless, we retain these two variables in the model, because they are the only indicators of economic status in the Indonesia Fertility Survey 1976.

Among the three variables classified as family and fertility variables, fertility preferences seems to have the strongest effect on the use of contraception. This effect is observed after controlling for the variables already discussed. Whether a woman has been married more than once or not, on the other hand, does not significantly affect current use of efficient contraceptives.

From the above discussion we may conclude that three variables, ie wife's employment, husband's employment and times married, do not significantly affect contraceptive use. The number of living children has the strongest influence, followed by province and language, and current age.

### 4.3 EXAMINATION OF INTERACTIONS

As mentioned earlier, one major feature of multiple classification analysis is the assumption of additivity of effects of independent variables on the dependent variable. In order to evaluate the validity of the use of multiple classification analysis in this instance, we present an examination of the interactions of pairs of variables in this section. The complete summary of the results of a series of two-way analyses of variance of all possible pairs of independent variables on contraceptive use is presented in appendix B. The examina-

tion of interaction is done in three stages. First, the significance level of the F value is observed. If it is larger than or equal to 5 per cent, the interaction between the corresponding independent variables is considered to be insignificant. If it is smaller than 5 per cent, we observe the ratio of the sum of squares of the interaction term to the sum of squares of the main effects of the corresponding variables (presented in column 3 of table B1). If the ratio is larger than 10 per cent, the effect of the interaction is not negligible. In such a case, we observe the ratio of the interaction sum of squares to the total sum of squares (table B1, column 4). If the ratio is greater than 1 per cent, the interaction has a non-negligible effect on the dependent variable of current use of contraception.

Using the above three criteria, we find the following non-negligible interactions:

- 1 between age and province and language;
- 2 between age and number of living children;
- 3 between age and sex composition of children;
- 4 between province and language and number of living children;
- 5 between province and language and sex composition;
- 6 between woman's education and sex composition.

Hence, out of a total of 66 interaction terms examined, there are 6 which have a noticeable influence on current use of efficient methods. Since the number of significant interactions is relatively small, the rest of analysis will be based on the additive model, entailing some over-simplification.

## 5 Investigation of Effects

This chapter presents a detailed examination of the effects of each variable on current use of efficient methods (which have been highlighted in the previous chapter). Investigation of the effects is done by comparing the percentages currently using efficient methods for different categories of each variable. In order to examine the effects of each variable, controlling for other variables, two sets of percentages are presented:

- 1 percentages adjusted for previous variables in the model (see column 4 of tables 8–11);
- 2 percentages adjusted for all other variables included in the model (see column 5 of tables 8–11).

### 5.1 DEMOGRAPHIC VARIABLES

Two variables are considered among the demographic variables, age and number of living children. The percentages using contraception for categories of age and number of living children (unadjusted, adjusted for previous variables, and adjusted for all other variables) are presented in table 8. In the remainder of the analysis, however, these two variables are employed as continuous variables, with squared terms for age and number of living children included along with the linear term.

The unadjusted percentages using contraception for different age groups (column 3, first panel of table 8) indicate that current use increases with age until it reaches a peak of 41 per cent at the ages of 30–34, remains high between 35 and 44, and then declines. This distinctively high level of contraceptive use among women in the intermediate age groups has also been observed in many other countries with recently widespread family planning programmes.

Unlike the patterns for the unadjusted percentages, the percentages adjusted for all variables (column 5) indicate a general decline in the percentages using efficient methods as age increases, from a peak at ages between 20 and 29. The increase in use noted earlier is probably due to the number of living children, which is the most important determinant of contraceptive use; age itself tends to decrease contraceptive use. To some extent, this may reflect some resistance among the older and more traditional women to an innovation such as family planning.

The second panel of table 8 shows that contraceptive use is strongly associated with number of living children. The more children a woman has, the more likely she is to use contraception. The level of contraceptive use among exposed women with five or more children is about 49 per cent, which is twice as high as the proportion using contraception among exposed women with one child.

Controlling for age (column 4), the pattern of contraceptive use according to number of living children remains

**Table 8** Unadjusted and Adjusted Percentages of Women Currently Using Efficient Methods by Demographic Variables

Woman's characteristics	N	Unadjusted percentages	Percentages adjusted for	
			Previous variables	All variables <sup>a</sup>
(1)	(2)	(3)	(4)	(5)
Overall percentage		33.5		
<i>Age</i>				
<20	600	13.8	16.6	35.1
20–24	1061	31.4	28.3	37.1
25–29	968	36.7	36.7	37.4
30–34	809	41.1	41.2	35.2
35–39	765	38.2	41.3	31.1
40–44	485	38.2	36.8	24.7
45–49	217	30.2	27.2	16.0
<i>Number of living children</i>				
None	635	3.1	8.7	35.0
One	1000	24.4	20.3	33.1
Two	913	36.7	30.3	34.0
Three	710	41.8	38.7	31.6
Four	579	39.9	45.5	29.7
Five or more	1064	48.7	50.7	33.5

<sup>a</sup> The adjusted values are derived from the regression equations of contraceptive use on age and number of living children and their squared terms. Accordingly, the figures in column 5 of the first panel of this table are obtained evaluating the regression of contraceptive use on age and the squared term of age at the mid-points of each category.

much the same as the pattern of the unadjusted percentage. In fact, the pattern of contraceptive use adjusted for age is even more regular, as it increases monotonically from 9 per cent for women with no children to 50 per cent for women with five or more children. When we adjust for all other variables in the model, the effect of number of living children lessens, which indicates that the effect is mediated through the related variables, family size and sex composition.

To examine the effects of number of living children on the use of efficient methods, we may also compare the difference in the percentages using contraception for two groups of women with a different number of living children, say, women with one living child and women with five or more living children. For the unadjusted percentage, the difference is about 24 per cent and it increases to about 30 per cent when age is taken into account. This means that age is acting as a suppressor variable, masking part of the effect of number of living children on contraceptive use.

## 5.2 BACKGROUND VARIABLES

In the hierarchical regression this block of variables is entered at the second step, preceded by the demographic variables. This block includes childhood residence, current residence and a combination of province of residence and language commonly used at home.

An analysis employing childhood residence generally assumes that this variable indicates the degree of exposure to modernization. Thus, women who were brought up in villages are assumed to be least exposed to modernization, while those who were brought up in cities are assumed to have had the greatest exposure to modernization. If moder-

**Table 9** Unadjusted and Adjusted Percentages of Women Currently Using Efficient Methods by Background Variables

Wife's characteristics	N	Unadjusted percentages	Percentages adjusted for	
			Previous variables	All variables
(1)	(2)	(3)	(4)	(5)
Overall percentage		33.5		
<i>Childhood residence</i>				
Village	3739	34.3	34.6	33.7
Town	902	29.7	28.9	31.6
City	260	36.0	34.6	37.4
Correlation ratio squared		.002	.002	.001
<i>Current residence</i>				
Rural	4103	34.2	34.5	35.4
Urban	814	30.2	28.4	24.1
Correlation ratio squared		.001	.002	.004
<i>Province and Language</i>				
Jakarta,				
Indonesia	139	28.8	28.8	28.9
Jakarta, others	143	28.6	30.3	29.8
W. Java,				
Indonesia	94	9.9	9.2	10.4
W. Java,				
Javanese	248	13.8	14.8	16.5
W. Java,				
Sundanese	952	25.0	25.7	25.0
C. Java,				
Javanese	1305	37.6	35.7	35.9
C. Java, others	77	42.5	42.8	39.4
E. Java,				
Javanese	1251	43.1	43.3	42.5
E. Java, others	150	29.1	32.3	35.7
Yogyakarta,				
Javanese	150	24.5	25.0	29.4
Bali,				
Balinese	118	50.4	46.9	46.7
Correlation ratio squared		.039	.029	.033

nization has a positive effect on willingness to accept innovations such as family planning, we may expect that women with childhood residence in cities are more likely to use contraception, while those with childhood residence in villages will show lower use of contraception. Our data in the first panel of table 9 however, are not entirely consistent with this general hypothesis. Women brought up in towns have the lowest percentage using efficient methods (29 per cent), while 34 per cent of women brought up in villages use efficient methods. It is true, though, that women brought up in cities have the highest percentage using efficient methods (36 per cent). This irregularity in the pattern may be due to confusion in the definition of types of places (especially towns) by the interviewers as well as by the respondents (see chapter 3). Accordingly, we will confine the discussion to those reported as being brought up in villages and cities.

The percentage using an efficient method among women brought up in villages is 34.3, which is 2 per cent lower than among women brought up in cities. Controlling for age and number of living children, the differential is attenuated, while there is a difference of about 4 per cent when all variables in the model are taken into account. The last evidence indicates that other variables (eg education and employment) tend to inflate the effect of childhood residence on the use of efficient methods. However, the difference in the percentage of use of contraception is quite small. Furthermore, we may also note that the contribution of childhood residence to the total variance is very small, that is, about two-tenths of 1 per cent. We may then conclude that the effect of childhood residence is not substantial.

Studies on Indonesian family planning have generally shown that the use of efficient contraceptives is higher in rural areas than in urban areas. Our data, in the second panel of table 9, show that 34 per cent of women currently residing in rural areas are using efficient methods while the percentage for urban women is 30, a difference of 4 per cent. This difference increases to about 6 per cent when controls for demographic variables and childhood residence are included. Controlling for all variables further increases the difference to almost 11 per cent, indicating that other variables tend to suppress the rural-urban differential. Hence our analysis supports the previous findings that women residing in urban areas are experiencing a lower level of use of efficient methods than those residing in rural areas. This differential actually increases when other variables are taken into account. This positive effect of rural residence is partly explained by the fact that the focus of the family planning programme has been the rural areas. The urban women, on the other hand, tend to use inefficient methods of contraception. Note that the contribution of type of place of residence in explaining the variation in the use of efficient method is small, as already seen in table 7.

Language commonly used at home is included in this analysis as a cultural indicator. It seems, however, that language used at home is usually determined by current place of residence rather than cultural background, so that a woman who has moved to a certain area tends to use the local language rather than her mother tongue, in particular if she moved a long time ago or has married a local person. We may note that the term 'others' in the category of province and language means the languages other than the one specified for the corresponding province. For example,

'others' in 'Jakarta others' includes Javanese, Sundanese, Balinese and other languages (ie Sumatranese). 'Others' in 'Central Java Others' and 'East Java Others' includes Indonesian, Sundanese, Balinese and other languages. With this condition, we cannot perfectly make a straightforward language differential, except for West Java.

The only finding deserving emphasis from the data in the third panel of table 9 is the regional differential in the use of efficient method. This is mostly due to the differences in the delivery system of family planning programme services among the provinces.

### 5.3 SOCIO-ECONOMIC VARIABLES

Variables included at this stage of analysis are wife's education, wife's employment, husband's education, and husband's employment. Education is usually expected to change a person's attitudes and as a consequence her behaviour. In the context of family planning, it has been hypothesized and generally observed empirically that higher education increases the likelihood of contraceptive use. Our data in table 10 (column 3 of first panel) clearly support this statement. Among women with no education, 31 per cent are using efficient methods, while the percentage among those with senior high school education is nearly 46. The lower percentage among the women who have higher education than senior high school (academy/college or university) should not be taken seriously, since the sample size for this category is small.

The difference in the unadjusted percentage using contraception between women without education and women with senior high school education is about 14 per cent. This difference increases to 21 per cent when previous variables are controlled. The difference, however, is reduced when all variables are included in the model. These changes in the impact of education on the use of contraception are clearly shown by the changes in the correlation ratios. The reduction of the effect of education on contraceptive use after controlling for variables entered afterwards—especially fertility preferences—is due to the fact that education does affect the other variable. That is to say, part of the effect of education on contraception is indirect through other variables such as fertility preferences. It is worth noting that the contribution of the wife's education in explaining variation in use of contraception is small.

Women who work in the non-traditional sector are expected to be more exposed to modernizing influences and institutions, including the family planning programme. They are also expected to have higher education. Analogous to the argument regarding the effect of education on the use of contraception, we may expect that those who work in the non-traditional sector will be more likely to use contraception than those who work in the traditional sector and those who have never worked. The unadjusted percentages presented in column 3 in the second panel of table 10 correspond to our expectations. Thirty per cent of the exposed women who have never worked are currently using efficient methods compared to 35 and 39 for those who work in traditional and non-traditional sectors, respectively. It is not surprising that the effect of the wife's employment is reduced when previous variables are controlled, because employment itself is probably related to education.

**Table 10** Unadjusted and Adjusted Percentages of Women Currently Using Efficient Methods by Socio-Economic Variables

Wife's characteristics	N	Unadjusted percentages	Percentages adjusted for	
			Previous variables	All variables
(1)	(2)	(3)	(4)	(5)
Overall percentage		33.5		
<i>Wife's education</i>				
No school	2709	31.3	30.0	31.5
Primary school	1844	35.3	36.6	35.8
Junior high school	196	38.6	39.8	34.4
Senior high school	137	45.5	50.7	41.9
Academy and univ.	30	(38.8)	(48.6)	(34.1)
Correlation ratio squared		.004	.008	.002
<i>Wife's employment</i>				
Never worked	1679	29.7	31.7	30.7
Traditional sector	3017	35.3	34.5	35.0
Non-traditional sector	221	38.9	34.4	34.9
Correlation ratio squared		.004	.001	.001
<i>Husband's education</i>				
No school	1305	27.9	27.5	27.5
Primary school	2858	34.5	34.1	34.4
Junior high school	341	37.3	40.7	39.9
Senior high school	307	39.0	39.5	38.2
Academy and univ.	105	49.6	51.6	49.7
Correlation ratio squared		.008	.006	.005
<i>Husband's employment</i>				
Never worked	28	(31.1)	(42.3)	(41.0)
Traditional sector	4114	32.5	32.9	32.8
Non-traditional sector	771	38.9	36.7	37.0
Correlation ratio squared		.004	.001	.001

The effects of husband's education and husband's employment on the use of contraception follow perfectly the pattern of the effects of wife's education and wife's employment. It is noticeable, however, that husband's education contributes more to the explanation of variation in contraceptive use than does wife's education. The effect of husband's education also persists after controlling for

wife's education. This indicates that husband's education is more influential in deciding whether or not to use contraception. We may also infer that the husband's attitude towards contraceptive use has an influence on the couple's decision to use contraception.

#### 5.4 FAMILY AND FERTILITY VARIABLES

In the context of sex preferences and family balance (ie a family with children of both sexes), the first three categories of sex composition of children (no living children, one living child but no sons, and one living child with one son) are of minor interest. The figures in column 3 of the first panel of table 11 show a large jump in the unadjusted level of contraceptive use between women with no sons and women with at least one son. For example, the proportion using contraception among women with two living children but no sons is about 28 per cent compared to about 35 for women with one son, and 40 for women with two sons. A similar increment in the percentage use of contraception with the increase in number of sons is also evident among the women with three living children. These patterns suggest that the probability of use of contraception is related to the number of sons in the family. This holds true with controls for previous variables and all variables, with the largest change in the pattern after adjustment for previous variables occurring for those having two living children. If we assume that those who use contraception are less likely to have more children, the findings indicate a son preference rather than preference for a mixed sex composition, as has been reported in the Principal Report of the Indonesia Fertility Survey quoted earlier.

Women who have married once are more likely to use contraception than those who have been married more than once. The pattern remains true even when other variables are taken into account. This finding is a promising one in terms of the prospects for reduction of future fertility in Indonesia, because those married once only have more children than those married more than once. Unfortunately, the contribution of these variables in explaining the use of efficient methods is insignificant, as indicated by the correlation ratios.

We mentioned earlier that fertility preferences is the third dominant variable in our model in explaining the use of efficient methods. The figures in the third panel of table 11, furthermore, show that the behaviour of the women is consistent, ie those who want more children are less likely to use contraception than those who do not want more children. Furthermore, among those who do not want more children, those whose desired number of children is less than their number of living children are more likely to use contraception than the others. This pattern remains constant when other variables are controlled for, indicating that the nature of the impact of this variable on the use of contraception is not affected by other variables.

**Table 11** Unadjusted and Adjusted Percentages of Women Currently Using Efficient Methods by Family and Fertility Variables

Wife's characteristics	N	Unadjusted percentages	Adjusted percentages for	
			Previous variables	All variables
(1)	(2)	(3)	(4)	(5)
Overall percentage		33.5		
<i>Sex composition of children</i>				
No living children	635	3.1	9.1	7.5
One living—no sons	514	24.0	27.4	27.9
One living—one son	486	24.8	28.8	29.5
Two living—no sons	233	28.1	39.4	39.7
Two living—one son	489	34.7	35.5	34.8
Two living—two sons	194	39.6	39.9	42.2
Three living—no sons	149	33.9	32.4	33.7
Three living—one son	556	42.9	40.6	40.0
Three living—two sons	709	44.1	41.2	41.0
Three living—3+ sons	951	47.2	42.1	42.7
Correlation ratio squared		.009	.009	.011
<i>Times married</i>				
Once	3528	34.9	34.2	34.0
More than once	1389	30.1	31.8	32.2
Correlation ratio squared		.002	.000	.000
<i>Fertility preferences</i>				
Des < liv, wants no more	322	53.1	45.3	45.3
Des > liv, wants no more	1856	46.1	43.1	43.1
Des ≥ liv, wants more	2739	22.8	25.7	25.7
Correlation ratio squared		.017	.019	.019

## 6 Summary and Conclusion

In this study, we have examined in detail the use of contraceptive methods among women in Java and Bali, and the effects of various variables, classified as demographic, background, socio-economic, and family and fertility variables, on the current use of efficient contraceptive methods. The study found that 33.5 per cent of exposed women were using efficient methods in 1976, including the pill, IUD, condom, sterilization and other scientific methods. In relation to the experience of contraceptive use in Indonesia generally, this proportion of current users is relatively high, since the proportion of ever-users of efficient methods is only 41.7 per cent.

The high level of contraceptive use among women in the intermediate age groups found in the study has also been observed in many other countries with relatively young family planning programmes. The pattern for the adjusted proportions for all variables indicates a decline in the proportions using efficient methods as age increases. This is perhaps the reflection of some resistance among the older and more traditional women to an innovation such as family planning.

The association between the number of living children and contraceptive use has been shown to be positive; the more children a woman has, the more likely she is to use contraception. The pattern remains true when age is controlled. The high percentage of contraceptive use among higher parity women indicates that the family planning programme has so far been recruiting high parity women for limitation of family size.

A significant feature of the national family planning programme in Indonesia is its strength in the rural areas. This is supported by our data which show a slightly higher percentage of women currently using efficient methods in the rural areas, whereas in most countries contraceptive use is higher in urban areas. The urban-rural differential, however, is not substantial, which leads to the conclusion that type of place of residence does not have a significantly large effect on the use of contraceptive methods.

Our data are in general agreement with the hypothesis of a positive association between education and the use of efficient contraceptive methods. Women with low education have a lower proportion using efficient methods than those with higher education. Women with education higher than senior high school, however, have a lower proportion, which is probably due to the small sample size. Nevertheless, the contribution of wife's education in explaining the variation in use of contraception is small, and mediated through other variables included in the model. Women who have never worked show lower contraceptive use than those who have work experience.

The effect of husband's education on the use of contraception appears stronger than the effect of wife's education,

though its contribution in explaining the total variance also small. It is interesting to note, however, that the effect of husband's education on the use of efficient methods persists even after controlling for wife's education. We may conclude that the effect of the husband's background on the use of contraception by the couple appears to be quite important.

Unlike other reports on sex preferences in Indonesia, our study indicates a son preference. Use of an efficient method increases with the increasing number of sons in the family. This pattern is observed even after controlling for other variables.

Of the exposed women in Java and Bali, about 90 per cent gave responses on the question on whether future births are wanted which are consistent with a measure derived from a comparison of the number of living children and the stated number of children desired. Palmore and Concepcion (forthcoming) have shown that a combination of the questions is highly associated with the use of contraception. The analysis presented here also suggests that these fertility preference measures affect use of an efficient method even with controls for other variables in the model.

In summary, we find that demographic variables are the most important factors in explaining the use of contraception, followed by background variables (especially province and language), and family and fertility variables (in particular fertility preferences). Socio-economic variables, on the other hand, are found to be less dominant in affecting the use of contraception. It should be remembered, however, that the socio-economic variables do influence other variables (i.e. family and fertility preference variables), so that some of their effects on the use of efficient methods are mediated through variables included after their inclusion in the model. With respect to the strong effects of background variables, in the absence of any further information, we speculate that regional differentials are due to differences in the delivery system of the family planning service as well as the supplies of them. Other factors, such as tradition, norms, infra-structure or other cultural variables may also account for these differences. We hope that the study undertaken by Freedman, Khoo and Supraptillah (1980) will clarify this problem, since they are employing more infra-structural variables related to family planning programme activities.

Finally, considering that the family planning programme in Java-Bali had been operating for only about six years at the time of the survey, the high level of current use of efficient methods, and our finding that use appears to depend mostly on demographic factors and province, the latter being related to programme efforts, are all indicative of the success of the family planning programme.

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# Appendix A List of Variables Employed

Variables	Categories	Variables	Categories
<i>I Demographic variables</i>		<i>IV Family and fertility variables</i>	
1 Current age	—	1 Sex composition of children	No living children One living child without son One living child with one son Two living children without son Two living children with one son Two living children with two sons Three and more children without son Three and more children with one son Three and more children with two sons Three and more children with three and more sons
2 Number of living children		2 Times married	Once More than once
<i>II Background variables</i>		3 Fertility preference	Desired < living children and does not want more children Desired ≥ living children but does not want more children Desired ≥ living children and wants more children
1 Childhood residence	Village Town City		
2 Current residence	Rural Urban		
3 Province and language	Jakarta, Indonesian Jakarta, others West Java, Indonesian West Java, Javanese West Java, Sundanese Central Java, Javanese Central Java, others East Java, Javanese East Java, others Yogyakarta, Javanese Bali, Balinese		
<i>III Socio-economic variables</i>			
1 Wife's education	No school Primary school Junior high school Senior high school Academy and university		
2 Wife's employment	Never worked Traditional sector Non-traditional sector		
3 Husband's education	No school Primary school Junior high school Senior high school Academy and university		
4 Husband's employment	Never worked Traditional sector Non-traditional sector		

# Appendix B Examination of Interactions

**Table B1** Analysis of Variance of Current Use of Efficient Methods: Testing All Possible Two-Way Interactions

Variables	Significance level of F statistic	Sum of squares of interaction as % of sum of squares of		1	2	3	4
		Main effects	Total				
1	2	3	4				
<i>Childhood residence and . . .</i>							
Current age	.878						
Current residence	.165						
Province and language	.683						
Wife's education	.900						
Husband's education	.577						
Number of living children	.249						
Wife's employment	.366						
Husband's employment	.273						
Sex composition of children	.855						
Times married	.129						
Fertility desire measure	.826						
<i>Current age and . . .</i>							
Current residence	.703						
Province and language	.035	19.5	1.3				
Wife's education	.030	19.7	0.6				
Husband's education	.011	20.2	1.0				
Number of living children	.000	23.1	1.1				
Wife's employment	.128						
Husband's employment	.052						
Sex composition of children	.000	20.4	1.6				
Times married	.002	11.6	0.4				
Fertility desire measure	.010	5.8					
<i>Current residence and . . .</i>							
Province and language	.000	10.8	0.5				
Wife's education	.016	26.3	0.2				
Husband's education	.130						
Number of living children	.032	3.7					
Wife's employment	.018	25.4	0.1				
Husband's employment	.020	32.5	0.1				
Sex composition of children	.196						
Times married	.036	20.9	0.0				
Fertility desire measure	.440						
<i>Province and language and . . .</i>							
Wife's education	.545						
Husband's education	.093						
<i>Woman's education and . . .</i>							
Husband's education	.812						
Number of living children	.004					10	
Wife's employment	.511						
Husband's employment	.337						
Sex composition of children	.002					12.8	1.1
Times married	.587						
Fertility desire measure	.417					10	
<i>Husband's education and . . .</i>							
Number of living children	.067						
Wife's employment	.043					16.0	0.3
Husband's employment	.130						
Sex composition of children	.006					11.7	1.0
Times married	.038					16.5	0.2
Fertility desire measure	.753						
<i>Number of living children and . . .</i>							
Wife's employment	.011					8.8	
Husband's employment	.043					5.5	
Sex composition of children	—						
Times married	.002					6.1	
Fertility desire measure	.005					4.6	
<i>Women's employment and . . .</i>							
Husband's employment	.424						
Sex composition of children	.146						
Times married	.424						
Fertility desire measure	.272						
<i>Husband's employment and . . .</i>							
Sex composition of children	.058						
Times married	.312						
Fertility desire measure	.008					3.9	
<i>Sex composition of children and . . .</i>							
Times married	.048						
Fertility desire measure	.026					4.7	
<i>Times married and . . .</i>							
Fertility desire measure	.233						