

SOCIODEMOGRAPHIC DETERMINANTS OF CONTRACEPTIVE METHOD CHOICE IN SRI LANKA: 1975-82

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Summary. The determinants of contraceptive method choice in Sri Lanka are examined during a period in which contraceptive prevalence increased by over 60% and involved substantial use of sterilization and traditional methods. Data are from the 1975 World Fertility and 1982 Contraceptive Prevalence Surveys. Polytomous logistic regression is used to model four current contraceptive choices: non-use, use of a traditional method, use of a modern temporary method and use of sterilization. The analysis shows, in 1975 and 1982, strong socioeconomic as well as demographic effects on whether any method is used. However, in both years the type of method chosen is primarily a function of demographic considerations related to the couple's family-building stage rather than social status, implying that in Sri Lanka there are few socioeconomic barriers limiting access to different contraceptive methods. The family planning programme, however, has emphasized sterilization rather than birth spacing methods.

Introduction

Microlevel models of contraceptive behaviour have largely focused on explaining past or present use of any birth control method and have found that certain types of factors (e.g. female education, place of residence, marital duration, and supply availability) have consistently differentiated users from non-users in many developing countries (Carrasco, 1981; United Nations, 1984). Several recent studies have extended our perspective by examining the determinants of the type of method practised (e.g. Chamrathirong & Stephen, 1986; Choe & Park, 1987; DaVanzo *et al.*, 1986; Jones, 1984). However, a fuller body of evidence remains to be assembled, especially with more detailed country-specific and cross-national research.

The secular rise of contraceptive use in the Third World provides another justification for investigating determinants of contraceptive method choice. The component of the rise involving the use of modern or efficient contraception is substantial (London *et al.*, 1985). Although common structural determinants of overall use are known, they do not necessarily exert the same influence on the type of

method used. The same determinants which differentiate the practising from non-practising individual may not distinguish between users of efficient and less efficient methods. Thus it is important to examine which variables, and with what relative strength, predict whether a couple will use the pill, IUD, sterilization, rhythm or abstinence.

The environment of contraceptive supply and its inherent changeability where public sector and international donor investments are concerned also make the investigation of the determinants of method choice worthwhile. The supply environment in many developing countries is dependent on national level inputs to provide information on and means for fertility regulation. A recent trend of many national supply systems is to move away from a full dependence on clinic-based distribution of contraceptives to more distribution through local, community-based agents. Principal examples of the latter are pharmacies and trained village midwives. This restructuring of the supply environment has at times led to a programmatic emphasis on those methods easily distributable by non-medical staff, such as oral contraceptives. Any added mobilization of organizational resources to provide the IUD and sterilization to isolated areas can also directly influence a country's contraceptive 'method-mix'. The interplay between aggregate-level inputs and the microlevel perceptions of particular methods conditions the actual practice of contraception. In turn, this interplay establishes the prevalence and use-effectiveness of birth control behaviour, both of which have considerable impact on fertility (Bongaarts & Potter, 1983).

As contraceptive innovation increases, information about changes in its structural determinants is substantively important. Does 'modern' birth control behaviour diffuse proportionately through a population at risk such that the pattern of determinants remains stable over time? Or are some structural factors, such as female education or urban-rural residence, better predictors early in the diffusion process, while other factors such as supply access, gain prominence later?

These questions are considered here. The focus is on selected sociodemographic determinants of contraceptive method choice in Sri Lanka and their effects over the period 1975-82. The study thus examines the extent to which an observed change in contraceptive use is concentrated within certain sub-strata of the population, whether prevalence of all types of methods has increased proportionately over time and how patterns of sociodemographic determinants may have changed in the interval. Unfortunately, lack of direct measures of programmatic factors limits what can be said about the influence of the supply environment. However, in Sri Lanka since 1975, there has been a large scale promotion of voluntary sterilization. This delivery effort is described using information from secondary sources (Hollerbach & Nortman, 1986; Sri Lanka Ministry of Plan Implementation, 1985), and its effect observed indirectly through the relative probabilities of sterilization use.

Unlike other studies that simply focus on whether or not contraception is used (Murty & DeVos, 1984), the determinants of the type of method chosen are examined here. This distinction is important conceptually because the decision to use any method at all is different from the decision to use one method rather than another. The type of method chosen depends in large part on the couple's motivation for birth control which in turn reflects their demographic and socioeconomic characteristics.

For example, because it is a permanent method, sterilization requires different motivations for family limitation than do the temporary methods such as the pill or IUD (e.g. stopping versus spacing). There are also differences among method types in their accessibility. Traditional methods such as calendar rhythm and withdrawal can be learned by word of mouth, but there are many more formalities involved in obtaining clinic-based methods. This issue is particularly relevant in Sri Lanka where a rise in traditional contraceptive use has been observed (Sri Lanka Department of Census and Statistics, 1983; Tsui, Kahn & Thapa, 1986, unpublished).

For these reasons, it is expected that significant and differential effects of sociodemographic determinants on the type of contraceptive method currently being used and some change in the pattern of effects over time will be found. The results and their substantive and programmatic implications will be discussed after a brief review of the trends in fertility and contraceptive behaviour in Sri Lanka and the conditions governing the availability of voluntary sterilization.

Background

Sri Lanka was one of the first countries in Asia to experience a sustained post-war fertility decline. As early as the 1950s, the crude birth rate began to fall from its previously high level of 40 per thousand (a total fertility rate [TFR] of about 5.5), to 27.5 (TFR of about 3.5) by 1974 (Alam & Cleland, 1981; Ratnayake, Retherford & Sivasubramaniam, 1984; United Nations, 1986).

The initial fertility decline was mostly because of changes in marriage patterns, namely the rising age at first marriage (Alam & Cleland, 1981; Fernando, 1974, 1980; Wright, 1968). In 1975, 60% of the female population between ages 20 and 24 were still single (Fernando, 1980; Namboordiri *et al.*, 1983). These dramatic changes in nuptiality are often linked to the depressed economy in the 1960s when the main national exports of tea and rubber products suffered declining prices on the international market. It is argued that ensuing high levels of unemployment discouraged Sri Lankans from marrying at younger ages (United Nations, 1986). After the early 1970s, an increasing portion of the fertility decline was attributed to declines in marital fertility (fertility control within marriage), and less to changes in nuptiality. Alam & Cleland (1981) show that declines in marital fertility accounted for 41% of the fertility decline between 1963 and 1971 and 54% during the 1971-75 period. In the subsequent decade (1975-86), control of marital fertility through contraceptive use accounted for more than 80% of the decline in fertility (Thapa, Piccinino & Tsui, 1988, unpublished).

Since the 1950s, Sri Lanka has experienced a number of major social changes that are likely to have influenced the demand for large families. National health programmes brought about large reductions in mortality, especially among infants and children. An expanded educational system made literacy, particularly among women, almost universal by 1980. The availability of work opportunities for women raised the net costs of childbearing (World Bank, 1984). Not surprisingly then, contraceptive use increased substantially as a national programme evolved to meet the demand. The 1975 World Fertility Survey (WFS) conducted in Sri Lanka estimated ever use of contraception among ever-married women to be 43%. The

Contraceptive Prevalence Survey (CPS) 7 years later showed this figure to have increased to 66%. Current contraceptive use among exposed women was measured at 32% in the WFS, rising to 55% among currently married women in the CPS.

In 1975 contraceptive knowledge was nearly universal, with over 90% of ever-married women having heard of at least one modern method, but there were substantial differentials among the population of ever users. For example, use was greatest among women who were well educated, urban or Sinhalese. As the national family planning programme expanded in the 1970s, it is likely that positive attitudes about contraception spread throughout the population, encouraging a broader cross-section of Sri Lankans to use contraception. This finding suggests that some degree of convergence in use may be expected across social and demographic sub-groups over time (e.g. a reduction of rural-urban differences). How this convergence may be revealed with respect to the types of methods chosen can only be speculated.

In Sri Lanka, voluntary sterilization services have been available since the late 1960s. No specific regulations exist concerning the legality of either male or female sterilization in Sri Lanka; however, there are administrative restrictions on eligibility. Eligibility for either male or female procedures requires being legally or consensually married, having the informed consent of the spouse and having at least two children. The maximum age of the client is restricted to 44 years for females and 49 years for males. Sterilizations obtained from health centres, government hospitals, special

Table 1. Sterilization compensation payments and acceptance in Sri Lanka, 1975-85

Date	Acceptor payment (Rs)	Sterilization acceptors		
		Male	Female	Total
1975	0	6,035	33,130	39,165
1976	0	2,924	32,664	35,588
1977	0	1,303	17,653	18,956
1978	0	2,325	19,624	21,949
1979	0	5,640	30,203	35,843
1980				
Jan-Sep	100	10,115	36,061	46,176
Oct-Dec	500	41,169	25,581	66,750
1981				
Jan	500	14,947	8,524	23,471
Feb-Dec	200	15,386	37,776	53,162
1982	300	12,945	46,838	59,783
1983				
Jan-May	300	4,565	21,367	25,932
Jun-Dec	500	42,313	42,239	84,552
1984	500	37,542	63,786	101,328
1985	500	17,443	54,329	71,772

Source: *Annual Report on Family Planning Acceptors in Sri Lanka* (various years). Family Health Bureau, Ministry of Health, Colombo.

sterilization clinics or clinics operated by non-governmental organizations are performed for nominal fees once eligibility requirements are met (Hollerbach & Nortman, 1986; Sri Lanka Ministry of Plan Implementation, 1985).

A compensation scheme to reimburse expenses incurred or income lost in connection with the sterilization for either male or female acceptors was introduced in January 1980. Sterilization fees paid to service providers vary by type of medical staff, and total Rs. 35.50 (about US \$1.70) for a vasectomy and Rs. 65.00 (US \$3.00) for female sterilization. The size of the cash payment to an acceptor has varied since its initiation until 1983, after which the Rs. 500 (US \$23.50) payment has remained constant. Public provision of sterilization and the inception of a payment scheme have substantially influenced the method mix of current contraceptors in the period 1975-82. Table 1 and Fig. 1 show the volume of sterilizations over time in relation to the variation in compensatory payments.

Data, hypotheses and variables

Data for the analysis come from the 1975 WFS and the 1982 CPS, both of which interviewed ever-married women of reproductive age. In the analysis of current contraceptive use, the sample is limited to currently married women between the ages of 15 and 49 at the time of the surveys. Both data sets have been weighted (but scaled to retain the original sample size), to adjust for varying sampling probabilities and non-response among strata.

Although both surveys ask respondents about current use of contraception, the wording of the questions differs. The WFS asks 'Are you or your husband currently using a method to keep you from getting pregnant? If so, what method are you using?' In contrast, the CPS asks 'Are you or your husband using some family planning

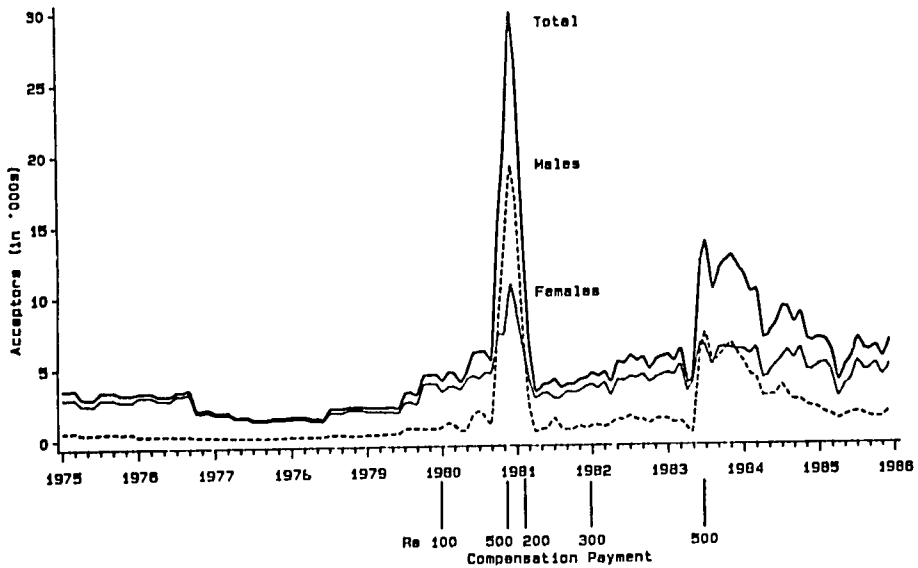


Fig. 1. Sterilization acceptors, Sri Lanka, 1975-85. Source: Table 1.

methods or doing something to avoid a pregnancy? If so, what is that method? Although the differences are subtle, the CPS may result in slightly higher levels of contraceptive prevalence if probing for 'doing something to avoid a pregnancy encourages the reporting of traditional use (especially if respondents do not ordinarily associate rhythm or withdrawal as 'methods' of family planning).

Another difference reflects the time of reference. Whereas the WFS asks only about 'current' use (at the time of the survey), the CPS probes non-users with an additional question about any use in the 'past month'. This could result in higher reported prevalence in the CPS (though a check of the original data located a contribution of only 51 women, or less than 3% of all users). Unfortunately, the effect of question wording on prevalence from these surveys cannot be determined because of the secular increase in contraceptive use during the intervening 7-year period.

In modelling current contraceptive use, four possible outcomes are considered: (1) not currently using, (2) using a traditional method, (3) using a modern temporary method (e.g. pill, IUD, condom) and (4) sterilization (male or female). In both surveys, if more than one method was being used, only one was coded. The term 'choice' is used interchangeably with 'acceptance' of a method. As with many other studies (cf. Bulatao, Palmore & Ward, 1989), the degree to which the acceptance of a method involved an actual choice is not known, only that a method is being used. It is assumed that acceptance of a method involved at least some choice on the user's part.

The timing of the decision becomes an issue when determinants are specified, especially in the case of sterilization. Decisions about sterilization were made at some time in the past (perhaps 5-10 years earlier for some respondents). Clearly, current behaviour cannot be the cause of a past decision and may in fact be a result of it. Modelling the determinants of a decision made at some point in the past limits the variables to those that must be considered fixed prior to the time of the decision.

One strategy for dealing with this problem is to omit the sterilization choice completely (Stephen, Rindfuss & Bean, 1988). However, to do so in the context of Sri Lanka, where such a large proportion of contraceptive users elect sterilization (Table 2), would result in a very unrealistic assessment of contraceptive behaviour. Not only would the remaining sample be biased, but the degree of bias would have increased by the 1982 survey, as the adoption of sterilization grew substantially. Instead, sterilized women are kept in the analysis and the explanatory variables limited to ones that can be justified as being fixed prior to the time when contraceptive decisions are made.

The model includes a series of demographic variables that control for the woman's age and stage of family formation: age at first marriage, years spent in marriage since first marriage and number of living children. The marital duration variable refers to time since the first rather than the current marriage because the CPS did not ask specifically about the latter. This should not, however, be too problematic since Sri Lanka has relatively low levels of marital disruption and rapid rates of remarriage (Smith, 1981).

The demand for different types of contraception is hypothesized to vary throughout the reproductive span. For example, recently married women will be the least likely to opt for sterilization or modern methods like the pill or IUD, since they are probably just starting the family-building process. If anything, they may choose

Table 2. Percentage of currently married women aged 15-49 using contraception, by type of method, Sri Lanka, 1975-82

Method	1975 WFS	1982 CPS	Difference (% points)
All	31.7	53.2	21.5
Modern temporary	8.8	9.4	0.6
Pill	1.5	2.5	1.0
IUD	4.7	2.3	-2.4
Condom	2.3	3.2	0.9
Other modern	0.3	1.4	1.1
Sterilization	9.9	20.8	10.9
Female	9.2	17.2	8.0
Male	0.7	3.6	2.9
Traditional	13.0	23.0	10.0
Rhythm	8.0	12.9	4.9
Withdrawal	1.5	4.4	2.9
Other traditional	3.5	5.7	2.2
None	68.3	46.8	-21.5

All estimates in this and subsequent tables are based on weighted data, tabulated by the authors. Pregnant and infecund women are considered non-users.

traditional methods. Women married for longer periods will be more likely to choose reliable methods, either to space a subsequent birth or to cease childbearing altogether (in which case one would more likely choose sterilization). Women married for over 15 years are the most likely to choose sterilization, though many may also choose no method (either because they are less fecund or because they were less educated and therefore less informed about various contraceptives).

Number of living children is used, rather than the more common children-ever-born measure because it more accurately reflects a woman's current family composition. Family size, in turn, influences her demand for more children and hence the type of contraception she is likely to choose. Women with more children are more likely to choose an efficient method of contraception whereas nulliparous women may choose a less effective method or none at all. It is expected that the closer a woman comes to reaching her desired family size, the more likely she is to choose sterilization. A woman's current parity can be influenced by her prior contraceptive behaviour, especially if she has used an efficient method for a long time. However, it is also possible that she selected the efficient method after having reached her desired family size.

In addition to the demographic variables, a series of socioeconomic characteristics are included. First is ethnicity, coded as a cross-classification between ethnic

group and religion, because both are considered important (Alam & Cleland, 1981): (1) Sinhalese-Buddhist, (2) Sri Lankan Tamil-Hindu, (3) Indian Tamil-Hindu, (4) Moor-Muslim, and (5) Christian-Other. The two Tamil groups are kept separate because those of Indian origin are considerably different from the native Sri Lankan Tamils and are spatially concentrated in the northern region of the country as well as on tea estates. Moreover, the national programme made a special effort to deliver sterilization services to the estate labourers. Urban residence is also controlled with the expectation that urban women have a greater desire to limit family size, as well as more knowledge and access to family planning services than rural women. It is, however, expected that as ideas about family limitation and contraception spread throughout the population, urban-rural differences will decline.

Two other socioeconomic variables included are wife's and husband's education, coded in four categories: (1) none, (2) 1-5 years, (3) 6-9 years, (4) 10 or more years. Although both measure educational attainment, it is suggested that they capture different aspects of the education effect. In Sri Lanka where women's status is lower than men's, it is likely that the husband's education is a better reflection of the family's socioeconomic position. In contrast, the wife's education is more likely to reflect her knowledge of contraception and her ability to use it effectively. With improved schooling opportunities for women during the 1970s and 1980s, differentials across education categories in method choice should lessen over time.

Two interaction terms are also included, measuring the joint effect of parity and marital duration on contraceptive choice. Other interactions were tested for by ethnic group and marital duration and only the parity marital duration interaction was found to be significant.

Analytical technique

Because our dependent variable involves four distinct choices, polytomous logistic regression is used as the estimation technique (Hanushek & Jackson, 1977; Pindyck & Rubinfeld, 1981; Maddala, 1983). As an extension of the dichotomous logistic regression model, the polytomous model allows for the simultaneous estimation of the log-odds of more than two choices.

The results are presented first as coefficients and then as predicted probabilities. The coefficients represent reductions or increases in the log-odds of being in one category relative to another. A separate set of coefficients is simultaneously estimated for each comparison of choices, so the present analysis of four outcomes has six possible comparisons. (See the Appendix for a brief derivation of the effects.) In addition to coefficients, simulations derived by evaluating the regression equation for different combinations of explanatory variables are presented. This procedure provides predicted probabilities of choosing each of the four outcomes on the dependent variable.

Results

The distribution by current contraceptive method (Table 2) shows that between 1975 and 1982, overall use increased substantially, from 31.7% to 53.2%, with the bulk of

Table 3. Mean values and percentage distributions on explanatory variables by method type, Sri Lanka, 1975-82

Variable	Modern temporary		Sterilization		Traditional		Non-use		Total	
	1975	1982	1975	1982	1975	1982	1975	1982	1975	1982
Marital duration (years)										
< 5	0.22	0.28	0.01	0.03	0.14	0.30	0.23	0.34	0.20	0.26
5-14	0.45	0.49	0.44	0.45	0.43	0.41	0.32	0.33	0.36	0.39
15+	0.33	0.23	0.55	0.52	0.43	0.29	0.45	0.33	0.44	0.35
Age at marriage	19.50	20.90	18.60	19.30	20.50	21.10	19.00	20.60	19.20	20.50
No. of living children	3.50	2.80	5.20	4.40	3.60	2.80	3.30	2.70	3.60	3.10
Place of residence										
Urban	0.21	0.31	0.25	0.22	0.22	0.25	0.17	0.23	0.18	0.24
Rural	0.79	0.69	0.75	0.78	0.78	0.75	0.83	0.77	0.82	0.76
Ethnicity										
Sinhalese	0.68	0.73	0.66	0.75	0.70	0.81	0.52	0.64	0.67	0.71
Sri Lankan Tamil	0.06	0.08	0.08	0.05	0.04	0.06	0.12	0.13	0.10	0.09
Indian Tamil	0.04	0.01	0.08	0.08	0.03	0.02	0.10	0.07	0.08	0.05
Moor	0.06	0.09	0.03	0.04	0.03	0.03	0.08	0.09	0.07	0.07
Other	0.07	0.09	0.08	0.08	0.13	0.08	0.07	0.07	0.08	0.08
Wife's education (years)										
None	0.12	0.08	0.17	0.16	0.10	0.09	0.25	0.18	0.21	0.15
1-5	0.35	0.23	0.40	0.40	0.32	0.27	0.40	0.35	0.39	0.33
6-9	0.31	0.42	0.28	0.34	0.33	0.42	0.23	0.32	0.26	0.35
10+	0.22	0.27	0.15	0.10	0.25	0.22	0.11	0.15	0.14	0.17
Husband's education (years)										
None	0.04	0.02	0.06	0.04	0.04	0.03	0.09	0.07	0.07	0.05
1-5	0.36	0.23	0.39	0.42	0.30	0.26	0.44	0.38	0.41	0.35
6-9	0.33	0.40	0.36	0.38	0.41	0.40	0.33	0.33	0.34	0.36
10+	0.27	0.35	0.19	0.16	0.25	0.31	0.15	0.22	0.18	0.24
Unweighted N	521	392	599	858	708	946	4332	1928	6160	4124

the increase due to sterilization and traditional method use. By 1982, sterilization dominated as the overriding method of choice, with a prevalence of 21% and accounting for almost 40% of all contraceptive users. Despite an active family planning programme, there was surprisingly little increase in use of other modern methods during the period, possibly because of the programmatic emphasis on sterilization.

The rise in traditional use does not have such a clear explanation. Some have argued that the 10-point increase is inflated because of under-reporting in the 1975 survey (Caldwell *et al.*, 1986). This under-reporting could be an artifact of the data collection process (e.g. insufficient probing of respondents in 1975). This situation

may also stem from actual changes in the social context of contraception (Tsui *et al.*, 1986, unpublished). In 1975, when contraceptive prevalence was still relatively low, fewer respondents may have considered traditional practices like rhythm and withdrawal to be contraceptive 'methods'. By 1982, since knowledge of the variety of contraceptive methods may have diffused considerably, more respondents may have 'reported' using traditional methods, without substantially increasing their level of traditional 'use'. Given the available data, it is difficult to distinguish between these competing explanations.

How do users of different methods compare with non-users (and each other) in terms of their demographic and socioeconomic characteristics? Table 3 presents means on the explanatory variables for each method-choice group for 1975 and 1982. Overall, the sample has shifted towards more recently married women with lower average parity than in 1975. The increase in recently married women from 20% to 26% is consistent with reported rates of first marriage for the country (Sri Lanka Department of Census and Statistics, 1983). Furthermore, by 1982, women were better educated, such that over half had at least 6 years of schooling, as compared with only about 40% in 1975.

There are several striking differences in the characteristics of users of different methods. First, as one would expect, sterilized women have been married longer and have on average at least one additional living child than non-sterilized women; sterilized women includes those who have been sterilized and wives whose husbands have been sterilized. Second, the percentage urban has actually increased over time among all sub-groups except for the sterilized. This implies that of all methods, only sterilization has maintained its level of prevalence in rural areas, probably as a result of the expanded family planning programme.

As far as educational attainment is concerned, in 1975 users of modern temporary and traditional methods were better educated than the other two groups; but by 1982, the educational distribution had improved for all groups, except the sterilized. Sterilized women were equally as likely not to have completed primary school in 1982 as in 1975, whereas education levels rose for the other two method groups. This may reflect the selective nature of the sterilization campaigns and their monetary incentives, rather than shifting method preferences among couples.

The polytomous logistic regression results for 1975 and 1982 are summarized in Table 4. For each of the six possible comparisons of method choices in both years, a separate set of coefficients is estimated and the full regression results are presented in the Appendix tables. The direction and significance of the regression coefficients are shown in Table 4. Each of the three methods is contrasted with non-use and with each other and the share of the comparison choosing the first choice is shown. For example, of non-users and modern temporary users, 11% used modern temporary methods in 1975 as compared with 17% in 1982.

There is remarkable consistency and stability in the results for 1975 and 1982, suggesting that contraceptive behaviour may have diffused fairly uniformly through the population. Generally, coefficients that were significant in 1975 maintain the same sign and level of significance in 1982. Although this test is not a formal one, it does imply stability over time, especially given that two independent samples have been used.

Table 4. Direction and significance of polytomous logistic regression coefficients for six comparisons of choice of contraceptive methods: 1975 WFS and 1982 CPS

Variable	Modern temporary versus non-use		Sterilization versus non-use		Traditional versus non-use		Modern temporary versus traditional		Sterilization versus traditional		Modern temporary versus sterilization	
	1975	1982	1975	1982	1975	1982	1975	1982	1975	1982	1975	1982
Marital duration												
< 5 years	---	---	---	---	---	---	---	---	---	---	+++	+++
15+ years			+++	+++					+++	+++	---	---
Age at marriage	---	-		-	++		---					
No. of living children	+++	+	+++	+++	++				+++	+++	---	---
Urban resident			+++						+++		---	
Ethnicity												
Tamil-Sri Lanka	---	---	---	---	---	---			+			++
Tamil-Indian	--	--			---	---			+++	+++	--	--
Muslim	--		---	---	---			+++			++	
Christian, other	--		--				--		--			
Wife's education												
None	---		---	---	---	---						
6-9 years	++	+++	++	+	+++	+++						
10+ years	+++	+++	+++		+++	++		+				+++
Husband's education												
None				--								
6-9 years		+++		+	+++	+++	-					
10+ years	+++	++	+++		++	++				-		+
Interactions												
No. of children and												
Marital duration <5	+++	+++	+++	+++	+++	+++		++	++	++	--	--
Marital duration 15+			---	---	---	---			---	---	+++	+++
Ratio	0.107	0.169	0.121	0.308	0.140	0.329	0.424	0.293	0.458	0.476	0.465	0.314

Positive relationships significant at: + 5%; ++ 1%; +++ 0.1% level.
 Negative relationships similarly indicated by minus signs.
 Blank: non-significant.

Demographic and socioeconomic variables are important in distinguishing contraceptors from non-users (Table 4). The effects of the demographic measures are in the expected directions: (1) negative effects of short marriage durations on the choice of all methods; (2) positive effects of long durations on the choice of sterilization; and (3) positive effects of the number of living children on the choice of all methods. Similarly, the effects of the socioeconomic measures are also in the predicted directions. Minority ethnic groups are consistently less likely to use contraception than the majority Sinhalese (the omitted category), though by 1982, the differences disappear for Muslims and Christians plus others. Better educated respondents (in terms of both spouses' education) are more likely to use contraception. Surprisingly, urban residents are no more likely to be using a method than rural residents in either year, except for sterilization, which, in 1975, was probably more available in urban areas.

The choice among methods of contraception is more influenced by demographic than socioeconomic variables, as indicated by the absence of significant socioeconomic effects (Table 4). This implies that the choice among methods primarily reflects a couple's stage in the family life cycle, rather than its social position. The choice between sterilization and the other two types of methods demonstrates this point. Newly married women with few children are less likely than women married for 5–15 years with many children to choose sterilization over a traditional method, and more likely to choose a modern temporary method over sterilization. The mirror image effects in panels 5 and 6 in Table 4 imply that the contrast between sterilization and each of the other methods is almost the same: the order of the comparison is simply reversed. When compared with sterilized women, there is very little difference between modern temporary users and traditional users. And in fact, the lack of any significant effects in the comparison of these two method choices (panel 4) indicates that their determinants are not very different. Thus in Sri Lanka, there does not seem to be a qualitative difference between users of modern and traditional methods.

The presence of significant parity-marital duration interactions indicates that the effect of parity on a couple's decision to use contraception is dependent on marital duration. Table 5 presents the effects of parity on method choice, conditional on marital duration (calculated as the first derivatives of the regression equations in the Appendix tables, evaluated for the different marital duration categories). At shorter durations (less than 5 years), couples with more children are considerably more likely to use any method (and to choose more efficient ones) than women with fewer children. At longer durations, a couple's parity has less influence on method choice, presumably because desired family-size goals have already been achieved.

Another way to interpret the regression results is by examining predicted probabilities of method choice from the regression equations (Table 6). These equations are calculated by evaluating the regression equation for different values of selected variables, holding all other variables constant at their means. Comparing probabilities from 1975 and 1982 shows how the use of different methods has increased or decreased over time for different strata of the population. Clearly contraceptive use has increased for all population sub-groups (Table 6). One need only look at the systematic decline in non-use (Table 6). Overall, non-use declined by 24 percentage points from 77% to 53%. Even larger declines were experienced by

Table 5. Effect of number of living children on method choice conditional on marriage duration*

Marriage duration (years)	Modern temporary versus non-use	Sterilization versus non-use	Traditional versus non-use	Modern temporary versus traditional	Sterilization versus traditional	Modern temporary versus sterilization
1975						
<5	1.003	3.034	0.972	0.225	2.062	-1.839
5-14	0.193	0.754	0.156	0.038	0.598	-0.561
15+	0.063	0.228	0.053	0.011	0.175	-0.164
1982						
<5	1.246	2.048	0.793	0.453	1.255	-0.803
5-14	0.150	0.622	0.158	-0.008	0.464	-0.472
15+	0.002	0.120	0.015	-0.013	0.105	-0.118

* Calculated as the partial derivative of the regression equations presented in the Appendix.

The regression model can be expressed as

$$\text{METHOD} = \alpha + \beta_1(\text{DUR} < 5) + \beta_2(\text{DUR} 15+) + \beta_3(\text{CEB}) + \beta_4(\text{DUR} < 5) * (\text{CEB}) + \beta_5(\text{DUR} 15+) * (\text{CEB}) + \dots \text{all other variables in the model}$$

where CEB = the number of living children, DUR < 5 = 1 if marital duration is less than 5 years and zero otherwise, and DUR 15+ = 1 if marital duration is 15 or more years and zero otherwise. The effect of CEB can be expressed as the partial derivative of the above equation

$$\frac{\partial \text{METHOD}}{\partial \text{CEB}} = \beta_3 + \beta_4(\text{DUR} < 5) + \beta_5(\text{DUR} 15+)$$

This partial derivative is evaluated for each category of marital duration in Table 5.

couples married for long durations. Among ethnic groups, the Sinhalese experienced larger declines in non-use than the other larger minorities.

Trends over time in method choice vary by type of method and individual characteristics. The present model implies that there was very little change in the use of modern temporary methods for any group—only a 1% increase on average and slightly larger increases for Muslims (5%), Sri Lankan Tamils and Christians plus others (3%). Modern temporary use actually declined for recently married couples with several children. The use of sterilization increased for most groups except, not surprisingly, recently married nulliparous couples. There were especially large increases for couples married for long durations (16–19%, depending on the number of living children), and Indian Tamils (17%). It is striking that sterilization, a method requiring programme effort, became so accepted within all sub-groups in the population in which, by 1982, differentials by social status (e.g. place of residence and education) virtually disappear. Whereas in 1975, rural residents were half as likely as urban residents to choose sterilization (3% versus 6%), by 1982 they were 85% as likely (12% versus 14%). Similarly, in 1975 the best educated women were three times as likely to choose sterilization as women with no education (6% versus 2%), whereas

Table 6. Predicted probabilities of current method choice, Sri Lanka, 1975 and 1982*

Variable	Modern temporary		Sterilization		Traditional		Non-use	
	1975	1982	1975	1982	1975	1982	1975	1982
Age at marriage								
18	0.09	0.10	0.04	0.13	0.11	0.25	0.77	0.52
24	0.07	0.09	0.04	0.12	0.13	0.25	0.77	0.54
Marital duration <5 years								
No. of living children								
0	0.02	0.03	0.00	0.002	0.02	0.14	0.96	0.83
3	0.31	0.27	0.14	0.19	0.16	0.35	0.39	0.18
Marital duration 15+ years								
No. of living children								
0	0.06	0.07	0.04	0.20	0.11	0.22	0.79	0.51
3	0.06	0.07	0.08	0.26	0.13	0.21	0.77	0.46
6	0.07	0.06	0.14	0.33	0.13	0.19	0.66	0.44
Place of residence								
Urban	0.09	0.11	0.06	0.14	0.12	0.25	0.74	0.51
Rural	0.08	0.09	0.03	0.12	0.11	0.25	0.78	0.54
Ethnicity								
Sinhalese	0.11	0.10	0.05	0.14	0.14	0.29	0.70	0.47
Sri Lanka-Tamil	0.04	0.07	0.03	0.06	0.05	0.16	0.88	0.71
Indian-Tamil	0.07	0.04	0.07	0.24	0.08	0.12	0.79	0.60
Moor	0.07	0.12	0.01	0.06	0.07	0.13	0.84	0.69
Other	0.07	0.10	0.03	0.13	0.17	0.27	0.73	0.51
Wife's education (years)								
None	0.05	0.07	0.02	0.10	0.06	0.19	0.87	0.64
1-5	0.08	0.07	0.04	0.13	0.10	0.23	0.79	0.57
6-9	0.10	0.11	0.05	0.14	0.15	0.28	0.71	0.47
10+	0.12	0.14	0.06	0.12	0.20	0.29	0.61	0.46
Husband's education (years)								
None	0.05	0.05	0.03	0.09	0.08	0.21	0.83	0.65
1-5	0.08	0.08	0.03	0.13	0.10	0.22	0.79	0.58
6-9	0.08	0.11	0.04	0.14	0.13	0.27	0.76	0.49
10+	0.12	0.11	0.05	0.12	0.12	0.29	0.71	0.49
Total predicted	0.08	0.09	0.04	0.13	0.11	0.25	0.77	0.53
Observed	0.09	0.09	0.10	0.21	0.13	0.23	0.68	0.47

* Calculated by evaluating the regression equation for each value of the variable of interest (e.g. urban, rural), holding all other variables in the model constant at their means. Predicted log-odds are then transformed back into probabilities.

in 1982, they were only a fifth more likely (12% versus 10%). The narrowing of the differentials probably reflects the incentive programme whose cash payments would have encouraged more lower status couples to accept sterilization.

Traditional method use also increased among most categories of couples, especially those married for shorter durations. This may reflect the recent rise in marriage due to women who had postponed marriage until their mid to late 20s. Because these newly married women were older than the newly-weds in 1975, they may have been more inclined to start their families sooner and therefore only use traditional methods to control the timing of childbearing (Tsui *et al.*, 1986, unpublished). A larger increase is noted in traditional use among Sinhalese couples than any other ethnic group and a much smaller increase among Muslims and high-parity couples married for longer periods.

Despite these changes in the differentials in method choice, the results suggest considerable stability in the overall structure of effects. Although some differentials across sub-groups have narrowed, the effects of most variables maintain the same sign and level of significance in 1975 and 1982. Furthermore, simple t-tests comparing coefficients from the two surveys reveal very few significant differences. The significant differences reflect the convergence between urban and rural residents in terms of sterilization, the increase in traditional use among couples married less than 5 years, and the convergence across education categories in the use of sterilization and traditional methods.

Conclusions

This paper focuses on the determinants of contraceptive method choice in Sri Lanka between 1975 and 1982, a period when prevalence rose by 60%. The impressive rise in contraceptive use within 7 years is significant evidence of change in reproductive behaviour. But, unlike the experiences of other countries where most of the increase in prevalence has been because of the adoption of modern methods, the rise in Sri Lanka grew out of a combination of sterilization and traditional methods. There was virtually no increase in the use of modern temporary methods such as the pill or IUD.

Results from the polytomous logit analysis showed that the type of method chosen in 1975 and 1982 was more a function of demographic considerations, such as the couple's stage of family building, and of ethnicity. Method choice was less influenced by the couple's social status, which implies that in Sri Lanka few socioeconomic barriers limit access to different contraceptive methods. There were in both 1975 and 1982, however, very strong socioeconomic effects in addition to the family life cycle effects on whether any method was used. Thus, social status was more important in distinguishing users from non-users than sterilized women from traditional or modern temporary users.

The findings that the determinants of method choice have remained relatively stable point indirectly to the importance of contraceptive availability in determining which methods are chosen. It seems likely that the dramatic increase in contraceptive sterilization is because of emphasis in the family planning programme on providing such services. Similarly, the consistently lower level of modern temporary method use probably reflects its low priority within the programme.

There is a striking similarity in the characteristics of users of traditional and

modern temporary methods. That is, pill, IUD or condom users are not necessarily more 'modern' (or 'progressive') in characteristics than users of withdrawal or rhythm. Without information about multiple method use, however, it is not known whether these couples are similar because they often switch back and forth among methods. Nor do we know whether the modern temporary users are any more successful at preventing conceptions than the traditional users (Laing, 1985). Possibly in Sri Lanka, where simultaneous use of more than one traditional method may occur, such users are practising contraception as effectively as those who use the pill, IUD or condom. Efficacy of traditional use in this country is clearly worthy of future investigation.

Demand for family limitation services in Sri Lanka over this period appears to have been greatly accommodated through public and private sponsorship of birth control services. The recently married couples in the later sample and their disproportionate use of traditional methods suggests that the national programme has been less effective in addressing their contraceptive demand for birth-spacing methods. While it is possible that methods such as the pill and IUD are not held in high regard by Sri Lankan couples, it may also be that a more widespread promotion of modern temporary methods would expedite their use. However, if Sri Lankan couples are satisfied with traditional methods, they still may not choose modern programme methods, even if they were available.

Another decision facing policy makers will be the perpetuation of the compensatory payment scheme for sterilization. The extent to which the programme continues to emphasize sterilization and sustains its appeal with financial compensation will strongly influence the future composition of method use in the country. Clearly, contraception is an established part of reproductive behaviour in Sri Lanka. The public management of family planning, however, is now challenged to meet the contraceptive demand for spacing as well as limiting births.

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Appendix

Derivation of the polytomous logit model

Let X denote the vector of covariates and b_t , b_m and b_s the coefficients for traditional methods, modern methods and sterilization, respectively. Assuming an underlying logistic distribution, the probability of not using a method can be written as

$$P(\text{no use} | X) = (1 + e^{x'b_t} + e^{x'b_m} + e^{x'b_s})^{-1}$$

and the probability of using modern methods as

$$P(\text{modern} | X) = e^{x'b_m} (1 + e^{x'b_t} + e^{x'b_m} + e^{x'b_s})^{-1}$$

Therefore, the odds of using modern methods rather than no method are

$$P(\text{modern} | X) / P(\text{no use} | X) = e^{x'b_m}$$

The values of b_m , the coefficients in the first column panel in the Appendix tables, represent shifts in the odds of using modern versus no methods attributable to each explanatory variable. The values of b_t and b_s can be derived in the same way (second and third column panels). These three columns comprise the 'full' set of coefficients estimated. The remaining columns can be derived as the differences among these initial three coefficients. Although they can be calculated by simple subtraction, they are presented because they provide tests of equality between the initial coefficients.

For example, the odds of using modern rather than traditional methods are

$$P(\text{modern} | X) / P(\text{trad} | X) = e^{x'(b_m - b_t)}$$

The difference $b_m - b_t$ is shown in the fourth panel of the Appendix tables. The fifth and sixth panels simply reflect the differences between the other methods.

Table A. Parameter estimates for polytomous logistic model with current method use outcomes, 1975 Sri Lanka Fertility Survey

Variable	Modern temporary versus non-use	Sterilization versus non-use	Traditional versus non-use	Modern temporary versus traditional	Sterilization versus traditional	Modern temporary versus sterilization
Constant	-1.534***	-4.306***	-2.645***	1.111**	-1.661***	2.772***
Marital duration (years)						
<5	-1.402***	-5.848***	-1.660***	0.258	-4.187**	4.445***
5-14†						
15+	-0.241	1.392***	0.260	-0.501	1.133***	-1.634***
Age at marriage	-0.039***	-0.007	0.025**	-0.064***	-0.033*	-0.032
No. of living children	0.193***	0.754***	0.156***	0.038	0.598***	-0.561***
Place of residence						
Urban	0.138	0.635***	0.111	0.026	0.524***	-0.497***
Rural						
Ethnicity						
Sinhalese†						
Tamil-Sri Lankan	-1.172***	-0.788***	-1.315***	0.143	0.527*	-0.385
Tamil-Indian	-0.599**	0.233	-0.705***	0.106	0.938***	-0.832**
Muslim	-0.540**	-1.437***	-0.861***	0.321	-0.576	0.898**
Christian/other	-0.472**	-0.485**	0.124	-0.596**	-0.609**	0.013
Wife's education (years)						
0	-0.575***	-0.529***	-0.610***	0.035	0.081	-0.046
1-5						
6-9	0.352**	0.374**	0.508***	-0.156	-0.135	-0.021
10+	0.711***	0.853***	0.972***	0.261	-0.119	-0.141
Husband's education (years)						
0	-0.430	-0.138	-0.232	-0.199	0.094	-0.293
1-5†						
6-9	0.027	0.186	0.310***	-0.283*	-0.124	-0.158
10+	0.542***	0.547***	0.333**	0.209	0.214	-0.005
Interactions						
No. of children and						
Marital duration <5	1.003***	2.28***	0.816**	0.187	1.464**	-1.278**
Marital duration 5+	-0.130*	-0.526***	-0.103	-0.027	-0.423***	0.397***

Weighted regression with currently married women 15-49 years.

† Omitted category.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table B. Parameter estimates for polytomous logistic model with current method use outcomes, 1982 Sri Lanka Contraceptive Prevalence Survey

Variable	Modern temporary versus non-use	Sterilization versus non-use	Traditional versus non-use	Modern temporary versus traditional	Sterilization versus traditional	Modern temporary versus sterilization
Constant	-1.576***	-1.819***	-1.017***	-0.559	-0.802*	0.243
Marital duration (years)						
<5	-1.642***	-3.761***	-0.794***	-0.848**	-2.967***	2.119***
5-14†						
15+	-0.200	1.423***	0.142	-0.342	1.281***	-1.622***
Age at marriage	-0.032*	-0.026*	-0.005	-0.026	-0.021	-0.005
No. of living children	0.150*	0.622***	0.158**	-0.008	0.464***	-0.472***
Place of residence						
Urban	0.234	0.176	0.045	0.189	0.131	0.058
Rural†						
Ethnicity						
Sinhalese†						
Tamil-Sri Lankan	-0.665***	-1.287***	-0.998***	0.334	-0.288	0.622**
Tamil-Indian	-1.244***	0.343	-1.153***	-0.091	1.496***	-1.587***
Muslim	-0.152	-1.134***	-1.233***	1.080***	0.099	0.982***
Christian/other	-0.068	-0.126	-0.171	0.103	0.044	0.058
Wife's education (years)						
0	-0.185	-0.363**	-0.317*	0.131	-0.047	0.178
1-5†						
6-9	0.555***	0.257*	0.381***	0.174	-0.123	0.297
10+	0.898***	0.129	0.433**	0.465*	-0.304	0.769***
Husband's education (years)						
0	-0.533	-0.493*	-0.169	-0.364	-0.324	-0.039
1-5†						
6-9	0.476***	0.235*	0.370***	0.106	-0.135	0.241
10+	0.492**	0.077	0.438***	0.054	-0.361*	0.415*
Interactions						
No. of children and						
Marital duration <5	1.096***	1.426***	0.635***	0.461**	0.791***	-0.331
Marital duration 5+	-0.148	-0.502***	-0.143*	-0.005	-0.359***	0.354***

Weighted regression with currently married women 15-49 years.

† Omitted category.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.