Religion and the Economics of Fertility in South India

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PREFACE

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration.

The length of this dissertation does not exceed 80,000 words, as approved by the Degree Committee, Faculty of Economics and Politics, University of Cambridge.

RELIGION AND THE ECONOMICS OF FERTILITY IN SOUTH INDIA

ABSTRACT

This thesis provides an account of the interplay between the economic, demographic and religious factors which influence women's age at first marriage, their adoption of contraception and their fertility, in a group of rural communities in southern India. In so doing, it also assesses possible implications for state-level population policies in India, which may need to take into account differences in nuptiality, contraceptive adoption and fertility across religious groups.

Religion is conceptualised as affecting demography in two ways: first, through its philosophical content or 'particularised theology', and second, in terms of 'characteristics' or socio-economic differences between members of different religious groups. The focus of this study is Hindu-Muslim demographics in south India. Hence, the 'particularised theology' component is dealt with by undertaking, in Chapter 1, a detailed comparison of the philosophical content of Islam and Hinduism on marriage, birth control, the position of women, and the importance of children within the family. The main finding is that with the exception of provisions on birth control, there is little difference between Hinduism and Islam in their theological positions on demographic issues. The 'characteristics' component is dealt with by including socio-economic variables in the econometric models. The aim is to investigate whether there are any differences across religions in the age at marriage, fertility and the decision to use contraception, after controlling for various economic, social and biological factors.

I spent 1995-96 conducting micro-level fieldwork and collecting primary data in a cluster of communities in the south Indian state of Karnataka. The communities were Ramanagaram town and five villages in the taluk of Ramanagaram in southern Karnataka. The core of my fieldwork consisted of detailed interviews of a sample of 201 rural Hindu, Muslim and Christian women. The interviews involved 93 questions administered from a carefully designed questionnaire. Descriptions of Ramanagaram, the questionnaire and the dataset are presented in Chapters 2 and 3.

Chapter 4 analyses the determinants of the age at first marriage using OLS methods and economic, biological and socio-cultural explanatory variables. These include both demand-side and supply-side factors: income, education of the women and their husbands, their occupations, the year of marriage (as a measure of 'ideational change'), marital consanguinity, the age at menarche, religion, and caste status (for the Hindus only). The results of the analysis show that there was no statistically significant difference between Hindus and Muslims in the religious and socio-economic factors which affected their age at first marriage.

In Chapter 5, a logit model with interaction variables is used to explore the influence on contraceptive adoption of a variety of variables: women's and husband's education, their occupations, family expenditure, ownership of a television (to measure 'diffusion'), the influence of female extended family members, the ease of access to a contraceptive method, religion, and caste membership (for Hindus only). The analysis concludes that there was no statistically significant difference between Hindus and Muslims in the effect of different socio-economic factors on the decision to use contraception.

In Chapter 6, the analysis of fertility using OLS methods and interaction variables explores the effect on children ever born of nonproximate influences such as education, expenditure, occupation, consanguinity, woman's age, son-preference and access to water and fuel infrastructure. The analysis shows that while religion did not exert a pure theological effect on fertility, there were statistically significant differences in the effects of different socio-economic factors such as access to education and fuel infrastructure, on the number of children ever born between Hindus, Muslims and Christians. The most important implication of this analysis is that the socio-economic factors which affect fertility decisions in south India may not necessarily be uniform across religious groups, and that the socio-economic 'characteristics' of different religious groups may need to be targeted differently by policy-makers in order to influence demographic decision-making in south India.

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In Bangalore, I thank Sucharita and S. Ranganathan, for their 'home away from home' at the Indian Institute of Science, and many other kindnesses. Professor M. N. Srinivas first suggested that I go to Ramanagaram, and looked over my questionnaire. I also acknowledge the help of Anand Inbanathan and N. Sudhamani at ISEC, Bangalore; Padma Krishna Rao of the Ministry of Finance, Government of Karnataka; and D. N. Rao of IISC, Bangalore.

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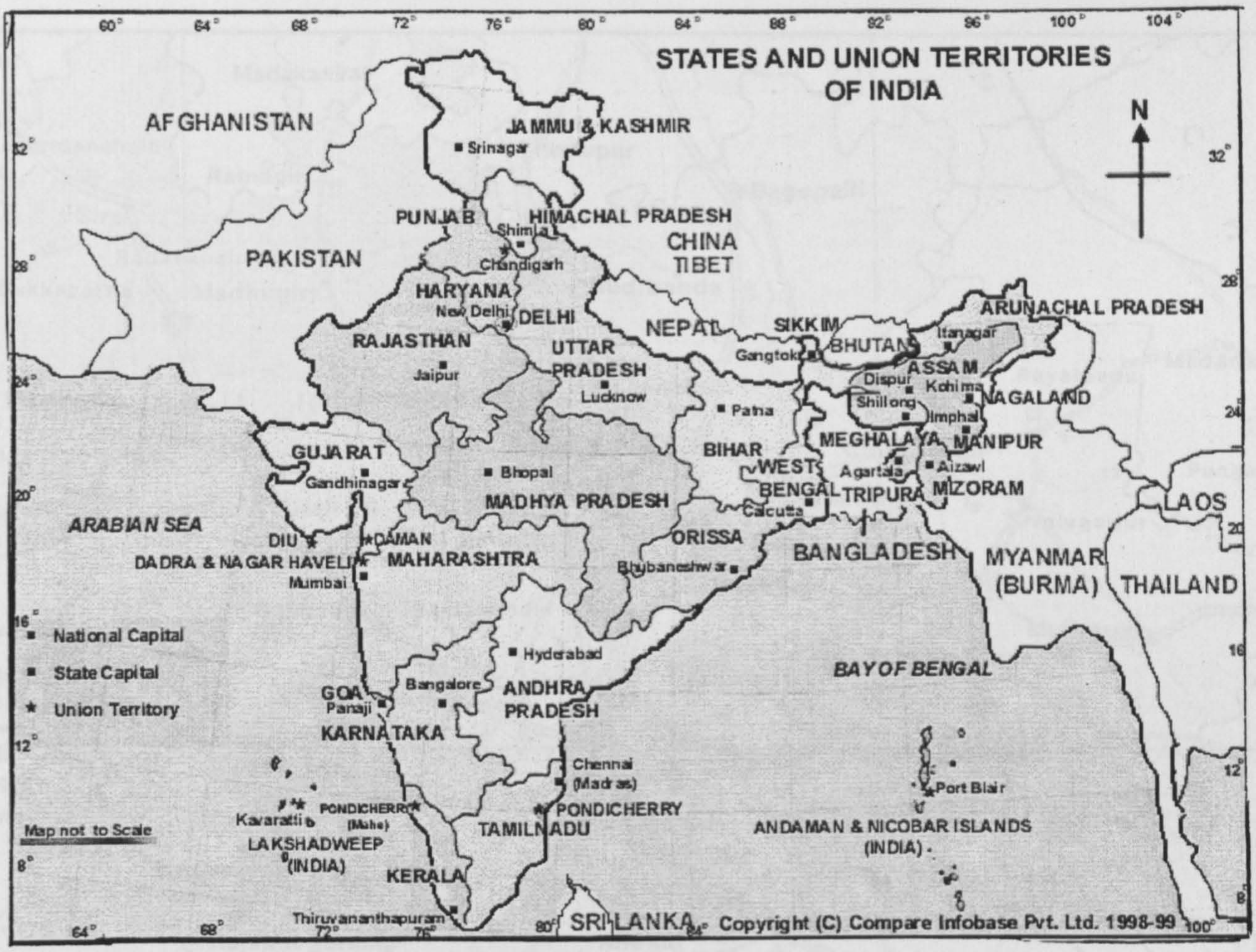
GLOSSARY OF FOREIGN WORDS

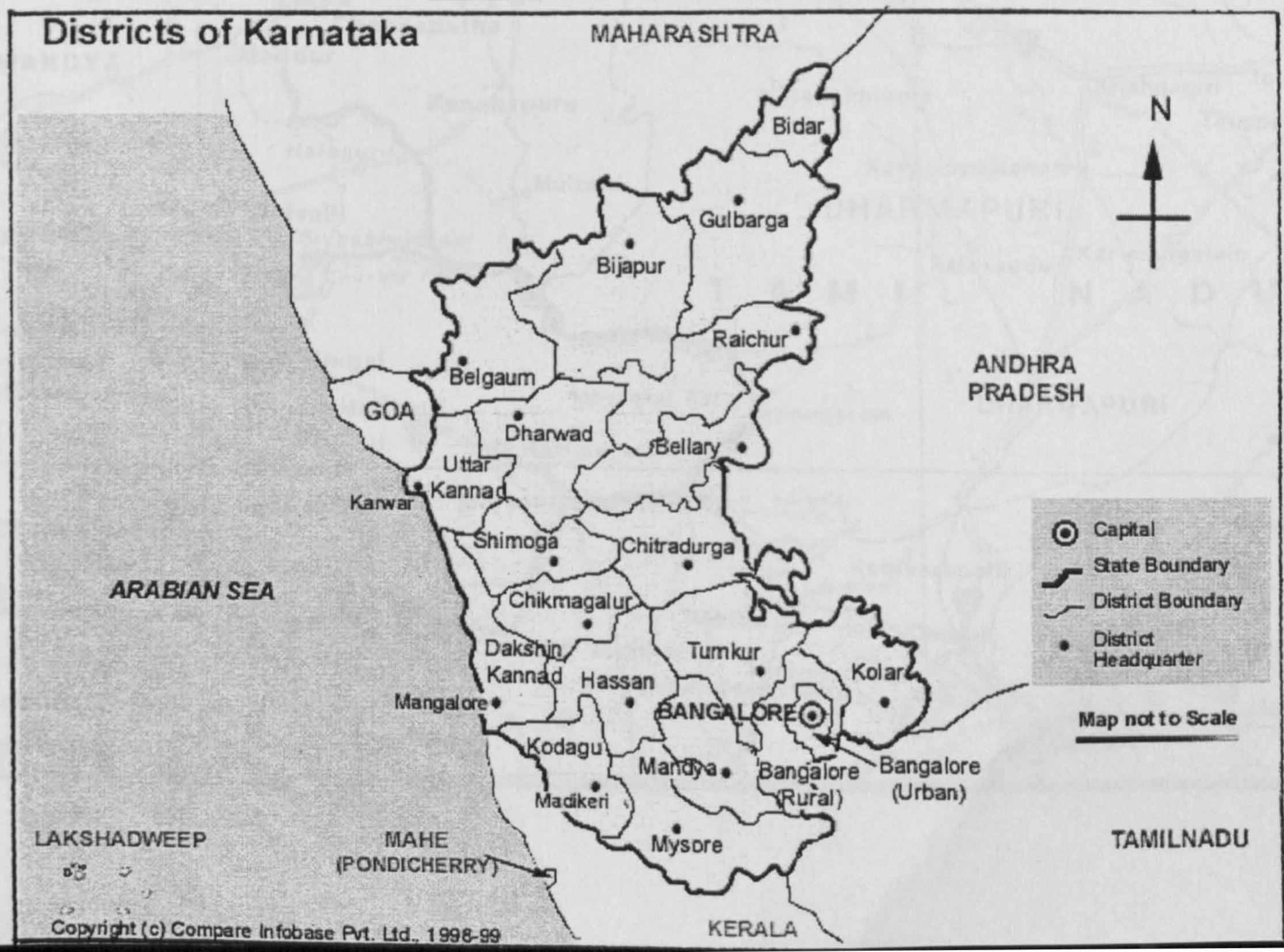
Advaita Vedanta	Hindu philosophical text (Sanskrit)
aangan	Central courtyard of a home (Hindi)
ardhanarisvara	Another name for the Hindu god Shiva, depicted in this form as half-man and half-woman (Sanskrit)
artha	Interest (Sanskrit)
Arthasastra	Hindu text which sets out the laws of government (Sanskrit)
aarti	Hindu act of worship which involves lighting an oil lamp or camphor flame (Sanskrit)
aase	Love (Kannada)
aasrama	Four stages of life in Hindu philosophy (Sanskrit)
aasti	Bequest, usually of landed property (Kannada)
aatman	Infinite real self (Sanskrit)
auto	Colloquial term for auto-rickshaw (Kannada)
beedi	Hand-rolled cigarette (Hindi and Tamil)
Bhagavad Gita	Hindu holy book (Sanskrit)
bhakti	Belief or faith (Sanskrit)
bindge	Pot of water, approximately equal to half a bucket (Kannada)
bindi	Red circular mark worn on forehead by Hindu women (Hindi)
brahmachari	Student or celibate (Sanskrit)
brahmin	Man of learning (Sanskrit)
chandrika	Circular trays with concentric partitions in which silkworms are reared (Kannada)
coolie	Bricklaying or construction work (Kannada)
dargha	Burial sites of saints or seers (Urdu)
dharma	Ethical living or the 'path of righteousness' (Sanskrit)
Dharma sastra	Hindu philosophical text (Sanskrit)
fatwa	Religious injunctions (Arabic)
fiqh	Jurisprudence (Arabic)
gadi	Vehicle or cart (Kannada and Hindi)
grihastha	Householder (Sanskrit)
grihasthaasrama	Stage of the householder in the fourfold division of life in Hindu philosophy (Sanskrit)
guna	Finite or empirical body (Sanskrit)
hobli	Sub-division of a taluk, consisting of 20-30 villages (Kannada)
hottu	Sawdust and coconut husks used for fuel (Kannada)
idda	Period of waiting before divorce under Islamic law (Arabic)
ijtihad	Interpretations of the Koran, which provide rules for novel situations (Arabic)
jumka	Long gold earrings, usually worn by brides (Hindi and Kannada)
kama	Desire and enjoyment (Sanskrit)
karma	Actions in present and past births (Sanskrit)
keerti	Prestige (Sanskrit)
kohl	Black cream used for eye make-up (Hindi)
Koran (or Quran)	Holy book of Islam (Arabic)
kshatriya	Man of power (Sanskrit)
lokasamgraha	To discover the world's potential for virtue and to derive happiness therefrom (Sanskrit)
madrasa	School for religious teaching (Urdu)
Mahabharata	Hindu epic poem about the 'great war' between two sets of cousins, the Pandavas and the Kauravas of Hastinapura (Sanskrit)
mahr	Dower paid to the bride under the Islamic marriage contract (Arabic)
mana	Unit of measurement for firewood (Kannada)
mandi	Market or group of stalls/shops (Hindi and Kannada)
maulana	Man learned in religious scriptures (Arabic and Urdu)
moksha	Salvation or spiritual freedom (Sanskrit)
mufti	Jurist (Arabic)

mullah	Man learned in religious scriptures (Arabic and Urdu)
nallah	Small drain for flowing water (Hindi)
Nitimanjari	Hindu philosophical text (Sanskrit)
panchayati-raj	Local self-government institutions (Hindi)
puja	Hindu ritual for religious worship (Sanskrit)
pundit	Hindu learned man (Sanskrit)
purdah	Seclusion and observing the veil in public (Arabic and Urdu)
purusartha	Fourfold objects of life in Hindu philosophy (Sanskrit)
qadi	Judge (Arabic)
ragi	Green finger millet, a coarse grain grown in southern Karnataka (Kannada)
Ramayana	Hindu epic poem about the life of the Hindu king Rama of Ayodhya, believed to be a reincarnation of the Hindu god Vishnu (Sanskrit)
Rg Veda (or Rig Veda)	The first and oldest of the four Vedas or Hindu holy books (Sanskrit)
rishi	Sage or learned man (Sanskrit)
sadaq	Dower paid to the bride's guardian under the Islamic marriage contract (Arabic)
sahadharmini	Concept in Indian philosophy which views the woman's earthly role as mainly to be a helpmate to her husband in his pursuit of the 'path of truth and righteousness' (Sanskrit)
saññyasin	Free suprasocial man (Sanskrit)
Sharia	Islamic law (Arabic)
shilanya	Foundation-laying ceremony (Sanskrit)
sloka	Couplet or verse (Sanskrit)
sraddha	Hindu rituals performed to honour deceased ancestors (Sanskrit)
sudra	Man of service (Sanskrit)
Sunna	Prophet Muhammad's interpretations of the Koran and its application to various situations (Arabic)
talaq	Divorce (Arabic)
talaq-al-bida	The 'divorce of innovation' under the Islamic marriage contract (Arabic)
taluk	Revenue sub-division, consisting of 100-300 villages (Kannada and Hindi)
tapahpradhanya	Self-control or self-denial (Sanskrit)
ulema	Learned men (Arabic and Urdu)
Upanishads	Hindu religious scriptures (Sanskrit)
vaisya	Man of skilled productivity (Sanskrit)
vanaprastha	Forest recluse (Sanskrit)
vargeeti	A woman's husband's brother's wife or 'co-sister'(Kannada)
varna	Fourfold organisation of society in Hindu philosophy (Sanskrit)
Vedas	Hindu religious scriptures (Sanskrit)
vidya	Learning (Sanskrit)
vriddhashram	Old-age home (Kannada and Hindi)
yajñapradhanya	Worldly pursuits (Sanskrit)

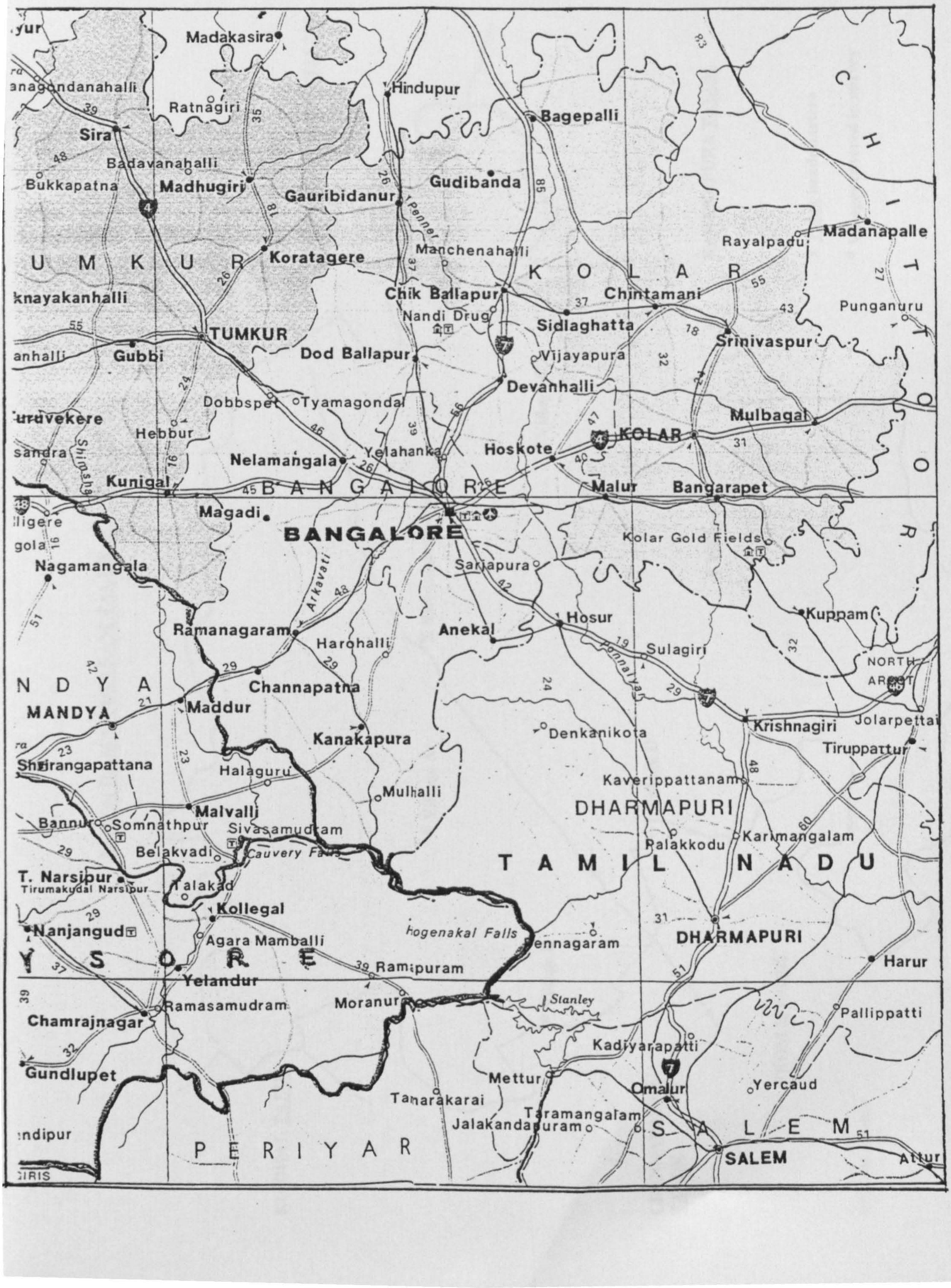
MAP 1: STATES AND UNION TERRITORIES OF INDIA



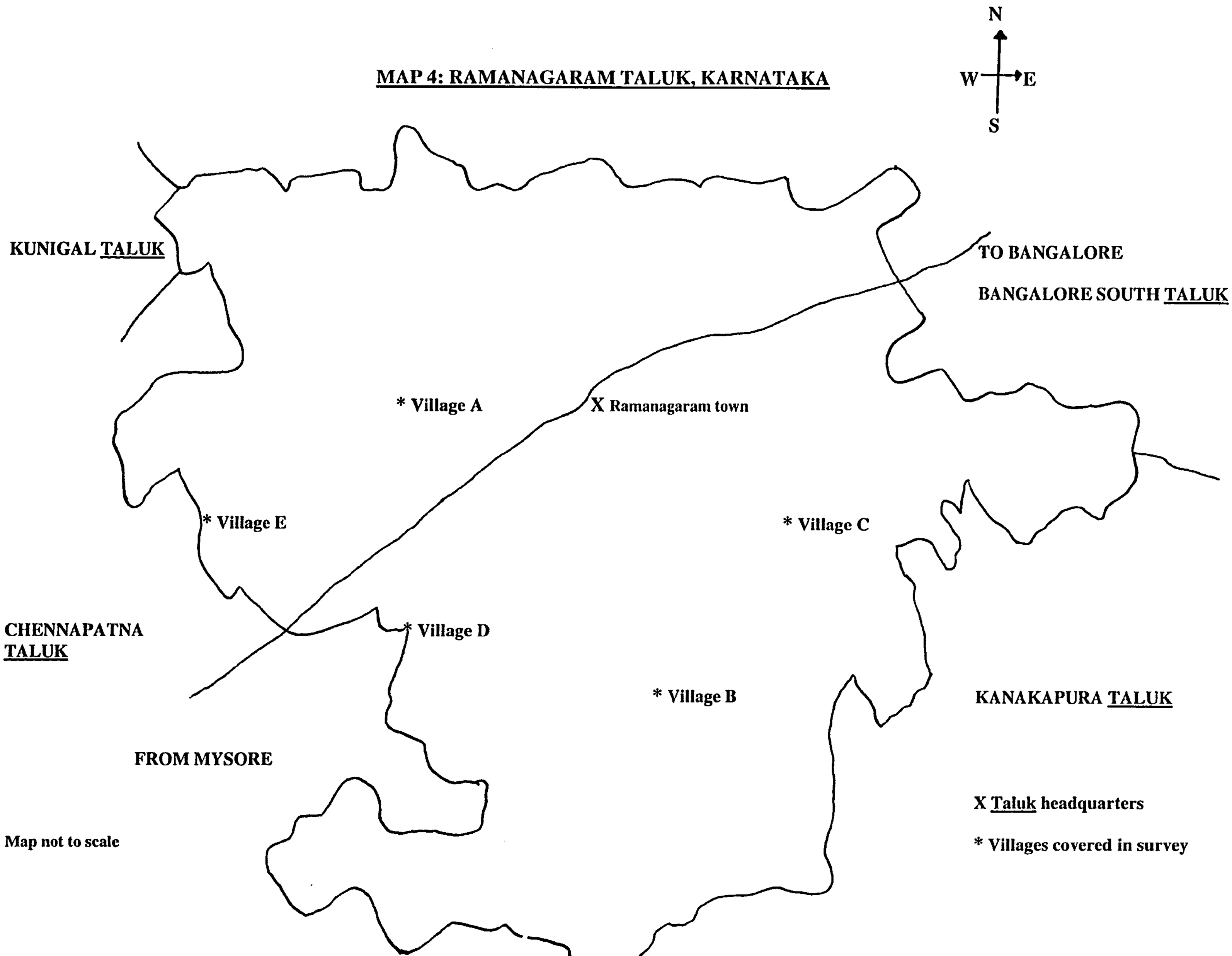
MAP 2: DISTRICTS OF KARNATAKA



MAP 3: BANGALORE RURAL DISTRICT, KARNATAKA



MAP 4: RAMANAGARAM TALUK, KARNATAKA



INTRODUCTION

> Those who move neither forward nor backward are not
> men of the Word, nor refiners of essence.
> Poor craftsman, misunderstanding the Word, they are those
> who spin useless thread for themselves.[1]

The conflict between the sacred and the secular has always rested at the heart of India's chequered history. The former defines the role for ideology, religious beliefs and their expression, value systems and their position in society. The latter follows the impulse toward economic betterment and is mirrored particularly in the competitive nature of India's political process.[2] For most in the Indian sub-continent, deep spirituality coexists with competition, and both factors routinely govern day-to-day living. Religion is linked intimately with the economics of survival.

However, where these two factors are inter-linked to generate divisions along religious lines, the outcome has been manifest in the resurgence of what is termed 'communalism', which has been largely, though not entirely, a feature of the post-colonial period. Communalism is defined as a phenomenon which uses religion not merely as a set of beliefs or ethical values but as a means to establish the identity of a social community, to attain economic and political ends. This has involved sometimes authoritative postures which seek to impose cohesion and uniformity over diverse members of a religious community in the process of identity-formation, coupled with antagonistic attitudes towards members of rival religious groups in the quest for economic 'rents'. Though communal conflict in India has taken place between Hindus and Sikhs, and Hindus and Christians, it is mainly Hindu-Muslim conflict which has recurred the most over the decades.

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[1] Le Mee, 1975: Rg Veda verse X.71.9, p. 147.
[2] Although it is recognised that political competition is also often about religion, a factor that is evident in India and in other countries characterised by religious pluralism.

In the process of identity-formation and the common quest for issues which emphasise difference between religions, disciplines which are often thought unrelated to religion are routinely brought in as part of the armoury in the confrontations (verbal and otherwise) over seats in educational institutions, government jobs or political office. A major issue, which has been the subject of many different claims and counter-claims, is fertility, and demographic and economic differences have been shown to have exacerbated communal conflicts in the past.[3] In a country of such a large population as India, where some members of virtually all of the main religious communities can claim to be a party to high fertility, it seems, at the outset, absurd to stress fertility differentials by religion. However, many political leaders (and others) have made statements about the fertility behaviour or demographic experiences of members of other religions. Most of these statements have been pure rhetoric and rabble-rousing, at best, or blatant untruths, at worst.[4] In fact, there has not been very much academic or scientific work which has dealt specifically or explicitly with the existence or causes of demographic differentials by religion in India.[5] This issue has not been dealt with in detail by the Indian Census, which only in 1995 made public demographic information by religion, but which mainly restricts itself to state- and district-level comparisons.

The demographic information made available by the Indian Census of 1981 and 1991 suggest that Muslims have higher fertility than Hindus, that this may outweigh differences in mortality, and that without controlling for the effect of any other factor which might affect fertility, such differences will persist, mainly because the process of demographic transition

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[3] Iyer, 1994.

[4] For an example of some of these blatant untruths, M. V. Ramamurthy writes, 'Muslims are by and large emotional and aggressive. Often in communal troubles they take the initiative though ultimately they are the worse sufferers. The Muslims, have not, till now, taken up the family planning programme with zeal and hence their population is growing at a higher rate than that of the Hindus. ... At this rate their population may become considerable in relation to the total population of our country. This is creating alarm in the minds of Hindus.' This extract is taken from the forward to a book (originally in the Telugu language and now translated into English) by Subbamma, 1988: vi.

[5] Two exceptions are Sharif, 1993; Jeffery and Jeffery, 1997.

has started earlier for Hindus than for Muslims.[6] More recent data provided by the Human Development Report on age-specific fertility rates by religious groups in India also suggests that age-specific fertility varies between Hindus and Muslims in India today.[7] Consider Table 1.

Table 1: Age-specific fertility rates by religious groups, all-India (1999)

	Age in completed years							TFR
Religion	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**15-49**
Hindu	0.06	0.27	0.24	0.14	0.08	0.03	0.02	4.2
Muslim	0.09	0.34	0.30	0.21	0.15	0.04	0.03	5.8
Christian	0.04	0.17	0.12	0.07	0.03	-	-	2.1
Others	0.02	0.23	0.26	0.14	0.07	0.03	0.03	3.9

(Source: India: Human Development Report 1999, NCEAR, Appendix A.8.5, p. 331)

The data suggest that the total fertility rate for Muslims in all of India is considerably higher than for Hindus. Age-specific fertility rates also indicate that Muslim women are bearing a larger number of children at earlier ages than are Hindu and Christian women. However, the Census information and the data provided by the Human Development Report consider mean levels in fertility only, and with the exception of the woman's age, do not control for the effect of other socio-economic influences on fertility.

The present study is an attempt to redress this deficiency. It adopts the micro-demographic approach to studying the determinants of fertility in a small cluster of communities in south India (which have witnessed communal conflicts in the past), yet it combines this approach with economic and econometric analysis. This study does not, and cannot, claim to be representative of the behaviour of all of India's population. However, it does hope to capture the behaviour and demographic decision-making of some Hindu, Muslim and Christian women in rural Karnataka. Further, by integrating the discussion of economic factors such as income with social and historical factors such as consanguinity, and the change in social

[6] Goyal, 1991
[7] NCAER, 1999.

norms occasioned by 'ideational change', it hopes to illustrate the necessity for such a multi-pronged approach (or 'synthesis') to the study of fertility determinants in India. Finally, this study seeks to provide an account of the interplay between the economic, demographic and religious factors which influence women's age at first marriage, their contraceptive adoption and their fertility, in a group of rural communities in southern India. In so doing, this study also hopes to assess the possible implications for state-level population policies in India, which may need to take into account differences in nuptiality, contraceptive adoption and fertility across religious groups.

I. The historical roots of communalism in India and its relevance to the study of fertility

Religion performs many roles in a society. First, it can be a powerful means of expressing unfulfilled aspirations. Religion may also function as a means to construct an identity and as a tool of dissent. Historically, religion in India has long been used as a tool of dissent. For example, the Bhakti movement in the late fifteenth and early sixteenth centuries mobilised popular support against the emphasis on rituals and the dogmatic finality characteristic of Hinduism and Islam at the time. If we examine the history of communalism in India, we find that communal incidents are not unique to post-Independent years, but are evident as early as the eighteenth century and in the colonial period as well.[8] The historical roots of communalism illustrate that organised caste hierarchies, the ability of religion to aid in identity-formation, and the fact that economic success depended on rent-seeking vis-à-vis the colonial state, were the three factors which initially contributed to the rise of communalism. In particular, the origins of communalism as we see it today have been linked to 'predatory commercialisation' due to imperfect markets in land and labour which developed in the colonial period.[9]

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[8] Bayly, 1983; Pandey, 1990.
[9] Bagchi, 1991: 193-218.

In the twentieth century, communal organisations, which numbered less than a dozen in 1951, today number more than 500 with many millions enrolled as members. Whereas only 61 districts in 1961 were affected by communal riots, this rose to 250 out of a total of 350 districts in all of India by 1987.[10] Compared with earlier decades, the 1980s and the 1990s have witnessed a new phase of communal confrontation characterised by great loss of life and property, detailed planning, and a particular concentration in industrial or commercial centres. Moreover, in the late 1980s, there has been an exacerbation of military postures around two major issues: first, the disputed mosque in Ayodhya, and second, Muslim personal law, centred around the Shah Bano case.[11] Thus, in the 1980s and 1990s, and most recently following the demolition of the Babri Masjid mosque on 6 December 1992, be it in Punjab, Assam, Bhiwandi, Telangana, Hyderabad, Meerut, Surat, Ahmedabad or Hyderabad, communal confrontations have left no corner of India untouched.[12] In the 1990s, and the disputed mosque at Ayodhya is a case in point, religion has come to be used not merely as the reflection of personal ideology but also as a theological weapon to highlight the insecurity of the poor or inequality between classes, or for 'rent-seeking' purposes due to group competition, which enables religious groups to gain legitimacy both in the eyes of the masses and in the eyes of the state. Perhaps this is the consequence of recognising that in the specific context of India's caste and social structure, group mobility is essential for individual

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[10] Figures taken from India today, 15 June 1987: 38.

[11] On 23 April, 1985, the Supreme Court of India upheld an order granting maintenance to a Muslim woman, Shah Bano of Indore, from her divorced husband under Section 125 of the Criminal Procedure Code (Cr. PC). The Muslim orthodoxy reacted virulently, claiming that the court had interfered with Koranic interpretations of Muslim personal law. The then Rajiv Gandhi government issued the Muslim Women (Protection of Rights on Divorce) Act in 1986, which legislated that Muslims were to be kept out of the purview of Section 125 of the Cr. PC. This was soon followed by the government placating Hindu communalists by granting permission to open the disputed Babri Masjid at Ayodhya for Hindu worship and to perform shilanyas (foundation-laying ceremonies) on the disputed site for construction of a temple to Rama in October 1989, just prior to the general elections. Both injudicious concessions, motivated primarily by political considerations, resulted in widespread communal riots thereafter.

[12] Pandey, 1991; Sarkar, 1981; Chandra, 1984; Engineer, 1984; Engineer, 1986; Engineer, 1991; Engineer, 1993; Engineer, 1994; Vanaik, 1991; Balagopal, 1992.

mobility. [13] This is because in such a variegated country as India, both under the colonial and the post-colonial state, control of the legislative process has been essential for economic gain; religious affiliation provides a unified way of reducing the transactions costs of forming rent-seeking groups.[14]

One way of strengthening the 'group' may be greater fertility; this is the 'minority group consciousness' hypothesis for explaining high fertility among some ethnic or religious groups, which will be discussed below in Chapter 1. Another way may be to gain mass support by suggesting that for any one group, members of other religious groups might soon come to outnumber the group due to their high fertility, different marriage practices, or low contraceptive use. Much of this debate, however, at least among religious or political leaders, has masked the fact that there may be real demographic differences between members of different religious groups in India, but differences which have more to do with socio-economic disparities than with the content of different religious beliefs per se. Consequently, it is necessary to examine from an academic perspective if this has any consequences for fertility decisions. In order to do so, the present study looks at the role of religion, compared to other factors, in influencing three major aspects of demographic behaviour - nuptiality, contraceptive use and fertility - in one taluk of south India.

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[13] For example, one Muslim woman interviewed in the present study mentioned that the main community rivalry in Ramanagaram town was between the Gowdas and the Muslims, and this was especially marked at election time. These are the two relatively prosperous communities in the town, which very often fought for seats to the local panchayat, the municipality and the state legislature. At present, Ramanagaram has a Gowda man representing it in the Karnataka state legislature's lower house of Parliament. In Ramanagaram, the local committees of the political parties both mobilised residents for political activities and helped them to obtain benefits under slum improvement and welfare programmes.

[14] For more on transactions costs and rent-seeking, see Stigler, 1993: 258-273. It is recognised also that while rent-seeking to some extent explains why people seek religious affiliation, this does not explain entirely India's few but large movements of socio-religious protest conversion to Buddhism, Christianity or Islam, where converts sought to escape the dogmatic finality of the caste system and avoid ascriptive rent-paying. Rent-seeking also does not explain also why a majority of religionists stay on for many consecutive generations in the religion of their ancestors' affiliation. I am grateful to Michael Lipton for alerting me to these considerations.

II. The theoretical framework

Following Bongaarts, I begin by distinguishing between the proximate and nonproximate determinants of fertility.[15] I then try to identify the factors which, in south Indian society in the 1990s, might theoretically influence both fertility itself and two of the proximate determinants (the age at first marriage and the decision to use contraception). In modelling the determinants of nuptiality, contraceptive choice and fertility, I take into account the socio-economic variables which are postulated in the theoretical literature to exert an influence on these demographic decisions, such as education, income, age, caste and access to infrastructure. However, as I am particularly interested in Hindu-Muslim demographics, my main focus is on the role of religion. I conceptualise religion as affecting demography in two ways: first, through its philosophical content (or 'particularised theology' following Chamie), and second, in terms of 'characteristics' or socio-economic differences between members of different religious groups.[16]

In order to study these issues, I spent 1995-96 conducting micro-level fieldwork and collecting primary data in a cluster of communities in the south Indian state of Karnataka.[17] The communities were Ramanagaram town and five villages in the taluk of Ramanagaram in southern Karnataka. The core of my fieldwork consisted of detailed interviews of a sample of 201 rural Hindu, Muslim and Christian women. The interviews involved ninety-three questions administered from a carefully designed questionnaire. The questionnaire collected information about the respondent's personal characteristics, the structure of her household, the decisions made by her and her husband on contraception and reproduction, and the

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[15] Bongaarts, 1978: 105-132.
[16] Chamie, 1977: 365-382.
[17] I undertook my fieldwork in a region studied in previous decades both by the Mysore Population Study, and by Caldwell, Reddy and Caldwell, enabling me to make effective comparisons with these two studies. See Mysore Population Study, 1961; Caldwell, Reddy and Caldwell, 1983: 343-361.

importance of religion to the respondent and her family. Chapter 1 of this dissertation presents a discussion of the relationship between religion and demography. Chapter 2 discusses information about Ramanagaram taluk, its population distribution, its infrastructure facilities, the data set and the sampling methodology. Chapter 3 presents the 'census' information on the 201 women interviewed.

Chapters 4 through 6 of this thesis present the results from the main empirical analysis of the data, which was undertaken both quantitatively and qualitatively. The quantitative component involved testing models of marriage age, contraceptive choice and fertility decisions using multiple regression analysis with ordinary least squares (OLS), and logistic regression (LOGIT) techniques. The aim was to investigate whether there were any differences across religions in marriage, fertility and the decision to use contraception, even after controlling for various economic, social and biological factors. The qualitative component of the analysis focused on women's descriptions of their religious observance, their opinions on their families and their views about contraception. This was done in order to provide ethnographic evidence to substantiate and give interpretative depth to the quantitative findings. Chapter 7 puts forward the major conclusions of the present study.

III. Overview of the key findings and gaps in the analysis

In India as in the Ramanagaram sample, Muslim marriage age is higher than Hindu marriage age, Muslim contraceptive use is lower than Hindu contraceptive use, and Muslim fertility is, on average, one child higher than Hindu fertility. Most studies of fertility differences in India stop with such comparisons between average values. The analysis undertaken in the present study decomposes the potential influence of religion into two effects (as discussed in Chapter 1). First, this study considers the 'pure religion effect' which deals with women's beliefs about the teaching of their religion and its influence on reproductive decisions; the influence

of priests and women's opinions about their teaching; and women's consequent religious practice. Secondly, this study examines the 'characteristics' effect, i.e. the extent to which religious differences in fertility are dependent on variations in other factors such as differences in female education, and their consequent impact on fertility. The analysis concludes that neither the pure religion effect nor the characteristics effect differs significantly between Hindus and Muslims as regards their marriage age (as discussed in Chapter 4) or their decision to use contraception (as discussed in Chapter 5). However, there are differences between Hindus and Muslims in the effect on their fertility of some socio-economic characteristics such as education, access to fuel infrastructure and son-preference (as discussed in Chapter 6). Religion also appears to account for some of the difference in age at marriage between There are also differences in the effect of religion between Hindus and Christians, and between Muslims and Christians. Furthermore, education has a different effect on contraceptive practice for Christians than it does for the other two religious groups.

The study therefore concludes that Hindu-Muslim differences in age at marriage, contraception and fertility outcomes results from differences between these two groups in characteristics such as female education, and the manner in which these characteristics affect demographic outcomes. However, the conclusions derived from the present study do need to be qualified by acknowledging that there may exist other effects of religion on fertility which this study does not attempt to address, and certain characteristics of Ramanagaram taluk and the sample which may not render the findings universally applicable to populations in all of India.

A. Omitted effects of religion on fertility

In addition to the pure religion effect and the characteristics effect, there are five other ways in which religion might affect fertility or its proximate determinants, but which are not dealt

with explicitly in the present study due to the limitations of the data, either because some information is extremely sensitive and is therefore difficult to uncover in fieldwork, or because the data was collected in five villages and the town of Ramanagaram all of which lie in close proximity, and may therefore be too homogeneous to test certain hypotheses (as discussed below and in Chapter 2).

The five ways in which religion might exercise an impact on fertility which are not considered in this study are the following. Firstly, there are ecological effects. Competition between Hindus and Muslims in a multi-faith area might lead both Hindus and Muslims to have higher fertility, marry earlier, or use contraception less than in villages which contain members of one religious group only. This could not be tested explicitly for the Ramanagaram data set because the Christians and Muslims resided only in Ramanagaram town and villages B and C, but not at all in villages A, D and E.

The second way in which religion might influence fertility is through 'variability effects'. That is, Hindus, Muslims and Christians could differ significantly not only in the mean values of demographic variables but also in distributional features of these variables. This possibility is examined in detail in the summaries of findings at the end of Chapter 3.

Religion may also affect fertility through its effects on other proximate determinants, for example, through influencing length of breastfeeding, duration of couple separation during the fertile period because of divorce or migration, or willingness to resort to abortion. The mean levels of these variables and their distributions might also affect the fertility of couples. For example, if the number of months of breastfeeding is longer for one religious group than for another, and if this is due to religious considerations, this could reduce fertility for the former because it increases the gap between successive births. If couples face long periods of separation due to some influence of religion on divorce (as may be the case for some sects of

Islam) or due to economic compulsions such as migration, this could reduce fertility. Finally, religious injunctions concerning abortion could theoretically affect fertility, if, for example, abortion is disallowed by the religious scriptures. Differences between Hindus, Muslims and Christians with respect to the proportions of women remaining single or the number of births that take place out of wedlock may be influenced also by religious norms, and this would have an impact on total fertility. The present study does not deal with these issues because such information is very sensitive and attempts to collect it through fieldwork are notoriously difficult.

There may also be differences in society's treatment of Hindus and Muslims that cause different acquisition of socio-economic and other characteristics. This possibility is extremely difficult (if not impossible) to quantify and must therefore be left unanalysed in a study such as the present one.

Finally, this study does not consider the impact of infant and child mortality as a proximate determinant affecting either the age at first marriage or the decision to use contraception. This decision is justified because infant mortality did not vary perceptibly between Hindus and Muslims in Ramanagaram. As is evident from Table 2, the mean and distribution of infant and child deaths did not vary significantly between Hindus and Muslims in the Ramanagaram sample. The sample of Christians was too small (N = 14) to make comparisons with the other two religious groups meaningful, given that none of the Christian women interviewed reported any child deaths.

Table 2: Infant and child deaths, Ramanagaram sample (1996)

Reported infant and child deaths	All women	Hindus	Muslims	Christians
Mean	0.16	0.15	0.21	0.00
Standard deviation	0.03	0.04	0.06	0.00

It is possible that the higher level of education for Christian women relative to the Hindu and Muslim women accounts for the lack of child deaths reported among them. This may also explain in part the lower fertility of the Christians (as discussed in Chapter 6). However, such a conclusion is largely speculative, as the number of Christians interviewed is very small relative to the number of Hindus and Muslims. The small number of child deaths reported for all three religious groups may also reflect the positive role being played by the maternal and child health-care programme in the state of Karnataka.

It is also necessary to understand that the role of infant and child mortality in an analysis of religion and fertility is very complex, a factor that is evident clearly when we look at all-India data. Consider Table 3.

Table 3: Infant and child mortality by religion, all-India (1999)

	Infant mortality				Under-5 mortality			
	Marital duration of ever-married women				Marital duration of ever-married women			
Religion	0-9	10-19	20+	All	0-9	10-19	20+	All
Hindu	69	79	99	86	88	110	139	119
Muslim	52	65	93	75	69	97	136	110
Christian	32	56	88	61	36	67	103	71
Others	83	79	82	81	92	114	112	109

(Source: India: Human Development Report, 1999, NCEAR, Appendix A.8.6, p. 333)

The data show that not only is infant mortality across the Indian states lower for the Christians than for the Hindus, but that it is also much lower for the Muslims than for the Hindus. Moreover, this difference is also apparent for under-5 mortality, where the performance of the Muslims is distinctly superior to that of the Hindus. The differences in infant and child mortality between Muslims and Hindus is even more marked among women who are married more recently. This suggests that the interrelationships between religion and fertility are complex, and may need to be explored independently of changes in infant and child mortality.

B. Special features of the sample area

As discussed in Chapter 2 below, the sample of women analysed was selected from the population in Ramanagaram taluk in Bangalore rural district in southern Karnataka. There are some features of this district which are unique and which may not necessarily reflect the situation in other parts of India. These features may qualify some of the conclusions of the present study. First, as discussed in Chapter 2, the villages covered in the sample are really peri-urban. Both here and in the urban areas, one could possibly expect more homogeneous fertility-related behaviour than in other parts of rural India. As shown in Chapter 2, the villages also have much higher male-female ratios and different age structures to that of some other parts of India. As discussed in Chapter 3, the Muslims who live in Ramanagaram are better off and more urbanised compared to some Muslim communities in other parts of India. As explained in Chapter 2, the sample was chosen specifically to examine whether religion exercised an impact on fertility even at a relatively high socio-economic level, and in areas where poverty did not compound demographic differences. However, it must be acknowledged that the conclusions which emerge from studying religious differentials in fertility in the Ramanagaram sample may not be applicable universally to more typically rural, demographically structured and poorer populations.

After taking into account these caveats, this study nevertheless hopes to serve two major purposes. First, it seeks to identify the determinants of two proximate influences on fertility (nuptiality and contraceptive choice) and of fertility outcomes in south India. Second, it attempts to assess the implications which taking into account religious differences in marriage age, contraceptive choice and fertility have for the formulation of state population policies in India, as well as in other countries characterised by religious pluralism. Ultimately, I hope to contribute to the discussion and the debate on the determinants of fertility in Karnataka in particular and in India more generally. In so doing I hope also to

present a realistic account of the demographic decision-making of the women of Ramanagaram taluk, who have so generously shared with me their views and their experiences.

CHAPTER 1

Religion and Reproduction: An Examination of the Impact of Religion on Demography

> Religion is the soul of soulless conditions, the heart of a heartless world,
> the opium of the people.[1]

At the outset, it is important to examine the ways in which religion is hypothesised to affect demographic outcomes, particularly in terms of theological content. In section I we first discuss the two hypotheses which propose certain links between religion and fertility, the 'pure religion effect' hypothesis and the 'characteristics' hypothesis.

A discussion of the impact of religion on fertility needs to be placed in the wider historical context of the role of religion in economic development. As early as 1905, Weber put forward his now-famous theory of the influence of the 'Protestant ethic' on the 'spirit of capitalism' and the rise of modern industrial society in Europe.[2] However, discussions of religion and development soon went beyond looking at the impact of religion in terms of its effect on entrepreneurial spirit, to address broader issues such as religion's role as a fundamental factor in society's moral base, which may impose a 'social limit' on development. In this context, three main issues emerged: first, further debate on the Protestant ethic, which looked at the religious sources of thrift, hard work, saving and reinvestment; second, the corollary of this belief, i.e. that some religions (such as Hinduism, Buddhism and Islam) impeded economic growth; and third, either viewing religion and development as independent phenomena[3] or viewing religion as a dependent variable of development.[4]

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[1] Karl Marx, quoted in Radhakrishnan, 1939: 314.
[2] Weber, 1992; Käsler, 1988. For a recent discussion of the Weber thesis, see also Landes, 1998: 174 - 181.
[3] For example, Taft Morris and Adelman concluded that in a sample of 55 non-communist under-developed countries, the cross-association between religion and modernisation could not be attributed to interactions between religion and the socio-economic indicators (such as crude fertility rates), but

As a variable which lies at the core of human development, fertility too may be affected by non-economic factors such as religion. Religion has two main components which may influence fertility: first, it articulates a set of normative values of a community, which will be called the pure 'religion effect'; and second, it is associated with other socio-economic traits which affect reproductive behaviour (which will be called the 'characteristics' effect).

I. Hypotheses about the impact of religion on fertility

Chamie has argued that there are three hypotheses about why one might observe fertility differentials by religion. These are briefly: the 'particularised theology' hypothesis, that the intellectual content of religion influences fertility irrespective of socio-economic and demographic contexts;[5] the 'characteristics' hypothesis, that fertility differentials reflect socio-economic differences between members of religious groups; and the 'minority group status' hypothesis, that the political and social insecurity of minority religious groups increases their fertility compared to the majority group. In discussing the theoretical literature on religion and fertility, this chapter will reduce Chamie's three hypotheses to two. The first is the 'pure religion effect' hypothesis on fertility, and the second is the 'characteristics' hypothesis, which reflects socio-economic differences between members of religious groups, but which treats minority group status as one more 'characteristic' of the population.

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rather was the outcome of complex historical processes in religious configuration and socio-economic development, spread over many centuries. See Taft Morris and Adelman, 1980: 491-501.

[4] For example, the Sarvodaya movement led by Buddhist monks in Sri Lanka provided a positive impetus to development. Religion and development also came into focus in Iran in the late 1970s and early 1980s. See Nash, 1980: 555-561. More generally, on the linkages between religion and development see Wilber and Jameson, 1980: 467-479; Goulet, 1980: 481-489; Taft Morris and Adelman, 1980: 491-501.

[5] Chamie, 1977: 365-382. Chamie used the phrase 'particularised theology'. However, in keeping with other terminology from economics used in the present study, we use the term 'pure religion effect' to describe the same factor.

A. The 'pure religion effect' hypothesis

> Real religion can exist without a definite conception of the deity but not without a distinction between the spiritual and the profane, ... religion generally refers to something external, a system of sanctions and consolations.[6]

In the standard model of fertility that considers the demand for and supply of children and the costs of fertility limitation (such as in the classic models in Bulatao and Lee[7]), ideas, attitudes and knowledge can diffuse geographically within religious, ethnic or linguistic boundaries. The content of a religion comes into play because it can take positions on issues that create either resistance or barriers to diffusion of attitudes and knowledge. Alternatively, it may in fact encourage diffusion of attitudes and knowledge (e.g. through literacy). The way this works is that religion may epitomise 'sanctions and consolations', and thereby affect conduct.[8]

A pure 'religious effect' on fertility can operate in a number of ways. Religions often adopt positions on the moral acceptability of birth control and abortion. They often have norms about 'desired' family size. Religious rituals often provide for distinct roles for children (as is the case with son-preference and religious roles for sons in South Asia). Religions can impose religious vows and practices of celibacy, either lifelong or outside marriage. Religion may take positions on the acceptability of contraception. And religion may encourage literacy in order to read the scriptures, which in turn may lead to indirect effects on fertility.[9]

A number of empirical studies have argued that Catholics show different fertility than Protestants and that this is due to differences in the content of their religious beliefs.[10] For

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[6] Radhakrishnan, 1939: 21.
[7] Bulatao and Lee, 1983.
[8] Weber, 1992: 97-98.
[9] See Gellner, 1981. In Chapter 1, Gellner discusses the effect of Islam on the spread of literacy in pastoral Arabian societies in the eleventh and twelfth centuries.
[10] Mosher, Johnson and Horn, 1986: 367-379; Westoff and Ryder, 1977; Westoff, 1979; Sander, 1995.

example, Catholic norms on contraception and family size have been thought to influence fertility. Janssen and Hauser argued that religion affected Catholic fertility in the United States.[11] Similarly, it is often argued that the particular philosophical content of Islam affects demographic behaviour.[12]

1. Islam

> Generally speaking, Islam is optimistic and transcendental, it does not favour either asceticism or extremes of ecstasy, but it does admit the concepts of gainful work, family ownership, earthly happiness and comfort.[13]

'Islamic' fertility has been the subject of many theoretical and empirical writings which have discussed the normative values associated with Islam and their relation to fertility. In this section we will discuss the main tenets of Islam and their relation to the family, drawing mainly on the works of Coulson and Hinchcliffe, Youssef, Qureshi, Gellner, and Obermeyer.[14]

a. The basic tenets and structure of Islam

Philosophers and sociologists have argued that the content of Islam is essentially bounded by a written document, the Koran, and the written words of the Prophet Mohammad.[15] Gellner has argued that of the world's religions, 'only Islam survives as a serious faith pervading both a folk and a Great Tradition.'[16] He argues that the presentation of the written word in the Koran is very important in Islam and has considerable influence on human conduct and society.

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[11] Janssen, and Hauser, 1981: 511-528.
[12] Youssef, 1978: 69-99; Qureshi, 1980: 563-575; Obermeyer, 1992: 33-60.
[13] Herbert, 1965, as quoted in Uppal, 1986: 22.
[14] Coulson and Hinchcliffe, 1978: 37-49; Youssef, 1978: 69-99; Qureshi, 1980: 563-575; Gellner, 1981; Obermeyer, 1992: 33-60.
[15] Radhakrishnan, 1939; Gellner, 1981.
[16] Gellner, 1981: 4.

A second feature of Islam is that happiness is derived not from personal spiritual experience alone, but rather

> It lays an equal emphasis on the social, economic and political arrangements under which people live and function ... it envisages a personal salvation that cannot be sufficiently realised except through the 'right' institutional arrangements. Both aspects require the same degree of adherence by a Muslim. So, it is as sinful for him to charge or pay interest on a loan as it is for him to neglect doing his five daily prayers or his fasting ... Observing them is not merely a social duty but an act of faith in God.[17]

These institutional requirements of Islam are specified in the Sharia or Islamic law, which is derived from two main sources: first, the Koran, and second, the Prophet Mohammed's interpretations of the word of God, and their application to various situations.[18] These rulings are collectively termed the Sunna. The Koran and the Sunna were codified over several centuries along with interpretations of Islam by Muslim scholars such as Ibn Taymiah and Ibn El Kayim who undertook the task of ijtihad or 'finding rules for novel situations', all of which collectively comprise the Sharia. However, the codification of the Sharia continued only until the eleventh century, which, according to Ragab, has subsequently robbed the Sharia of its vitality because it did not dynamically change in accordance with new situations which arose in later centuries.[19] As Coulson and Hinchcliffe emphasise, the 'classical formulation of Islamic law interpreted Quranic provisions "in the light of prevailing standards of tribal law".'[20] For our discussion of religion and fertility, the Sharia is important because for devout Muslims, this 'is not merely a set of laws that affect the Muslim on some specific occasions, but rather, it is the keynote of his existence; his religious, political, social, domestic and private life is completely bound up and regulated by the precepts of the law.'[21]

The Sharia was made applicable to all Muslims in India in 1937.

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[17] Ragab, 1980: 517.
[18] Ragab, 1980: 513-521.
[19] Ragab, 1980: 513-521.
[20] Coulson and Hinchcliffe, 1978: 38.
[21] Landau, 1958: 128.

Officially, Islam has no formal organisation and no church, and unlike Hinduism, in Islam the community of the faithful cannot be split up into 'lay society' and the 'extra-specially faithful', i.e. Islam has no concept of priesthood.[22] According to Qureshi, 'A Muslim's duty is to God and neither to any individual nor to any church.'[23] However, Islam does possess a plethora of small religious groups, termed 'orders' or 'brotherhoods', some of which revolve around specific saints. There are also groups of people who dedicate their lives to the study of Islamic texts such as the Koran, or the performance of religious duties, and who occupy a position of respect among Muslims. These include the mufti (jurist), qadi (judge), maulana and mullah (learned men) and others, who are collectively termed the ulema, because they are 'learned in such subjects as fiqh (jurisprudence), Sunnah (traditions of the Prophet) along with subjects of classical learning.'[24] The ulema occupy an important place in Muslim society and Qureshi argues that 'Temporal rulers in Muslim society have generally avoided antagonising the ulema and instead have sought to establish a working relationship with them.'[25]

Obermeyer argues that Islam gives importance to kinship structures and 'the mutually reinforcing authoritarianism of state and family.'[26] She asserts that the absence of a religious hierarchy in Islam enables it to embrace people in regionally very diverse contexts so that no effort has been made to change local laws as long as they are not in conflict with the Sharia.

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[22] Gellner, 1981: 48.
[23] Qureshi, 1980: 564.
[24] Qureshi, 1980: 564.
[25] Qureshi, 1980: 564. The ulema are men learned in Islamic scriptures. It must be emphasised that they are not 'priests' in the traditional sense of individuals through whom members of a religion may communicate with God.
[26] Obermeyer, 1992: 33-60.

A majority of Muslims in India are Sunnis, as are a majority of the Muslim women interviewed in the Ramanagaram sample.[27]

How is the structure of Islam hypothesised to affect women's fertility? Coulson and Hinchcliffe argue that 'the Quran is ... a declaration of the fundamental Islamic ethic - the general moral terms it lays down with respect to the position of women are .. of greater importance than its specific legal rules. Thus, injunctions that wives should be treated fairly and equitably, that divorce should take place only with due consideration, and that in general women's rights should be respected, abound.'[28] According to Qureshi, the Sharia deals with interpersonal relations and family issues. Islam is hypothesised to affect fertility directly by its position on the moral acceptability of birth control, and by its views on marriage, polygyny and divorce.[29] It is popularly believed that because Islam permits a man to take multiple wives, father large numbers of children and unilaterally divorce his wife, this collectively encourages high fertility in Islamic populations because men do not bear equally the cost of having to rear their own offspring. This is also the view that has been repeatedly put forward by Hindu right-wing political parties in the Indian sub-continent.

b. Islam on marriage, polygyny and divorce

Youssef argues that in the Koran all Muslim males are encouraged to marry, early and universal remarriage of widowed and divorced women is highly encouraged, and the purpose of marriage is explicitly stated to be not only procreation but the gratification of spiritual and physical needs'.[30] In this context, it is important to recognise that for Hindu-Muslim differences in widow remarriage to affect completed fertility, a precondition is that

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[27] There are, of course, other Muslim sects in India such as the Shias and the Alawites. However, there is little difference between Shias, Sunnis and Alawites in their theological attitudes towards contraception and fertility.
[28] Coulson and Hinchcliffe, 1978: 37-38.
[29] Qureshi, 1980: 564.

significant proportions of men die before their wives' fertile period ends and that remarrying women's babies are born after remarriage.

Coulson and Hinchcliffe argue that in most Muslim countries, the minimum female age at first marriage is 18 years, but that marriages which are contracted between parties below the minimum age are still considered legally valid.[31] They point out that though Hanafi and Shiite law allows women who are past puberty to contract their own marriages, all sects of Islam recognise the right of 'marriage guardians' to arrange marriages for female infant wards without their prior consent. An important feature of all Islamic marriage contracts is the mahr, sadaq or dower, which is paid to the bride, or her guardian, and which constitutes women's right to property. The tight control of parents and guardians over the selection of marriage partners and strict seclusion before marriage are features of Islamic societies.[32] Youssef argues that alternatives to marriage, such as employment, may even act as potential threats to the likelihood of marriage. She points out that early marriage is particularly striking in Libya and Pakistan where, among 15-19 year olds, three out of four girls are married.

Coulson and Hinchcliffe argue that Islamic law does not require a husband to obtain permission from a court or from current wives in order to have another marriage.[33] Although the Koran stresses that a man is urged not to take on a second wife unless he is in a position to treat all wives equally, the law interprets this as a matter for the man's own conscience and does not recommend legal intervention in this decision. Although Muslim men are permitted to take more than one wife, in some interpretations of Islam they can only take a second wife with the consent of the first wife. There is also evidence that in some Islamic countries, such as in parts of Malaysia and Iran, the man does need to obtain permission from the courts before contracting a second marriage. In Pakistan, a polygynous marriage has to obtain

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[30] Youssef, 1978: 88.
[31] Coulson and Hinchcliffe, 1978: 37-38.
[32] Youssef, 1978: 78.

sanction from an arbitration council which consists of, among others, representatives of both the husband and the current wife. Moreover, in many Muslim countries today, some wives adopt the Hanbali interpretation which allows wives to insert stipulations in their marriage contracts which restrict the rights of husbands to contract additional marriages, and which may also give Muslim women the right to work outside the home, a right they are denied under traditional Muslim law.[34] Obermeyer also refers to empirical evidence from the Arab nations that polygyny is not widespread because supporting more than one wife is costly.[35] Studies by Ghallab and White find that levels of polygyny are 1% in Damascus, 2% in Cairo and no more than 10% for all the Arab nations taken together.[36]

In India and in the Ramanagaram sample, there is little evidence of polygyny. The Census of 1961 outlined that polygyny was highest among the tribal communities of India, and was practiced least by Muslims. In fact, polygyny among Hindus was found to be higher than among Muslims. It was estimated that in 1931-41, polygynous families in India as a percentage of total families was 6.8% for Hindus and 7.3% for Muslims. This percentage fell in 1961 to 5.1% for Hindus and to only 4.3% for Muslims.[37] This suggests that the incidence of polygyny is not significant for fertility behaviour in India. In the Ramanagaram sample, only four out of the 187 marriages were polygynous unions. Furthermore, as Obermeyer points out, polygynous marriages are not always more fertile than monogamous unions. Moreover, given the degree of female monogamy and the low degree of non-marital sexual activity within the religion, polygyny on its own may not necessarily raise fertility, as it implies that some men inevitably marry later or not at all. It may also be that the main impact of polygyny on fertility is expressed through women's roles. As argued below, the impact of Islam on fertility may be a consequence of low autonomy for women which the religion

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[33] Coulson and Hinchcliffe, 1978: 37-38.
[34] Youssef, 1978: 41.
[35] Obermeyer, 1992: 33-60.
[36] Ghallab, 1984: 232-241; White, 1978: 52-68.
[37] Indian National Social Action Forum Manual, 1994: Chapter 4.

encourages and which has been shown empirically to be associated with high fertility in Islamic populations. This is reinforced by the fact that in many poor societies children act as a form of social insurance and hence women achieve bargaining power within the family only by having many children. Thus, the extent to which Islam directly impacts on fertility by enforcing norms concerning marriage and polygyny, is strongly debated in the literature.

The issue on which scholars of Islam are most unanimous, and which academics believe requires the most urgent reform, is the fact that Islam permits a man to divorce his wife, in some situations, unilaterally. As Coulson and Hinchcliffe argue, 'It is a fundamental principle of Islamic law that the power of divorce is in the hands of the husband, and may be exercised at will, however blameless she (the wife) may be, without having recourse to a court of law' (emphasis added).[38] Although many Muslim countries do require pronouncements of divorce to be made in a law court, an important aspect of divorce under Islamic law even today is that the power to divorce remains solely in the hands of the husband, considerably weakening the bargaining position of the wife.[39] In addition, a divorced or widowed woman retains custody of any children only for a limited period after divorce, after which custody passes either to the father or the nearest male agnate. Even during the limited period of the mother's custody, the father or male agnate remains the official 'guardian' of the child, reserving the right to control both the child's education and his or her marriage, without the mother's consent. The provision for unilateral divorce by the husband is an aspect of the Sharia which is particularly important in India, because in the late 1980s and early 1990s an issue which is at the

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[38] Coulson and Hinchcliffe, 1978: 42.

[39] For example, the talaq al-bida or 'divorce of innovation' consists of the husband pronouncing three talaqs at a time, immediately dissolving the marriage. However, according to Coulson and Hinchcliffe in some Islamic countries such as Iran and South Yemen, this power of the husband to undertake such unilateral repudiation has been completely abolished. Also, some Islamic schools such as the Shiite sect Ithna 'Ashari do not recognise this form of divorce. In other forms of divorce, where the talaq may be pronounced over several months, there is a waiting period (called the idda), in which women are entitled to some maintenance. However, all responsibilities of the husband towards the wife are completed either with the pronouncement of the talaq or the termination of the idda. See Coulson and Hinchcliffe, 1978: 37-49.

forefront of the 'communalism' phenomenon is the debate over the Muslim woman's right to maintenance after divorce.

c. Islam on birth control and abortion

Islam has traditionally been portrayed as not permitting birth control or abortion in any situation. However, Obermeyer challenges this view and argues that the position of Islam on birth control and abortion depends very much on the interpretation of the different schools of Islamic jurisprudence.[40] According to her, Islam does permit family planning, an inference she draws from the absence of any reference to prohibition of birth control in the Koran. Sunni and Shia positions on birth control are, in fact, derived from the writings of Al-Ghazali, a medieval Islamic theologian, who outlined five situations where birth control within Islam is permissible: first, if one of the partners is afflicted with a disease which may be passed on to children; second, if the wife is predisposed to too many closely spaced pregnancies; third, concern for the effect of too many pregnancies on the wife's health; fourth, 'the husband's impecunious condition'; and, fifth, perhaps surprisingly, 'concern for the wife's beauty.'[41] Obermeyer also argues that some schools of Islamic jurisprudence do permit abortion. While the Malikis school prohibits abortion outright, most other schools permit abortion up to the time when the foetus is regarded as being 'ensouled', a definition which varies to include the 40th, 80th or 120th day of pregnancy, depending on the school, after which abortion is prohibited by all schools. Moreover, these positions have been upheld by fatwas issued in Egypt in 1937, 1953 and 1959.[42]

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[40] Obermeyer, 1992: 33-60.
[41] Obermeyer, 1992: 43.
[42] Obermeyer, 1992.

d. Islam on women's status in the family, children and son-preference

It has also been hypothesised that Islam traditionally awarded men a more prominent place than women within the family. Sons were given twice as large an inheritance as daughters and a man's testimony in court was worth twice that of a woman. Coulson and Hinchcliffe argue that 'Quranic provisions concerning women's status and position were dissipated and largely lost over time. Islamic law has continued to reflect the patriarchal and patrilineal nature of a society based on the male agnatic tie. Within the scheme of family law which developed in this way, woman, whether as daughter, wife, or mother, occupied an inferior position.'[43] Obermeyer argues that regardless of ethnic origin, women in Islamic societies in the past have been restricted to a lifestyle that guaranteed preservation of family honour and prestige.[44] Youssef has argued that in Muslim societies there are strict institutional mechanisms which prevent much contact between men and women. There is strict segregation of the sexes in schools, at work and an informal separation of the sexes in all recreational activities. Landes also argues that the economic implications of gender discrimination observed particularly in the Arab Muslim nations is serious, because it not only restricts the opportunities of women, but undermines the 'drive to achievement of boys and men [45].' However, it should also be pointed out at this stage that women were restricted in many ways in Christian and Hindu societies in the past as well.

Youssef argues that one of the features of Muslim societies which tends to increase fertility is that Muslim women gain respect and status within their own kin group and community when

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[43] Coulson and Hinchcliffe, 1978: 38.

[44] However, in India, the role of the Muslim woman has not always been to observe the veil and be restricted to the home. As Engineer argues, there are instances in Indian history where Muslim women who belonged to the ruling dynasties fought and led battles on the battlefield. Among them are Gul Bahisht against the Raja of Jalore in the time of Alauddin Khalji; Noorjehan (the wife of Jehangir) whose hunting exploits included killing lions and mounting elephants, and are described in the Tuzk -i - Jahangiri; and Chand Khatun (also called Chand Sultana), who defended the kingdom of Ahmednagar against the Mughal emperor Akbar's army. For more on this, see Engineer, 1997: 12.

[45] Landes, 1998: 412.

they marry and have children, and that this is the only role which gives them a bargaining position in the social structure.[46] This is because children represent a form of social insurance against the threat of divorce or polygamy, since women derive status from motherhood even when divorced or rejected for a second wife. Accordingly, 'Offspring guarantee to the woman status and respect that extends far beyond her position in the conjugal home and reaches into the heart of her own family's and the community's valuation of her. Hence, we may expect women to continue childbearing activities throughout their reproductive years - whether they are happy in their marriage or not.'[47] Youssef argues also that this applies to those women who live in modern Muslim societies as well because 'In Muslim society, modernity is often a struggle to incorporate higher female education and occupational emancipation within the traditional boundaries that define roles in terms of marriage and motherhood, rather than an attempt to restructure relationships between the sexes in relation to society.'[48]

Regarding the position of Islam on children, Youssef argues that pronatalist tendencies in Islam do not emanate from direct Koranic injunctions to procreate, but from factors within the wider society.[49] She argues that children are not considered the 'primary values' of life in Islam, and that high fertility stems more from the streak of fatalism, 'a strong belief in the active providence of God'[50], and the belief that 'Allah creates sexuality and determines procreation and barrenness.'[51] Thus, the literature seems agreed that Islam involves low female autonomy compared with men, and that there are a number of ways in which this may encourage high fertility in Muslim societies.

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[46] Youssef, 1978: 69-99.
[47] Youssef, 1978: 79.
[48] Youssef, 1978: 79.
[49] Although it is recognised that son preference as such has no effect on total fertility or indeed on sex ratios. For more on this see Dasgupta, 1993: Chapter 12*; Cassen, 1978: 54-55.
[50] Youssef, 1978: 87.
[51] Youssef, 1978: 87.

e. Empirical evidence for the influence of Islam on fertility

Empirically, most studies which have dealt with Islam and fertility have focused on the Arab countries in North Africa and West Asia, such as Egypt, Sudan, Morocco, Algeria, Iraq, Saudi Arabia, Syria and Yemen. They comprise one-quarter of the world's Muslim population, a total of 220 million people in 1991. Between 1950-56 and 1985-90 these nations collectively showed a total fertility rate of 6.9 children per woman.[52] Nagi argued that Arab fertility was high due to the low status of women in this region.[53] Caldwell argued that the influence of Islam on societal values related to women was reflected in the high proportion of Arab countries which he rated as being among the world's 'poor health achievers.'[54] Gallagher and Searle, and Lutz also argued that in Arab countries, religious factors were significantly associated with fertility, even when controlling for socio-economic status.[55] However, Obermeyer argues that 'The "fateful triangle" model that sees an inevitably ill-fated association between Islam, women and demographic outcomes is inadequate because it ignores the diversity of Islam ... such a model is inappropriate because it is inattentive to the contradiction between norms and behaviour, and to ambiguities within the normative structure of a society.'[56]

In this section we have examined the content of Islam in general and then looked at its position on marriage and polygyny, birth control and abortion, role for children and women's status in the family. We have also considered empirical studies of Islam and fertility. The arguments do not appear to provide unambiguous support for the 'traditional' view of Islam and fertility (according to which Islam fosters high fertility because of polygamy and unilateral divorce). However, there seems to be some persuasive evidence that the content of

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[52] World Bank, 1991; Farid, 1987; Omran, 1980.
[53] Nagi, 1984: 189-204.
[54] Caldwell, 1986: 171-220.
[55] Gallagher and Searle, 1983; Lutz, 1983: 15-35.
[56] Obermeyer, 1992: 50.

the Islamic religion encourages high fertility because of low autonomy for women and son-preference. However, it is not clear whether this is any different from the effect on fertility of the content of other religions, such as Hinduism. One way of assessing the extent to which the theological content of Islam is likely to be playing a role in the social and demographic situation of Islamic societies is to compare and contrast it with the content of Hinduism.

2. Hinduism

> Hinduism, like the curate's egg, is good only in parts. It is admirable and abhorrent, saintly and savage, beautifully wise and dangerously silly, generous beyond measure and mean beyond all example.[57]

Hinduism is a difficult religion to analyse because of its diversity of gods, sects, philosophies and cults. In order to draw out the main tenets of Hinduism that are relevant to our discussion, we will rely on a philosophical articulation of the 'Hindu view of life'.[58]

a. The basic tenets and structure of Hinduism

Unlike in the case of Islam, there is no one religious book which contains all the teachings of Hinduism. However, there is a large number of writings and scriptures which put forward Hindu beliefs. These include the Vedas, the Upanishads, the Bhagavad Gita, and the epic poems Ramayana and Mahabharata.

Philosophically, the main religious experience of Hinduism is the common quest for salvation (moksha) of the human soul, in an attempt to bridge the gap between the infinite real self (aatman) and the finite or empirical body (guna). The gap is bridged when the empirical self (guna) is disciplined to tread the path of righteousness (dharma). Until that point, the

[57] Radhakrishnan, 1939: 338.

empirical self is believed to follow a cycle of births, with life in each birth determined by the actions (karma) in the past birth and in the present.

However, in this common quest, Hinduism does not preach asceticism. Rather, it exhorts followers to engage in 'worldly' activities, but to do so in a detached manner. Thus, Hinduism lays out a 'code of conduct' for the individual, particularly in relation to the society in which he/she lives, in order to achieve the religious goals of changing 'body into soul, to discover the world's potentiality for virtue, and derive happiness from it (lokasamgraha)'.[59] In essence, this Hindu conception of a 'code of conduct' is similar to the way in which Islam prescribes a 'way of life' for its followers.

The Hindu code of conduct encapsulates the fourfold objects of life, the fourfold succession of the stages of life, and the fourfold ordering of society as follows. The fourfold objects of life (purusartha) are desire and enjoyment (kama), interest (artha), ethical living (dharma), and spiritual freedom (moksha). In order to achieve these, the individual has to progress through four stages (aasrama): student (brahmachari), householder (grihastha), forest recluse (vanaprastha), and the free suprasocial man (sañ ñyasin). However, individuals are organised within society into a fourfold order (varna): 'the man of learning (brahmin), the man of power (kshatriya), the man of skilled productivity (vaisya) and the man of service (sudra).'[60] The spirit behind this fourfold order is essentially that learning, power, skills and service are the indispensable elements of any social order. Moreover, this scheme is meant to provide a framework for guidance for the individual, with an emphasis on conduct (karma) rather than belief (bhakti), but strictly within a social context. Thus, while the theory of varna emphasises the social aspects, the theory of aasrama dwells on the individual. The implications for fertility of this ordering of society and caste endogamy is that social mobility

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[58] Radhakrishnan, 1927; Radhakrishnan, 1947; Radhakrishnan, 1939; Gopal, 1989: 73-78.
[59] Radhakrishnan, 1939: 353.

of the individual may be dependent on caste mobility, with fertility influenced by the norms of the caste, or by the restricted socio-economic opportunities of certain castes.

b. Hinduism on marriage, polygamy and divorce

In a discussion of Hinduism and its impact on fertility, the grihasthaasrama (or householder) stage of the 'Hindu view of life' is particularly relevant. Similar to the Koranic position on marriage, Hindus are encouraged to enter married life.[61] Moreover, marriage is important in Hinduism.[62] This is indicated by the fact that the Hindu gods are always depicted as being married (unlike the cases of Christianity and Islam), and that no god in the Hindu pantheon is ever depicted in a temple or other place of worship without at least one consort, which in itself may provide evidence for the sanction of polygyny. However, the perfect marriage, which is repeatedly idealised in the Hindu scriptures, is the monogamous one, epitomised by the relationship between the gods Rama and Sita or Savitri and Satyavan, where both stand by each other through various trials. Polygyny was tolerated in the Hindu scriptures as well, but only in the absence of male offspring.[63] The religious epic poem Ramayana does in fact highlight the evils of polygamy.[64] Polygyny became illegal for Hindus in India in 1955 with the Hindu Marriage Act legislation. Moreover, in scriptural Hinduism, the indissolubility of marriage is the ideal, but in certain circumstances, divorce is permitted. As Kautilya argues in the Arthasastra, 'if the husband is of bad character, or is long gone abroad, or is guilty of high

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[60] Radhakrishnan, 1939: 351. The earliest reference to these four classes is found in the Purusa sukta verse in the Rg Veda.

[61] Radhakrishnan, 1939: 379. The Hindu scriptures outline eight different forms of marriage - paisaca, rakshasa, asura, gandharva, arsa, daiva, prajapatya and brahma. For more on this, see Radhakrishnan, 1947: 165.

[62] For example, the Nitimanjari argues that 'Home is not what is made of wood and stone; but where a wife is, there is a home.' See Radhakrishnan, 1947: 149.

[63] This may be construed as an indication of son-preference, which is dealt with in a subsequent section.

[64] For more on this, see Radhakrishnan, 1927: 61.

treason, or is dangerous to his wife, or has become an outcast, or has lost virility, he may be abandoned by his wife.'[65]

c. Hinduism on birth control and abortion

Hinduism does not explicitly say anything about limiting births. Abortion and the decision to use contraception are regarded as women's personal matters which are not within the purview of religious injunction. One explanation for this may be the notions of 'purity and pollution' in Hinduism, which are strictly upheld in the day-to-day practice of traditional Hinduism. For example, matters pertaining to the reproductive functions of women, such as menstruation or childbirth, are viewed as making women temporarily 'impure'.[66] In scriptural Hinduism, the only reference to the control of births is indirect, in the context of norms about abstinence. For example, Vyasa argues that, 'He [the householder] should avoid intercourse with his wife when she is old or barren or ill-behaved, when her children die or when she has not yet attained maturity, when she gives birth to daughters only or has many sons.'[67] Thus, strict notions of 'purity and pollution' may be one reason why abortion and birth control issues are not specifically addressed in the Hindu scriptures. In contrast, the role for children and the importance of the family ideal are repeatedly stressed.

d. Hinduism on women's status in the family, children and son-preference

In Hinduism, the role of women in the family is considered very important. As Radhakrishnan argues, the 'general Hindu view of woman is an exalted one - it regards the woman as the helpmate of man in all his work: sahadharmini.' He cites Sayana, a

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[65] Arthasastra: III.3, as quoted by Radhakrishnan, 1947: 181-182.

[66] This is reflected in the Hindu custom that no members of a family in which a birth has just taken place are allowed to visit a temple or to engage in auspicious religious occasions such as weddings, from a minimum of ten to a maximum of up to forty days after the birth. This is also true of deaths, though the period of mourning extends for one whole year.

commentator on the Rg Veda, who said that 'The wife and the husband, being the equal halves of one substance, are equal in every respect; both should join and take equal part in all work, religious and secular'(emphasis added)[68]. In one form, the god Shiva is androgynously depicted as ardhanarisvara, (half-man and half-woman), emphasising the importance of the masculine and the feminine in the Hindu faith.

Women's position in the family in Hinduism is slightly different to women's position in Islam. In scriptural Hinduism, women are regarded as being equal to men within the family to a greater extent than is the case in scriptural Islam. However, as in the case of Islam, for devout Hindus establishing a household is considered a fundamental duty. On the position of women in the family, and the functions of the householder as a step towards spiritual growth, Hindu thought essentially argues that 'The wife has an equal position with the husband in all domestic and religious concerns ... Every woman has a right to marry and have a home.'[69]

It is interesting that when compared with Islam, where the role for women was mainly to 'uphold family honour', the role for women in Hinduism is much more clearly defined to be 'equal in every respect'. However, though Radhakrishnan does not explicitly comment on this, the Hindu scriptures mainly see the woman only in relation to the man, and give her an 'equal', 'exalted position', as a 'helpmate' only within marriage and the family. It is important to note that though women are not considered inferior to men within the family in Hinduism (unlike in the case of Islam), there are few independent roles assigned to them outside the domestic sphere.

A separate issue that can be important in some contexts but which is not relevant to the present study is that of women's rights to land. Traditionally, the Hindu law of land

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[67] As quoted by Radhakrishnan, 1947: 189.
[68] Radhakrishnan, 1927: 61.
[69] Radhakrishnan, 1939: 379.

inheritance implies that women cannot inherit land. Furthermore, as Agarwal argues, even in parts of India which have established rights in land, women may not exercise effective control over land, even when they own it.[70] This question is not pursued further in the present study because there was no variation across women in Ramanagaram with respect to land ownership rights and hence this factor cannot account for differences in their demographic behaviour.

The lack of independent roles assigned to women outside the home is justified by the Hindu scriptures using notions of women's supreme 'self-sacrifice' of which they are seen as being more capable than men.[71] The Hindu scriptures also put forward the view that because child-rearing takes up parental time, women need not be 'burdened' by having to work outside the home in order to shoulder the economic responsibilities of the family, but that the latter is to be undertaken by men: 'While man has to take to worldly pursuits (yajñapradhanya), woman is capable of self-control and self-denial (tapahpradhanya).'[72] It must be noted here that this essentially religious notion of 'women's self-sacrificing nature' is reflected, even today, in the unequal distribution of food and health-care allocations between men and women, sons and daughters, high birth-order and low birth-order children, which many economists and others have observed in analysing intra-household resource allocation in rural households in India.[73] It is thus easy to see that as far as the content of Hinduism is concerned, women appear to be unequally 'equal', and that their consequent lack of autonomy may have implications for fertility.

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[70] Agarwal, 1994.

[71] This is similar to ideas of women's ability to sacrifice for the family in Victorian England. See McNay, Humphries and Klasen, 1997.

[72] Radhakrishnan, 1927: 61.

[73] Dasgupta, 1993a: 343-370. Although it is important to note that some evidence suggests that intra-household nutritional discrimination against women is confined to parts of north India. See Harriss, 1990.

This is reinforced by the great emphasis in Hindu philosophy on children and especially the role for surviving sons.[74] In Hinduism, marriage is 'prescribed for the development of the personality as well as continuance of the family ideal ... At the end of the (Sraddha) ceremony the performer asks, "Let me, O fathers, have a hero for a son!"' [75] A common Vedic blessing for newly-married Hindu women is 'May you be the mother of a hundred sons'. The Mysore Population Study described one of the traditional Vedic blessings for married women popularly used in Karnataka 'May she bear ten sons, and make of her husband an eleventh!'[76], which is a good example of how the 'pure religion effect' may have operated to encourage high fertility in traditional Hindu societies in the past. Thus, philosophically, the emphasis of Hinduism on marriage and having children (especially sons), may provide a purely religious motive for high fertility.

e. Empirical evidence for the influence of Hinduism on fertility

Empirical evidence for the impact of the Hindu religion on fertility is scarce. The Mysore Population Study noted differences in fertility by religion in erstwhile Mysore state. In its in-depth study of attitudes towards family size, it concluded that Hindu religious traditions in Indian society favoured having many offspring.[77] This study also showed that after childbirth, Hindu women spent on average, a 53-week interval away from their husbands in their parents' home, and that this was connected with Hindu religious beliefs about women's 'purity and pollution' after childbirth, while Muslim women stayed away from their husbands

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[74] For example, 'The Hindu scriptures speak of the three debts we have to pay: to the rishis by Vedic study, to the gods by sacrifices, and to the ancestors by offspring.' See Radhakrishnan, 1947: 150-151.
[75] Radhakrishnan, 1927: 59-60.
[76] Mysore Population Study, 1961: 130.
[77] Mysore Population Study, 1961: 130-156.

for an average of only 28 weeks.[78] The study argued that this may have explained higher fertility among Muslims than Hindus in Mysore state at that time.[79]

3. Islam and Hinduism compared

A cursory look at the philosophical content of Islam and Hinduism suggests significant dissimilarities: a monotheistic Islam with a closed line of Prophets versus a polytheistic Hinduism with a pantheon which is continually admitting new deities; an egalitarian view of the ordering of society versus the socially structured hierarchy of caste; the creation of one mind versus the amalgamation of diverse beliefs and philosophies; the Islamic emphasis on a 'common creed', the Hindu experience of the 'common quest'.

However, a more detailed look at the main tenets of Islam and Hinduism, in the specific context of religion and fertility, suggests significant similarities between the two religions, especially with regard to their positions on marriage and the value of children. Essentially, both Hinduism and Islam view religion similarly: in Islam as a way of life, in Hinduism as an experience which prescribes a code of conduct. Second, both religions espouse a degree of fatalism and put a high value on asceticism and/or renunciation as the true path to spiritual growth. Thirdly, though in theory neither religion has a 'church' or a 'priesthood', both religions have evolved classes of people (the religious pundits of Hinduism and the ulema of Islam) who dedicate themselves to interpreting religious scriptures and applying them to real-life situations. More particularly, in India there is a caste system among Muslims with the same rigidity of endogamy as that found among Hindu castes. Fourth, scripturally, the position of women in these two religions is similar. In the case of Islam, though women are assigned a lower status than men, women are expected to 'uphold family honour and prestige'. In the Hindu scriptures, women have an 'exalted and equal' position, but only in

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[78] Mysore Population Study, 1961: 137.

the domestic sphere. Moreover, neither religion assigns an independent role for women outside the family. Fifth, both religions emphasise the importance of marriage and actively encourage it. Sixth, both religions set great store by children as a way of glorifying the family ideal, especially emphasising the role of sons in continuing the lineage. Perhaps where the two religions do differ most is in terms of their attitude to birth control and abortion. Hinduism does not explicitly express any religious opinion (at least scripturally) for or against birth control or abortion. Indeed, Hindu concepts of 'impurity' may reduce fertility if they lead to longer sexual abstinence during menstruation and after childbirth. In contrast, various schools of Islamic thought have argued that birth control is permissible but only in restricted situations. However, this is subject to wide variation, leaving considerable room for alternative interpretations of what Islam does say on these matters at a practical level.

Finally, it must be understood that in countries such as India, there is a 'meeting of religions', and a pruning of Islam's more dogmatic aspects, where the Shia Muslim sect is closer to Hinduism than the Sunni sect, and Muslim sects such as the Khojas have tenets which are a mixture of Vaishnava and Shia doctrines.[80] This 'meeting of religions' is best seen in Islam which, 'borrowed its idea of Messiah from Judaism, its dogmatism and asceticism from Christianity, its philosophy from Greece, and its mysticism from India and Alexandria.'[81] Moreover, Sufiism is similar to the Advaita Vedanta, with Sufis abstaining from meat and believing in reincarnation, like orthodox Hindus.

Thus, despite the theologically different points of the spectrum from which Islam and Hinduism emerge, there appear to be some significant similarities, at least in terms of their beliefs about the influence of religion on conduct, and their positions on the importance of marriage and the family. In terms of content alone, both religions would appear to foster high

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[79] Mysore Population Study, 1961: 119-120; see also Chandrasekaran, 1952.
[80] For example, the Khojas believe that one of their Prophets is the tenth incarnation of Vishnu.
[81] Radhakrishnan, 1939: 339.

fertility, with little practical difference between the two. This is not meant to imply that the content of these two religions does not or cannot affect demographic outcomes. Rather, this suggests that any differences between Hindu fertility and Muslim fertility is more likely to be the result of different interpretations and differing degrees of adherence to religious precepts by individual Hindus or Muslims in real-life situations. It must be noted also that this is influenced by the institutions through which these religions operate: for example, in matters relating to birth control or abortion, the ulema are in a position to interpret Islam for followers, whereas in the case of Hinduism, the lack of explicit scriptural injunctions may mean that priests are not consulted on these matters. This difference in the role of religious institutions in influencing decisions about contraception was clearly evident in Ramanagaram, in an interview with the local mullah, who was educated in a madrasa in Bihar, and who was personally opposed to family planning. He said clearly that he would not advocate birth control or abortion (and, in fact preached against it) to the townspeople because it was against the tenets of Islam. On the other hand, the two Hindu priests interviewed said that they were not consulted about personal matters such as birth control; and that they were usually approached by the townspeople only if a family member was suffering a grave illness.

B. The 'characteristics' hypothesis

A second, and distinct, view of how religion may affect fertility is the 'characteristics hypothesis'. This hypothesis argues that fertility differentials between populations reflect socio-economic differences between members of different religious groups.[82] It is thus possible that the fertility of one religious community may differ significantly from that of another, but for reasons other than the philosophical content of religion, such as differences in income or educational levels. In addition, there are situations in which both the 'theology'

[82] Riccio, 1979: 199-228.

and the 'characteristics' mechanisms may work in combination. For example, religion may act to discourage investment in 'child quality' if it translates into low autonomy or status for women. This is partly the pure religion effect in operation, but it might work through a 'characteristics' effect as well.

One important characteristic of a religious community may be its minority group status. It is hypothesised that fertility for a minority community may be higher if it feels threatened by the majority community in political, economic or social spheres.[83] This is also likely if identification with a religious organisation can be used for economic gain and rent-seeking activities. This is particularly relevant in countries such as India where religion has been used in the past as a means of gaining legitimacy in the eyes of the state in order to corner some portion of the gains from development. For example, at the level of local government institutions, election to political office in religiously segmented populations (such as in Ramanagaram) depends not merely on economic affluence and high social status but also on numerical preponderance. A second example is that members of particular religions may be prevented from engaging in certain occupations. Thirdly, there may be differential access to education or types of educational system for those belonging to different religions.

Empirical evidence for the 'characteristics' hypothesis is widespread. As with the 'pure religion effect' hypothesis, this literature focuses on differences in fertility between Catholics and others, or Muslims and others. Empirical evidence for the 'pure religion effect' hypothesis is found in studies that consider the demographic experience of Catholics and Protestants in the Unites States and Australia. It has been argued that from the 1940s to the 1960s in the United States, white Catholic couples consistently had more children than white

[83] Van Heek, 1966: 125-138; Stinner and Mader, 1975: 53-59.

Protestant couples, even after controlling for socio-economic factors such as education.[84] Using data from the 1973 Social Mobility Survey in Australia, Miller argued that Catholics had larger families than did people who belonged to other denominations.[85] Other multivariate analyses of Catholic samples which have found a positive association between religion, devoutness and high fertility are Westoff and Ryder, Mosher and Hendershot, and Sander.[86]

Other studies of Catholic-Protestant differentials have emphasised socio-economic factors in accounting for differences. These factors include education, occupation and residence. Galloway, Hammel and Lee argued that in Prussia between 1875 and 1910, while religion was an important indicator of fertility level, loss of religion contributed little to fertility decline.[87] Golde's cross-sectional study in 1971 of two neighbouring Catholic and Protestant villages in Baden-Württemberg in Germany suggested that Protestantism, by stressing literacy for religious reasons, enabled Protestant farmers to read technical agricultural journals, leading to earlier mechanisation than among the Catholics, a decline in children's labour value and hence a diminished incentive to have high fertility.[88]

One main concern in the debates on Catholic/non-Catholic fertility in the context of the 'characteristics hypothesis' has been the increasing divergence between Catholics and non-Catholics between 1945 and the mid-1960s, followed by more rapid convergence during the 1970s.[89] Westoff and Jones, in a study of white women in intact first marriages in the USA in

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[84] There are very few studies using economics methods which explicitly consider religion in models of fertility. The few which have done so include Rosenzweig and Schultz, 1985: 992-1015; Boulier and Rosenzweig, 1978: 487-497; Sander, 1995: Chapter 4.

[85] Miller, 1988: 65-79.

[86] Westoff and Ryder, 1977; Mosher and Hendershot, 1984: 671-677; Sander, 1995.

[87] Galloway, Hammel and Lee, 1994: 135-158.

[88] Golde, 1975. This is relevant to India as well, where some upper caste Hindus had access, initially, to religious education, and then to western scientific education more easily than others.

[89] Westoff and Jones, 1979: 209-217; Westoff and Ryder, 1977: 431-453; Janssen and Hauser, 1981: 511-528; Mosher and Hendershot, 1984: 671-677; Blake 1984: 329-340.

the 1960s and 1970s, attributed this pattern of divergence and convergence to five factors.[90] The divergence was caused by social, economic and residential differentiation between Catholics and other Americans; by strong minority group feelings among the Catholics; by a tendency of Catholic schools and institutions to contribute to minority group consciousness; and by church sanctions against contraceptive use. The subsequent convergence in the late 1960s and the 1970s was caused by secular forces, such as the rejection of church teaching on birth control, the great increase in the proportion of Catholics in the middle class, and the suburbanisation of Catholics. Another study, by Mosher and Hendershot, of white women in the USA found that while the fertility of Catholics and non-Catholics was converging, the differential was larger than that found by Westoff and Jones.[91]

Evidence for the 'characteristics hypothesis' is also to be found in studies of Islamic populations. In one of the few studies which considered religion by sectarian denomination, Chamie conducted a study of five religious groups in Lebanon.[92] These were Shia Muslims, Sunni Muslims, Druze Muslims, Catholic and non-Catholic Christians. The total fertility rates for these groups varied from 6.5 to 3.3. Chamie pointed out that within the Muslim community there was wide variation, and that Druze Muslims had similar fertility to the non-Catholic Christians. He also concluded that religious differentials in fertility were only significant at low levels of the wife's education, so that religion is an important characteristic in differentiating fertility behaviour only at certain socio-economic levels. Though this study provides support for the characteristics hypothesis, more importantly, it illustrates that there may be an interaction between the 'pure religion effect' and the 'characteristics' effect. As observed above, the experience of the Arab countries supports both the 'characteristics' hypothesis and, to some extent, the 'particularised theology' hypothesis.

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[90] Westoff and Jones, 1979: 209-217.
[91] Mosher and Hendershot, 1984: 185-191. The differences in the Mosher and Hendershot analysis is probably due to the inclusion of Hispanic women who are mainly Catholic.
[92] Chamie, 1977: 365-382.

There are also a number of empirical studies which support the hypothesis that minority group consciousness is an important 'characteristic' which affects fertility. Van Heek and Day argued that Roman Catholic fertility was observed to be higher than Protestant fertility only in areas where Catholics believed they were being threatened by Protestant domination.[93] Stinner and Mader studied family planning in two Muslim populations in the Philippines.[94] One research area was 94% Muslim, the other was only 20-35% Muslim. Stinner and Mader discovered that family planning was more popular in the area having a higher proportion of Muslims. Another study by Heer and Youssef compared demographic indicators for six predominantly Islamic republics of the former USSR with the non-Islamic nationalities.[95] They found that ideal family size in 1975 for the Islamic nationalities was 6.05 while the expected number of children was 6.24. For the non-Islamic nationalities, the corresponding figures were 2.68 and 2.16. These authors also argued that economic development may have increased Islamic fertility, with the minority status argument exacerbating the situation, because Marxist ideology was at variance with Islamic ideology.[96]

Evidence for the characteristic of 'minority group consciousness' is also found in the case of Sri Lanka in the 1960s, where there was latent Buddhist opposition to contraception. Ling has argued that this was the result of heightened Sinhalese-Tamil conflicts, in which the ethnic and cultural identities of both groups were perceived as being threatened.[97] Ling found that in the 1960s, Buddhist monks in Sri Lanka were conducting a vigorous campaign against contraception on the grounds that it would substantially reduce the Sinhalese population relative to Tamil Hindus and Muslims.

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[93] Van Heek, 1966: 125-138; Day, 1968: 27-50.
[94] Stinner and Mader, 1975: 53-59.
[95] Heer and Youssef, 1977: 155-173.
[96] This is similar to the argument that economic development has direct effects encouraging fertility and indirect effects which discourage it. See Heer and Turner, 1965: 279-292; Heer, 1966: 423-444.
[97] Ling, 1980: 581.

In conclusion, both the 'particularised theology' hypothesis and the 'characteristics' hypothesis suggest that differences in fertility by religion reflect the influence of organised religion on fertility. The 'pure religion effect' operates through the religion's norm-enforcing abilities and its ability to impose sanctions. However, differences in fertility by religion may merely reflect differences in the socio-economic characteristics of a religion's members. Among these characteristics, a particularly important one may be minority group consciousness. Empirical evidence for both these hypotheses has been mainly observed from (though not restricted to) fertility differentials between Catholics and non-Catholics, and those between Muslims and non-Muslims. This empirical literature has suggested that over time, as identities become less distinctive and the economy develops, there is convergence in fertility between religious communities. For example, some countries, such as Malaysia and Indonesia (and more recently Bangladesh) - all Islamic countries by political orientation - have witnessed declines in their total fertility rates. However, it should be pointed out that Malaysia and Indonesia are not wholly Muslim in terms of population, and that family planning may be more readily available in these countries, either due to the needs of the other religious populations or due to government efforts.[98] This illustrates the way in which the effect of religion is heavily dependent on its being supported (or opposed or counteracted) by other institutions such as the state. This implies that though we need to consider the norm-enforcing strength of religion, we must also look towards its ability to interact with social arrangements and other institutions in society over time.

Finally, it is necessary to examine briefly trends in fertility over time by religion in India as a whole and in Karnataka state in order to see if there is empirical evidence from India supporting either the characteristics hypothesis or the pure religion hypothesis. In 1995,

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[98] Cleland, 1993: 345-352.

Census data on religion were published by the Government of India. These data provided statistics on selected demographic indices by religion, as shown in Table 1.

Table 1: Selected demographic indices by religion for India (1995)

Religion	Total population	Sex ratio (females pre 1000 males)	% of total population (1981)	% of total population (1991)*	% decadal growth rate (1971-81)+	% decadal growth rate (1981-91)+	Urban population	% of urban population to total population	% of total urban population
Hindu	687.6	925	82.63	82.00	24.14	22.78	164.7	24.0	76.35
Muslim	101.5	930	11.36	12.12	30.69	32.76	36.0	35.5	16.70
Christian	19.6	994	2.43	2.34	16.83	16.89	6.1	31.1	2.85
Sikh	16.3	888	1.96	1.94	26.15	25.48	3.8	23.3	1.75
Buddhist	6.3	952	0.71	0.76	22.52	35.98	2.3	36.5	1.05
Jain	3.3	946	0.48	0.40	23.17	4.42	2.4	72.7	1.09
Others	-	-	0.42	0.38	26.61	13.19	-	-	-
Religion not stated	-	-	0.01	0.05	66.88	573.46	-	-	-

*Excludes figures of Jammu and Kashmir where the Census was not held
+Excludes figures of Assam and Jammu and Kashmir
(Source: Census of India 1991, Paper 1 of 1995 on Religion)

The data show that while the decadal growth rate of population increased for the Muslims between the 1970s and 1980s, it has decreased for the Hindus and remained constant for the Christians. However, the proportion of the population belonging to different religions remained almost unchanged between 1981 and 1991.

In this context, it is also useful to examine data taken from the 1991 Census on the distribution of the population by religion among the Indian states, which is shown in Table 2.

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Table 2: Distribution of population by religion, selected Indian states (1981-1991)

State	Hindus		Muslims		Christians	
	% of total population (1991)	% increase 1981-1991	% of total population (1991)	% increase 1981-1991	% of total population (1991)	% increase 1981-1991
Andhra Pradesh	89.14	24.74	8.91	30.66	1.83	-15.14
Bihar	82.42	22.72	14.81	29.50	0.98	13.99
Gujarat	89.48	21.12	8.73	24.05	0.44	36.96
Haryana	89.21	27.18	4.64	45.89	0.10	28.52
Himachal Pradesh	95.90	20.95	1.72	28.04	0.09	12.16
Jammu and Kashmir	32.24	-	-	-	-	-
Karnataka	85.45	20.66	11.64	25.71	1.91	11.12
Kerala	57.28	12.62	23.33	25.49	19.32	7.41
Madhya Pradesh	92.80	26.61	4.96	31.21	0.65	21.20
Maharashtra	81.12	25.29	9.67	31.40	1.12	11.26
Orissa	94.67	19.11	1.83	36.83	2.10	38.67
Punjab	34.46	12.73	1.18	42.42	1.11	21.75
Rajasthan	89.08	28.09	8.01	41.46	0.11	21.28
Tamil Nadu	88.67	15.15	5.47	21.14	5.69	13.63
Uttar Pradesh	81.74	23.11	17.33	36.54	0.14	23.04
West Bengal	74.72	21.09	23.61	36.89	0.56	19.96
India	**82.41**	**22.78**	**11.67**	**32.76**	**2.32**	**16.89**

- The Census was not conducted in the state of Jammu and Kashmir in 1991.
(Source: Census, 1991, Paper V on Religion, 1995)

The table shows that over the 1981-91 period, Hindu fertility has grown less than Muslim fertility in states where Hindus predominate. However, in states where Muslims predominate, Muslim fertility has grown less than Hindu fertility.

It is instructive to compare these figures with those for Karnataka, shown in Table 3.

Table 3: Distribution of population by religion, Karnataka state (1991)

Religion	% of total population (1981)	% of total population (1991)	% decadal increase (1971-81)	% decadal increase (1981-91)
Hindu	85.77	85.45	25.74	20.66
Muslim	11.21	11.64	33.74	25.71
Christian	2.08	1.91	26.18	11.12
Sikh	0.02	0.02	-6.28	57.80
Buddhist	0.11	0.16	198.83	72.81
Jain	0.77	0.73	29.99	14.62
Other religions	0.04	0.01	32.95	-50.97
Religion not stated	0.00	0.08	375.82	8242.03

(Source: 1981 Census and 1991 Census of India, Paper 1 of 1995 on Religion)

Hindus are the majority religious community in Karnataka to an even greater extent than in India as a whole. Although the proportions of Hindus, Muslims, Sikhs, Jains and Buddhists remained more or less constant between 1981 and 1991, there was a fall in the proportion of Christians. Compared to 1971-81, decadal growth rates have fallen for all religious communities in Karnataka except the Sikhs. This is consistent with the general decline in fertility figures for the state as a whole.

Finally, we can compare these figures with those for Bangalore rural district, in which Ramanagaram is located, shown in Table 4.

Table 4: Distribution of population by religion, Bangalore rural district (1991)

Religion	Total population	% of total population	Total urban population	% of total urban population	Total rural population	% of total rural population
Hindu	1520520	90.88	218281	71.97	1302239	95.06
Muslim	144337	8.63	81656	26.92	62681	4.58
Christian	6559	0.39	2429	0.80	4130	0.30
Jain	1147	0.07	779	0.26	368	0.03
Buddhist	24	0.001	8	0.003	14	0.001
Sikh	197	0.01	85	0.03	112	0.008
Others	47	0.003	47	0.02	0	0.00
Religion not stated	365	0.022	1	0.0003	364	0.03
Total	1673196	100	303286	100	1369908	100

(Source: 1991 Census of India, Paper 1 of 1995 on Religion)

Hindus are the majority community, forming over 90% of the population in the district. Minority communities such as the Muslims and Christians form a greater proportion of the urban population than the rural population of Bangalore rural district. In particular, the Muslims make up nearly 27% of the urban population, but less than 5% of the rural population.

It is instructive to compare these findings with those presented by the Mysore Population Study conducted by the United Nations in 1961.[99] That study found that for Mysore state as a whole in 1961, the crude birth rate was 40 per 1000, the crude death rate was 18 per 1000, and the rate of natural increase was 22 per 1000.[100] At the time this was well above world averages, and very high in comparison with India as a whole, a fact attributable mainly to the very low death rate at the time.[101] The total number of children ever born in the category 'towns', under which Ramanagaram was included, was 3.9.[102] Average family size for women over 45 in that survey was 5.6 for women in 'towns', 6.7 for Muslims and 5.2 for Hindus.[103] The study attributed this difference to the shorter periods of sexual separation after childbirth between husbands and wives for Muslims compared with Hindus, and to taboos on

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[99] Mysore Population Study, 1961.
[100] Mysore Population Study, 1961: 78.
[101] Mysore Population Study, 1961: 78.
[102] Mysore Population Study, 1961: 110-111.

sexual relations for prolonged periods during lactation for Hindus, and abstinence on a larger number of religious days for Hindus, which were widely observed in the local population.[104] The study observed that 'the relatively high percentage of Muslims in the towns is a factor tending to raise the average number of children there'.[105] The study found that the non-backward castes showed slightly higher fertility (4.0) than the scheduled castes (3.3) and the backward castes (3.1).[106]

More recently, the National Family Health Survey calculated the total fertility rates and mean number of children ever born for women aged 40-49 for the three years preceding the survey, and reported their results by religion.[107] The figures for Karnataka are shown in Table 5.

Table 5: Total fertility rate and children ever born, Karnataka (1992-93)

Religion	Total fertility rate (for women aged 15-49 years)	Mean number of children ever born to women aged 40-49 years	Total wanted fertility rate
Hindu	2.73	4.57	2.10
Muslim	3.91	5.82	2.88
Christian	2.25	(3.50)	1.98
Other	(1.54)	*	(0.92)
Total	2.85	4.65	

( ) rate based on 125-249 person-years of exposure and mean based on 29-45 cases
* mean not shown, based on less than 25 cases
(Source: Compiled from the National Family Health Survey 1992-93, Karnataka, 1995: Table 5.2: 62 and Table 7.9: 126.)

The differences in fertility by religion are very large. In terms both of current fertility and of cohort fertility, Muslims appear to have the highest fertility of any religious group, followed by the Hindus. The difference is one child per woman, on average. More recent estimates from the Human Development Report of 1999 also suggest that the total fertility rate for ever-married Hindu women in Karnataka is 2.3 while that for ever-married Muslim women is

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[103] Mysore Population Study, 1961: 119-120.
[104] Mysore Population Study, 1961: 120.
[105] Mysore Population Study, 1961: 120.
[106] Mysore Population Study, 1961: 120-121.
[107] National Family Health Survey 1992-93: Karnataka, 1995: 62-63.

3.9.[108] The difference between the total 'wanted' fertility rate (a concept discussed in detail in Chapter 5 below) and the total fertility rate is greatest for Muslim women, at one child on average. The available demographic indices for India as a whole and Karnataka in particular therefore suggest considerable differences between religious groups, especially between Hindus and Muslims.

A review of the literature suggests that it would be desirable to have more quantitative studies of the impact of Islam on fertility. This is an important area for future research and is particularly relevant for comparing the impact on fertility of Islam and of Hinduism. One of the earliest anthropological studies which looked at fertility issues at the micro-level, and still one of the very few studies to do so, was that conducted by Dandekar in 1959 in six rural communities in the state of Maharashtra in western India.[109] Yet, even though this study was conducted in a population having members belonging to different religions, it not only failed to place any emphasis on the issue of religious differentials in fertility, but hardly mentioned religion at all. Instead, it simply examined the use of contraception in the villages, and investigated how it was related to fertility outcomes. Modern sociological analyses of religion and fertility in the Indian context have used religion mainly as a means of categorising the population than as an explanatory variable. Almost none have used multivariate analysis. An outstanding example, and therefore one of the most valuable studies of religious differences in fertility, is that conducted by Jeffery and Jeffery in north India, a study discussed in detail in Chapter 4.[110] It is partly these exogenous gaps in the existing literature - the paucity of micro-studies, of quantitative data, and of those using multivariate analysis - that has led the present study to seek to combine a multivariate analysis of religion and fertility with an anthropological exploration of the qualitative factors that affect religion and fertility in south India today.

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[108] Shariff, 1999.
[109] Dandekar, 1959.
[110] Jeffery and Jeffery, 1997.

In the debate about the relationship between religion and fertility, there seem to me to be four basic questions. First, should the observed higher fertility of minority communities (mainly Muslim) in India be attributed to socio-economic characteristics or to theological beliefs?[111] Does the frequency or intensity of religious observance influence fertility? How does women's status vary across religions and is this significant for fertility? Finally, might 'convergence' between religious groups (as in the case of Catholic and non-Catholic fertility in the 1970s in the USA) take place in any society? In the present study, an attempt is made to answer these questions by examining attitudes towards religion, religious observance and their effect on nuptiality, contraceptive choice and fertility in the taluk of Ramanagaram in southern Karnataka.

[111] Mandelbaum, 1974: 46.

CHAPTER 2

Ramanagaram: Mythical Origins, Present-Day Realities

The town of Ramanagaram, lying on the Bangalore-Mysore highway in the south Indian state of Karnataka, is named from the hill that partly surrounds the town, called Ramagiri (see Maps 1 and 3). Popular myth explains that when the Hindu god Rama was banished from his kingdom in Ayodhya, and wandered in the forests of the Deccan for 14 years, he chanced one day to rest on the hill of Ramagiri, so named as the 'hill of Rama'. His wife, the Goddess Sita, was thirsty, and so Rama procured water for her by piercing the surrounding rocks with an arrow. The resulting pool of water was then kept within by the large boulder-like formations that may still be seen in Ramanagaram today.[1]

The name Ramanagaram itself was a post-Independence invention, as the town was always named 'Closepet' in the colonial period. This name was derived from the name of a British colonel named Close, who stayed one night on the hill of Ramagiri with his troops and the town was named to mark his halt there. Closepet or Ramanagaram as we know it today is a bustling town of 50,437 people according to the 1991 Census. Located in Ramanagaram taluk[2] that is itself nestled between Kunigal taluk in the north-west, Chennapatna taluk in the west and Kanakapura taluk in the east, Ramanagaram is one of the main silk towns in the sericulture belt of southern Karnataka, producing the raw silk yarn that is required for India's large and diverse silk weaving industry (see Map 4). The yarn is then transported to all the major weaving centres such as Kancheepuram, Dharmavaram and Hyderabad in south India and to Varanasi in the north.

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[1] This episode is narrated by Narasimaiah, 1994: Chapter 1.

[2] A taluk is a revenue sub-division and consists of about 100-300 villages. It is served by a number of revenue inspectors. The latter is usually in charge of a hobli, comprising a group of 20-30 villages within a taluk.

The town is watered by the River Arkavati, a tributary of the River Cauvery, which has its origins in the Nandidurga hills and, flowing from the north-east to the south-west in Ramanagaram, cuts right across the body of the taluk and the town and in so doing parallels the Bangalore-Mysore state highway that also runs through the town (see Map 4). The river provides the soft water which facilitates the silk-reeling process and thereby sustains the silk industry at Ramanagaram. This prized natural endowment has favoured Ramanagaram's silk industry, at least until recently.

I. Profile of a south Indian town

Before considering the details of my field study which focuses on a sample of 201 Ramanagaram women, it is essential to familiarise ourselves with the environment in which the women covered in the sample live, in particular some general information about Ramanagaram taluk, the town, its main sources of economic activity and its infrastructure.[3]

A. Structure

Ramanagaram is situated on the state highway (SH 17) between Bangalore and Mysore, 48 kilometres from Bangalore (see Map 3).[4] Table 1 shows the size of Ramanagaram taluk and Ramanagaram town in terms of area and population.

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[3] A study of Ramanagaram was carried out in 1995 by the Government of Karnataka in association with the Asian Development Bank, GHK/MRM International Ltd and the Tata Economic and Consultancy Services as part of the Karnataka Urban Infrastructure Development Project. To the best of my knowledge, this is the most thorough and comprehensive survey of the town and taluk in recent years.
[4] Ramanagaram is also directly on the broad-gauge railway line between Bangalore and Mysore.

Table 1: Location and distribution of households in Ramanagaram taluk (1991)

Ramanagaram	Area of village and hectares of town in sq. kms.	Number of occupied and residential houses	Number of households	Total population*	Males*	Females*
Whole taluk	630.64	38630	39057	205956	106467	99487
Rural	625.68	29559	29792	155519	80262	75257
Urban	4.96	9071	9265	50437	26205	24232

*includes institutional and homeless population.
(Source: 1991 Census, district/taluk primary census abstract, row 02.80)

By Indian standards, Ramanagaram is a medium-sized town with a moderate rate of growth of population.[5] The annual compound growth rate of population between 1981-91 was 1.4% for the town alone and 3.2% including the outer growth areas.[6] The growth rate for the town alone is low compared to the 1.92% for Karnataka and 2.14% for India as a whole over the same period, mainly because of the substantial amount of out-migration that is continually taking place from Ramanagaram to Bangalore, and to other cities in south India and elsewhere. In 1995, mean household size in Ramanagaram was estimated to be 5.6, and nuclear families comprised some 66% of total households.[7]

The breakdown of the population in Ramanagaram taluk, by religion, residence and sex is shown in Table 2.[8]

[5] A proposed boundary extension for Ramanagaram is being considered. According to the 1991 Census, 60,660 people live in the total area (i.e. the town and villages around it that will form a part of the boundary extension scheme) while the figures for 1994 are 53,273 and 66,381 for the town and total areas respectively. These figures are taken from the Outline Structure Plan for Ramanagaram, Final Report, 1995, Chapter 4, section 4.5.3: 4.27.
[6] This is defined as the city limits plus the villages that form a part of the proposed boundary extension programme for Ramanagaram.
[7] Karnataka Urban Infrastructure Development Project , 1995: appendix E.1: section 2.1-2.2: E.1.2.
[8] See also the Mysore Population Study, 1961: 56. The breakdown of the population by religion in 1961 was 70.8% Hindu, 25.9% Muslim, 3.0% Christian and 0.3% Others.

Table 2: Breakdown of population by religion, sex and residence (Ramanagaram taluk, 1991)

Category	Demographic index	Whole taluk	Rural	Urban
Total population		205956	155519	50437
Males	Numbers	106467	80262	26205
	Percentage	**51.69**	**51.61**	**51.95**
Females	Numbers	99489	75257	24232
	Percentage	**48.31**	**48.39**	**48.04**
Hindus	Numbers	172745	145942	26803
	Males	88964	75089	13875
	Females	83781	70853	12928
	Percentage	**83.87**	**93.84**	**53.14**
Muslims	Numbers	32101	9174	22927
	Males	16879	4926	11953
	Females	15222	4248	10974
	Percentage	**15.59**	**5.90**	**45.46**
Christians	Numbers	838	218	620
	Males	455	132	323
	Females	383	86	297
	Percentage	**0.41**	**0.14**	**1.23**
Other religions	Numbers	277	185	87
	Males	169	115	54
	Females	103	70	33
	Percentage	**0.13**	**0.12**	**0.17**

(Source: 1991 Census, village/town primary census abstract).

The most important feature of Table 2 is the religious composition of the population. Hindus form 84% of the population in the taluk, but only 53% of the population in the town. In contrast, the Muslims form 16% of the population in the taluk, but 46% of the population in the town. The Christians form approximately 0.4% of the population of the taluk and about 1.2% of the population in the town. Thus, the non-Hindu communities seem to be concentrated in Ramanagaram town.

In the Government of India Census of 1991, the total workforce is defined as the total number of main workers and marginal workers.[9] In Ramanagaram, the total number of workers (main plus marginal) was 16,932 in 1991. Of these, the majority, 13,423, are male. The total

[9] The main workers are those that are employed more than 183 days per year while the marginal workers are those that are employed up to 183 days per year.

number of workers expressed as a percentage of the total population in Ramanagaram is 33.6%. Main workers form 99.7% of the total workforce, although this percentage is a proportion of the sample covered in the KUIDP survey and, as with all workforce data, should be interpreted with caution.[10]

In the past ten to twelve years, Karnataka has been consistently lagging behind India as a whole in growth and industrial development. This is mirrored in Ramanagaram, which has only four medium-scale industrial units and no large-scale ones. As the 1995 urban infrastructure study remarked, 'no medium- or large-scale unit has been established at Ramanagaram for almost two decades'.[11] There is no public sector manufacturing unit in the area. The report identified 650 small-scale industrial units in the taluk, employing a total of 5,400 persons. Of these, 300 are reported as being in the silk-producing sector.[12] Silk-related activity is confined to the cottage and small-scale industries. The reeling and twisting units, in particular, employ a total of 3,683 people, with an average of 12 persons per unit.[13] The level of capital employed is Rs.50,000 per firm, which is very low by national standards. The main small-scale units operated - apart from in the silk sector - in the areas of agricultural implements, chemicals, food and tobacco, glass and ceramics, repair and servicing works, leather-based units, mechanical engineering units, plastics, printing, silk and wood-based industries.

Sericulture is the economic life-blood of Ramanagaram taluk, and women (and to some extent children) are the mainstay of many stages in the process of silk manufacture. Also, in the models presented in later chapters, we examine whether employment in the silk industry

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[10] KUIDP Final Report, 1995: appendix D: sections 5.3-5.6: D.27.
[11] The four medium-scale units are the Chamundi Textiles and Silk Mills that specialises in silk manufacture; Senapathy Whitelays Ltd. that produces electric insulation paper; Valliappa Textiles Ltd that produces cotton yarn and fabric; and Lakshman Isola Ltd. that manufactures mica paper and products. There is one KSSIDC industrial estate for small-scale industries. Interestingly, the silk reeling and twisting units are not a part of this estate.
[12] KUIDP Final Report, 1995: section 5.5.

affects women's decisions about contraception and fertility. It is therefore worth looking more closely at this industry.

India is the second-largest producer of silk in the world, after China. Karnataka accounts for nearly half of national silk production. Ramanagaram is one of the chief centres in Karnataka for cocoon trading and produces 90% of the silk thread that is later woven into cloth by the nation's major weaving centres.[14] Hindu, Muslim and Christian women in Ramanagaram are all involved actively in different stages of the silk manufacture process.

The silk manufacture process begins with mulberry growing and silkworm rearing. It progresses through marketing of the cocoons, reeling the cocoons, twisting the silk yarn, and dyeing the yarn. This yarn is later woven into cloth and finally the cloth is fashioned into garments. At every stage, women in Ramanagaram have an important role to play.

The production process begins with silkworm rearing. According to the Karnataka Silk Association, there were 8206 mulberry cultivators in the taluk in 1994. Multivoltine silkworms are reared in Ramanagaram to produce mulberry silk.[15] Mulberry trees are grown throughout the year for the silkworms to feed on. The silkworm eggs are normally obtained from the three Government grainages and 28 private licensed seed producers in the taluk. The sericulturists first keep the eggs in circular trays with concentric circle partitions called chandrikas with mulberry leaves in anticipation for the worms to feed on when the larvae emerge. Ten days later the larval stage begins and the mulberry leaves are the chief food of the worms as they build their cocoons. Rearing the silkworms is a full-time activity, as the

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[13] KUIDP Final Report, 1995.

[14] Information provided by K. Seshagiri Rao of the Karnataka Silk Board Association and a long-time resident of Ramanagaram.

[15] Silkworms are differentiated into bivoltine and multivoltine according to the number of generations the silk moth passes through during the year. The bivoltine breed produce one or two generations a year. The multivoltine race may produce up to six generations a year. Bivoltine cocoons yield 800-

temperature and humidity levels have to be carefully controlled. The trays have to be kept safe from insects and flies which can infect the worms with disease and result in considerable economic loss to the rearers, as the diseased worms produce inferior silk filament in the cocoons. Therefore, the trays are arranged on wooden slats, often in the rearer's home, and are covered with netting. The women of the household have a major role to play at this stage because it is they who primarily look after the worms in the chandrikas in addition to their household duties, ensuring the requisite standards of hygiene, temperature and humidity. This stage of the silk process is relevant to our analysis of fertility because silk rearing is an income-earning occupation for women, but one which is compatible with child rearing, since it is performed in the home.

The cocoons, once formed, are taken, mainly by the women's husbands, to be marketed at the cocoon markets. By law, marketing of the cocoons may only be done in the Government Cocoon Market in Ramanagaram, by open auction method. The cocoons are then taken to the reeling units where they are first dried either in the sun or in steam, to kill the silkworm and retain the continuous filament in the cocoon. Then they are boiled so that the sericin in the cocoon shell is softened. This enables the silk thread to be unwound in a process known as 'silk-reeling'.

Ramanagaram has evolved into a major silk-reeling centre mainly due to the availability of soft water which facilitates the reeling process. The devices used for silk-reeling are the country charkha, the cottage basin and the filature reeling basin, though the charkha and the cottage basins are the most popular. Of the reeling units in Ramanagaram 50% operate using the charkha, 45% use cottage basins and only 5% use filatures.[16]

1500m of filament (the fibre in the cocoon shell) apiece a year, while multivoltine cocoons yield only 400m of filament apiece.

[16] KUIDP Final Report, 1995: appendix D: section 3.5: D.37.

The silk-reeling is done mainly by adult women and the boiling of the cocoons is mostly done by young boys and girls. Some of these women are the ones I met on my first trip to Ramanagaram, working in dingy rooms, with their hands immersed in scalding water, heated to 45°C. The very hot water both softens the cocoons after boiling and enables the thin thread to be extracted. Working in these darkened rooms, the women suffer from diminished eyesight, from bruised hands from keeping them continuously immersed in hot water for so many hours a day, and from asthma from the noxious fumes that emerge from the cocoon-boiling process to soften the sericin. The women need to combine threads from about 7-8 cocoons to form silk thread of the appropriate denier for twisting. There is usually a male supervisor, continuously checking the denier and quality of the reeling and the skeining/twisting into diamond formations that follows the reeling process. The twisting process involves combining several silk threads together to form skeins. The skeins are packed in 2-kilogram bundles called books, which are then packed in bales. The bales are eventually dyed elsewhere (non-locally) and later woven into finished silk cloth. Twisting and sale of finished silk is done privately and is not subject to any government regulation. However, raw silk is only allowed to be sold through the Government Silk Exchange at Ramanagaram.

Thus, women have a major role to play in many important stages of the silk process, and especially at the rearing and reeling stages. The rearing of the worms is entirely a household activity; 95% of the reeling activity is undertaken in the household sector, as is 50% of the weaving activity. The other 5% of the reeling is done in large-scale government units called 'filatures' and some of the women I interviewed worked in these filature units.

The main challenge facing the Ramanagaram silk industry in the 1990s is competition from Chinese silk, which is 30% cheaper than Indian raw silk and of superior quality.[17] Until now, heavy import duties on bivoltine Chinese silk have resulted in weavers elsewhere in India using Indian silk. However, as import duties on Chinese silk are further reduced, Indian weavers seem likely to substitute Chinese silk for Indian silk. This could have serious repercussions on the economy of Ramanagaram by threatening the silk-rearing and silk-reeling industry in the taluk, and consequently employment for women who sustain this industry.

Moreover, the Ramanagaram silk industry has so far proved unable to diversify into other stages of the silk process, such as weaving or garment-making; there are no weaving mills in the town. The greatest value added in the silk process occurs at the weaving and garment-making stage, and the silk economy of Ramanagaram might survive the substitution against Indian silk by diversifying its industries to include those that are the most lucrative in terms of value-added. Other problems facing the silk industry currently are frequent power shutdowns and water shortages. Moreover, a large-scale silk producing unit, and suitable marketing and co-operative facilities to obtain the cocoons and sell the yarn, are also required. A further advantage would be a suitable silk waste disposal system that will not pollute the environment as does the present one, nor cause the employees suffering due to the close contact with the fumes emitted during the silk process.

Thus, the silk manufacture process in Ramanagaram is one in which women play a vital economic role. Further, the challenges which this industry faces in the 1990s, both due to the lack of infrastructure and from cheaper imports of silk yarn from China, may have important repercussions on employment for women in Ramanagaram, and consequently perhaps also on

[17] KUIDP Final Report, 1995: appendix D: section 5.7.

their demographic decisions. However, this lack of infrastructure is not restricted to the silk sector, but is mirrored in the town more generally.

Road quality is bad in Ramanagaram, with roads that require widening, inadequate pavements, inadequate streetlighting which is not properly maintained, and shortages of buses, bus stands and truck terminals. Mahatma Gandhi road, one of the main arteries of the town, requires continual upgrading and roadworks. Only one train stops at Ramanagaram in the mornings, and one in the evenings.

In terms of power infrastructure, there is a massive shortage of electricity, which the women I interviewed continually complained about. There is only 12.5 mw of power made available to the town, with 8 to 10 hours of electricity shutdowns daily. At times, the power cuts amounted to as many as 50 times a day. This particularly affected industrial equipment and water supply.

In terms of water infrastructure and sanitation, the river Arkavati is used mainly for washing clothes, bathing and irrigation. The northern part of the river within the city limits harbours a series of government-constructed wells to provide water to the town. There are only two water-tanks in the whole town, and there is no proper water-distribution system. Borewells are the main sources of water supply. Water is inadequate particularly in the summer, for domestic and industrial use, and especially in poor neighbourhoods, and this was evident to me during my fieldwork. The women interviewed complained bitterly about the lack of water infrastructure in their town, and a look at the water infrastructural facilities in Ramanagaram justifies their dissatisfaction.

As regards sanitation, certain areas such as Mehboobnagar, Tipunagar, Gottipur, Gasainagar, Mohalla and extension areas of Ramanagaram are severely affected by flooding in the rainy

season. The slum areas are particularly badly affected by the lack of adequate infrastructure, and housing and water are key problems here. Mangalvarpeth was declared a slum by the municipality in 1986, but has not yet been relocated.

The lack of suitable infrastructure in Ramanagaram is relevant to an analysis of fertility because (as we examine in Chapter 6), the lack of adequate water and fuel infrastructure may contribute to greater fertility, if children are the cheapest way of obtaining the labour to perform water and fuel collection tasks which are time-consuming for the household. Another way in which poor water infrastructure and sanitation facilities may contribute to greater fertility is by raising infant mortality.

As regards educational infrastructure, there are only 6 primary schools, few high schools, and no training colleges or professional colleges. There is only one arts college in the town. According to the 1995 Infrastructure report, a science college, a polytechnic and a typing and computer class are urgently needed. This lack of educational infrastructure is reflected in the low mean level of education for the women interviewed in the sample (5.5 years), especially those belonging to the low and scheduled castes. Moreover, as we explore in later chapters, more years of education has been linked to lower fertility for women, higher age at marriage, and increased adoption of contraceptive techniques.

There is also an informal system of education in Ramanagaram which co-exists with the formal sector. This is the 'Anganwadi' or 'courtyard teacher' movement. In this movement, educated women, who are specifically trained for the purpose in the town, conduct primary school level teaching in the courtyards of their homes (aangans) in the nearby villages. This system of instruction has an advantage over the six primary schools, in that mothers who cannot afford to send their children to one of the larger schools because of monetary disincentives such as the inability to pay fees, buy school uniforms, or meet other demands

such as requests for donations, or because of psychic disincentives such as these schools demanding regular attendance, instead can send their children to study in the Anganwadi schools. There are altogether 205 Anganwadi teachers in Ramanagaram taluk and each school is managed by a single teacher. There are altogether 12,500 students enrolled in these schools, of which 5,600 are girls. The average number of students per school is 61. The women of Ramanagaram taluk were comfortable with this system because the courtyard teacher was an educated woman from their own neighbourhood, who was trustworthy, highly motivated, and whom the mothers also consulted for information on infant and child care. The disadvantage of the Anganwadi system of education was that though the courtyard teachers were provided with some basic training at the Anganwadi centre in the town, they were not well-qualified teachers, and did not have the superior educational facilities of the six primary schools in their courtyard classrooms. However, the Anganwadi teachers did manage to supplement the educational activities of the six schools in the town and provided an important source of primary school teaching for many of the children of the women interviewed in the Ramanagaram sample.

In terms of health infrastructure in Ramanagaram, there is only one public hospital, with 50 beds. There are only two doctors in this hospital and no specialists. There are no clinical laboratory facilities, and the private doctors are few, far between and very costly. Catholic missionaries run the Our Lady of Lourdes Health Centre at Ramanagaram. The urban family welfare centre at Ramanagaram and the maternity hospital there are recognised as M.T.P. (medical termination of pregnancies) centres. There are 14 chemists and druggists and 24 and 20 'pharmacists and related establishments', as defined by the Municipality of Ramanagaram. The latter essentially include those establishments that are legally recognised by the Municipality to stock medicines and other pharmaceutical drugs. The facilities in Ramanagaram for health-care, though poor, are about average for an Indian town of its size. The women I interviewed recognised that the high-level health infrastructure in their town

was lacking. However, there were many lower-level facilities, such as the health-care provided by the 'Anganwadi' movement. In addition to educating children, the Anganwadi teachers also educated the mothers of their neighbourhood in Oral Rehydration Therapy (ORT) procedures for their infants. These 'courtyard teachers' distributed anti-polio tablets and provided free instruction to the neighbourhood women on the benefits of breastfeeding, as well as information on infant and child care. It has been hypothesised that such low-level health care is even more important than high-level medical facilities in reducing both fertility and mortality (especially infant and child mortality) and the usefulness of having this system in Ramanagaram emerged from the interviews carried out in this study.

B. Reasons for choosing Ramanagaram for field study

I chose Ramanagaram for my field work for several reasons. Firstly, this study essentially revolves around fertility and its socio-economic and religious determinants. Karnataka has seen a steady decline in fertility rates over the past decade, mainly due to the co-ordinated literacy and family planning programmes in the state. Yet, both in Karnataka as a whole and, as I found subsequently, in Ramanagaram in particular, there is a mean difference in fertility of nearly one child on average between Hindus and Muslims. This is a significant differential and needs investigation.

However, it seemed desirable for me to study these fertility differentials in an area where there were not wide differences in the levels of living between the religious communities, as there are for example in the north Indian states of Uttar Pradesh or Bihar and even in the northern districts of Karnataka such as Bidar or Gulbarga, which also have significant minority populations but where poverty compounds demographic differences.

The town, moreover, is moderately sized, with one major industry (silk) dominating the area. All religious communities are involved with this industry in one way or another, so there is a common point of reference for all. However, as there is no major large-scale unit in the area, the environment in which the town operates is still very 'rural'.

As mentioned, Ramanagaram has been exposed to family planning and literacy programmes and there are some schemes operating in the area towards this end. These include the National School Health Programme and the Comprehensive School Health Programme. The Health Training Centre was started in 1936 by the Mysore Government in co-operation with the Rockefeller Foundation. In fact, the first Family Planning Health Centre in Karnataka was set up in Ramanagaram in 1952, when India first started its government-sponsored National Family Planning Movement and was the first country in the world to do so. Moreover, Ramanagaram was one of the 'towns' of 10,000-25,000 population covered by the Mysore Population Study in 1961 undertaken by the United Nations.[18] This study covered a sample of 10,744 households. Ramanagaram is therefore a good test case as one area which experienced the inception of coordinated thinking and official policy on family planning in India. It seemed interesting to see if there were religious differences in fertility in an environment where contraceptive technology was freely available and heavily advertised.

Moreover, the town and the taluk, situated in the prosperous silk belt of Karnataka, is expected in the next fifty to seventy years to function as a 'counter-magnet' to Bangalore. At present, the very low annual rate of increase in annual population figures of 1.4% in Ramanagaram is due to large-scale out-migration to Bangalore and elsewhere.

Bangalore rural district, in which Ramanagaram is located, is also very important for the socio-economic development of the state of Karnataka in the future, both because of its

proximity to Bangalore city and because of the importance of the performance of this district for socio-economic and demographic indicators. Table 3 presents data on selected socio-economic and demographic characteristics of Bangalore rural district and compares these data with those for Karnataka state.

Table 3: Socio-economic and demographic characteristics of Bangalore rural district and Karnataka state

Index	Bangalore rural district	Karnataka state
1. Socio-economic indices		
GDP per capita (in Rs.) GDP per capita (in Rs.)	4788	5357
Population below poverty line 1993-94 as a proportion of total population	38.17	33.16
% of households using polluting fuel (wood, cow-dung, kerosene and coal) for cooking 1991	96	90
Agricultural wages		
Male	19.32	18.80
Female	16.26	14.40
Share of earned income		
Male	0.71	0.71
Female	0.29	0.29
Adult literacy rate 1991		
Male	55.5	63.8
Female	28.1	37.5
% child labour to total child population (aged 5-14) 1991	8.58	8.80
2. Demographic indices		
Proportion of population		
Male	0.51	0.51
Female	0.48	0.49
Mean age at marriage		
Male	26.71	26.21
Female	19.69	20.14
Difference in mean age at marriage between males and females 1991	6.41	6.07
Life expectancy at birth	66.69	62.07
Child mortality under-5	67	90
Infant mortality rate		
Male	51	74
Female	49	72
Total fertility rate	3.76	3.87
Eligible couples protected by all family planning methods 1996-97	66	58

(Source: Government of Karnataka, 1999, selected figures from statistical appendices, pp. 217-378)

[18] The Mysore Population Study, 1961: 12. Interestingly, the field training for the Mysore Population Study was conducted in one of the villages which was surveyed in the present study as well.

The most interesting feature of Table 3 is that infant mortality and under-5 mortality in Bangalore rural district is much below the levels for Karnataka state as a whole. Also, the percentage of couples protected by family planning methods in this district is much higher, and the total fertility rate lower than that found in all of Karnataka. However, the district performs less well on economic indicators such as the percentage of people living below the poverty line (which is much higher in the district compared to all of Karnataka), and in the percentage of households using polluting sources of fuel for cooking (which is also very much higher in this district than in the rest of Karnataka state). Finally, Table 3 illustrates strikingly how, both in Bangalore rural district and in Karnataka state, a very high proportion of children aged 5-14 are used for their labour, particularly in the silk-reeling industry.

The prospects of a town such as Ramanagaram being able to divert migration away from Bangalore in the next few decades is an important question, and the fact that this town (and the villages around it) and Bangalore rural district may play an important role in the socio-economic development of the state of Karnataka in future, made the choice of this area for a demographic field study more interesting.

II. The data set

In this second part of the chapter I outline the data used in the study: the manner in which the sample was selected, the sample size, and the distribution of the sample between Ramanagaram and the surrounding villages. I also discuss the questionnaire that was administered to the women in the sample (a copy of which is included in this dissertation as Appendix A.1). In subsequent chapters, the responses of the women will be analysed in depth.

A. Methodology: sampling procedure, sample size and method of interview

In October 1995, after my first visit to Ramanagaram, I made a series of preliminary trips to the town and several villages in the taluk. Eventually I decided to include in my sample both Ramanagaram and five other villages.

The sampling procedure adopted was a two-stage quota sampling technique. First, I identified the first four villages to be used: these will be referred to as villages A, B, C, and D in Ramanagaram taluk (see Map 4). I chose to interview some women from both the town of Ramanagaram and the surrounding villages because the villages were intimately connected with the rural and small-scale economy of Ramanagaram. Their proximity to the town (all within a radius of 20 kilometres), coupled with their involvement in the silk-rearing industry that sustains the silk-reeling in Ramanagaram town, made them suitable choices. In fact, many of the villagers came to the town for employment in the silk units as well. I also selected a fifth village, which I call village E, a bit further away on the Ramanagaram/Chennapatna taluk border. Table 4 shows the size of the five villages and the number of households in each village.

Table 4: Location of villages, area in hectares and distribution of households, (Ramanagaram taluk, 1991)

Village/town	Area (village hectares, town in sq. kms)	Number of occupied and residential houses	Number of households	Total population*	Males*	Females*
A	381.95	287	289	1495	769	726
B	1015.56	710	712	3753	1967	1786
C	204.24	308	308	1756	915	841
D	425.17	234	234	1245	640	605
E	572.83	734	734	3339	1638	1701
Ramanagaram town	4.96	9071	9265	50437	26205	24232

* includes institutional and homeless population.
(Source: Village/town primary census abstract, 1991 Census)

Depending on the size of the town or village, I adopted a proportional sample size, with the largest sample being from Ramanagaram town itself. Within the town, I randomly identified households in each of the major neighbourhoods, so as to cover the widest spectrum of levels of living. That is, I selected women from both the slum areas and the more affluent localities. However, as my study deals specifically with religion, among the households first identified within the villages/town, I eventually selected 111 Hindu households, 75 Muslim households and 15 Christian households. The total number of households covered was 201. The Hindus who were included in the sample resided in the town and all the villages chosen, but the Muslims who were interviewed resided only in the town and three other villages. The Christians in the sample lived in the town and one other village. The number of Christian households sampled is much fewer than the number of Hindu and Muslim households, mainly because the population of Christians in the taluk is much smaller than the population of Hindus and Muslims. As in other studies based on sample data, it is acknowledged that there is always a trade-off between the depth of information collected and the number of households sampled. The sample for this study was selected in a manner which was proportional to the distribution of the population in the taluk. However, as will emerge from later chapters, the demographic differences between the Christians and the other two

religious groups in Ramanagaram taluk are so very striking that the contrasts between the demographic behaviour of the three religious groups emerge even when Hindus and Muslims are compared to the very small sample of Christian households selected.

A total of 187 adult married women and 14 adult single women were interviewed for this study. It must be emphasised again that the villages covered in the sample are large by Indian standards, with unusually high male-female ratios, and are close to Ramanagaram town. The villages are also associated actively with socio-economic activity in Ramanagaram town. This may imply that fertility, contraceptive use and marriage age between Hindus and Muslims may be more homogeneous in the Ramanagaram sample than might be expected in a more purely 'rural' area of the Indian countryside.

The interviews were conducted mainly on an individual basis but seven were attended by two persons (especially with the presence of elderly mothers, mothers-in-law or young sisters, some of whom were also interviewed). Each interview lasted a minimum of 45 minutes, but many were as long as one and a quarter hours, depending on the discussions generated and the interest of the respondent. I also conducted some group discussions. This was for two reasons. Firstly, I did so in order to corroborate what the individuals had said by raising the same issues which were asked in the questionnaire in a general discussion with groups of women. Secondly, I thought it important to observe the women that we had earlier interviewed in a group setting to judge the extent to which they would articulate and vocalise their beliefs among their peers. The group sizes varied from 4 to 8 depending on the locality and the religious community. I also interviewed five of the women - two Hindus, two Muslims and one Christian - in depth and more than once, in order to carry out case studies of their lives. These women were specifically chosen by me to illustrate aspects of the typical Ramanagaram woman's lifestyle. They all belonged to different castes and localities.

A universal problem with survey data is that it is difficult to induce people to reveal their preferences and private choices to a researcher. Economists routinely distinguish between agents' 'stated preferences' and their 'revealed preferences'. Anthropologists often comment on the difficulties of approaching a society as an outsider, particularly when it is rural, and trying to determine lifestyles, incomes or the manner in which the people in these communities make choices about aspects of their lives.[19] It is even more difficult for a young urban woman, who is perceived by the community she is researching as 'educated' or as an 'alien', to persuade predominantly rural women to reveal their views on extremely sensitive issues such as their sexuality or religious beliefs that form the core of their personal lives. All too often what is deemed personal is kept strictly private. Therefore, both to lend 'respectability' to myself in the eyes of the women I eventually interviewed and to allay their inherent suspicions of one 'young enough to be my granddaughter' as one elderly woman remarked to me, I deliberately adopted the research strategy of taking my mother with me to interview the women in Ramanagaram. I found that this was an excellent means of interviewing the women, especially on sensitive issues such as fertility histories and contraception. Identifying with a sari-clad Indian woman, who was a wife and mother like themselves and who was putting herself through a great deal of inconvenience to help her daughter, perhaps similar to their own experiences with their children, always struck a chord of sympathy with the women. They empathised with my mother and replied eagerly to questions that I do not honestly feel they would have spoken either frankly or freely about with me. Moreover, they thoroughly approved of my studies being thus chaperoned. As many as 40% of the women interviewed remarked to me at the end of the interview that they 'approved' of my having brought my mother when I interviewed them. In this context, after we had been speaking to her for about one hour, Devamma from village C, an elderly though illiterate woman, asked pointedly,

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[19] See Srinivas, 1976; Christensen, 1992: 124-137; see also Lipton and Moore, 1972.

> Amma (mother), I definitely approve of you coming here to help your daughter with her work, but I have a question. You sent her all alone, unchaperoned, across the seas and far away from you to study in England; yet within our own country, you chose to come with her to Ramanagaram. Why?

For these reasons, therefore, my mother was present during all the discussions and interviews.

Finally, the individual interviews were conducted in Kannada, Hindi, Tamil, Telugu, English, or a combination of these languages, depending on the individual respondent's preference. I personally translated and recorded the response in English on the questionnaire. Where no English equivalent could be found, I recorded the word or phrase in the vernacular and have subsequently attempted to find the word/phrase in English that most accurately fits (or at the very least comes close in meaning to) what the respondent was trying to convey.

B. The questionnaire

The questionnaire administered to the women was divided into five sections, Sections I.1 through to Section II.3.[20] Section I.1 covered personal information regarding the respondent. This part was a mini-census which recorded all persons living in that house; their ages; primary and secondary languages spoken; religion; educational background in terms of number of years of primary, secondary and university education, if any; and marital status including age at menarche, age at first marriage and age at cohabitation with spouse. This section also asked questions about the husband's age, education and occupation, and the extent of consanguinity between spouses. Details regarding the children, specifically about their ages, education, occupations and current residence, were also covered in this section. Finally, the women were asked if their families possessed any land, and its acreage. They

[20] The questionnaire was initially devised between February 1995 and June 1995 in Cambridge. Subsequently, it went through a series of revisions in India.

were then asked to list their main items of monthly expenditure and their ownership of particular items of consumer equipment.

Section I.2 covered decision-making within the family. This section asked about rapport between family members and decision-making within the household, specifically with regard to housework, income-earning work and spending money. This section also discussed nutrition decisions, and information concerning the value of daughters to the household. The women were asked about their married daughters' ages at marriage and unmarried daughters' proposed ages at marriage.

Section II.1 dealt with the economic value of children in terms of costs and benefits, contributions of children to current and future income, and the direct and opportunity costs of childbearing. These questions dealt with children's hourly contributions to the time budget of the household, both in terms of helping their mothers and in performing income-earning work. Questions pertaining to old-age security motives for child-bearing and son-preference were also discussed at this stage.

Section II.2 dealt with reproduction, contraception and health-care, including fertility decisions and attitudes towards contraception and health-care. The women were asked a range of questions about their desired family size, their preference between boys and girls, and their opinions about large families compared to small ones. They were also asked about their attitudes towards contraception, inter-spousal communication regarding family-planning issues, the position of their religion on contraception, and the ease and frequency of health care in their town/village.

Finally, Section II.3 involved questions pertaining to religious observance, religious beliefs and the extent of piety in the family and in the community. These questions were personal

evaluations by the women of the importance of religion in their lives and in those of their families. There were also questions on the extent of communal interaction between religious groups in the town/village.

Finally, this section also included several questions on women's status in the town/village and the respondent's view of how variables relevant to women's well-being had changed over the past five years. These variables included, among others, the woman's assessment of the economic position of the family, the incidence of communal violence and domestic violence in the town/villages, and the status of women in general locally. Altogether ninety-three questions were asked of each woman who was interviewed. The next chapter discusses in depth the census information provided by the women through their answers to the questions in Section I.1 of the questionnaire.

CHAPTER 3

The 'Census' Information on the Sample

In this chapter, we examine the 'census' information on the 201 women.

I. Rural vs. urban residence

Table 1. Rural vs. urban residence, Ramanagaram sample (1996)

Rural/urban residence	All women	Hindus	Muslims	Christians
Ramanagaram town	124	46	64	14
Village A	8	8	0	0
Village B	24	19	4	1
Village C	17	10	7	0
Village D	10	10	0	0
Village E	18	18	0	0

The respondents came from 5 villages and the main Ramanagaram town. As is evident, the minority populations are mainly concentrated in the town. As explained in chapters 1 and 2, the villages sampled in the present study are really peri-urban and hence there is little to distinguish the manner in which women lived in these villages, compared to their lifestyle in the town. Hence, although it is important to be aware of the distribution of the women by religion between Ramanagaram town and the villages, it was not regarded as necessary to include a rural-urban dummy in the regression models presented in chapters 4 through 6.

II. Caste and jati

The Hindu women interviewed fell into 23 different jatis or sub-castes. Broadly, the four major castes within Hinduism are divided into numerous sub-castes or jatis, which are of more importance in a local setting than the major caste. The Mysore Population Study found that the number of separate Hindu caste groups in Mysore state was over a hundred, of which

14% were 'scheduled', 20% were 'backward' and 66% were 'non-backward' castes.[1] The corresponding percentages for the Ramanagaram sample are 20% scheduled castes, 35% backward castes and 45% non-backward castes. The same three caste groupings are used in the analysis in later chapters, though they are referred to as scheduled castes, low castes and high castes respectively.

Disaggregated, the numerically strong castes in the sample were the Gowdas (24), the Scheduled Castes (21), the Brahmins (12), the Lingayats (7), and the Okkaligas (7). There were 5 Ekesus, 4 Aswajanas (those that belong to the Ursu community that trace their ancestry to the royal family at Mysore), 4 Bestru (the fishermen's caste), 4 Kuruba and 4 Lambani (the minstrel/gypsy caste), 3 Marathi, 3 Mudaliar, 2 Vishwakarmas, 2 Kumbhar (the potter's caste), and 2 Balija. There was also one each of the Gamsettu, Ganigas, Gangemata, Gwaladuru, Maduvar, Nayak, Reddy and Upasadu castes. The Muslims were either Sunnis (49) or Mehdavis (26). All the Christians were Protestants and of the same denomination (the Church of South India).[2] This variable is relevant to an analysis of fertility, as there may be differences in fertility by caste even among those that share the same religion.

III. Age

The mean age of the women interviewed was 33.4 for Hindu women, 36.3 for Muslims and 35.5 for Christians. The mean age of the woman for the entire sample as a whole was 34.7. In the study, the women were randomly selected, and no overt effort was made primarily to select women from particular age groups. However, as it turned out, most of the women were in the 30-40-year age decile. This is a happy coincidence because in a study of fertility, it is particularly useful to have a large sample of women who are of reproductively active age but

[1] Mysore Population Study, 1961: 56-57.
[2] This is probably because the Church of South India which is dominant in the area is Protestant in its leanings.

have more or less completed their childbearing, in order to make comparisons between groups more meaningful. Additionally, it is good that the women completed their childbearing recently so that the factors which influenced them are more relevant to contemporary decision-making.

IV. Language

Table 2. Languages spoken, Ramanagaram sample (1996)

Language	All women	Hindus	Muslims	Christians
Kannada	104	103	1	0
Urdu	73	0	73	0
Tamil	16	2	0	14
Marathi	3	3	0	0
English	1	0	0	1
Gujarati	1	1	0	0
Konkani	1	1	0	0
Telugu	1	1	0	0
Urdu/English	1	0	1	0

The women spoke a variety of languages as their primary language of communication. This reflect both the unique geographical position of Karnataka state (which shares its borders with four other Indian states) and its history of Hindu, Muslim and British rule. Kannada, Urdu, Tamil, Marathi, English, Gujarati, Konkani, and Telugu were all reported as the primary language of communication by some women in the sample. For the 111 Hindu women interviewed, the primary language of communication was overwhelmingly Kannada. The 75 Muslim women interviewed spoke primarily in Urdu. A majority of Christian women interviewed spoke in Tamil.[3]

Apart from their primary languages of communication, the women spoke a wide variety and varying combinations of other languages. English, Hindi, Kannada and combinations thereof were the most popular 'other' languages that the women spoke, probably because these three

[3] These women spoke Tamil at home because the Christian women in this region are mainly Tamil Christian migrants from Tamil Nadu.

languages were the main medium of instruction in the schools, and the languages most popularly used in this area.

V. Literacy

This variable is interesting because it is widely argued that there is an inverse relationship between fertility and literacy.[4] Of the 201 women in the sample, 126 (62.7% of the sample) said they could read and write in their primary language of communication. This does not, however, imply that the levels of education are very high in Ramanagaram taluk: in fact, the mean number of years of education for all 201 women was only 6.0, while that for the 187 married women was 5.5 years. Many who had been educated no further than 4th Standard (four years of primary education after two years of kindergarten), still said that they could read and write their primary language, though their knowledge of reading and writing was quite elementary. Among the Hindus, 49 (44%) could not read, as compared with 24 of the Muslims (32%) and 2 Christians (13.3%). Consider Table 3.

Table 3: Percentage of population that is literate in India, Karnataka, Bangalore rural district and the Ramanagaram sample

Place/group	Male	Female	Total
India 1991*	67.3	44.3	52.2
Karnataka 1991*	64.1	39.3	32.9
Bangalore rural 1991*	52.2	32.9	42.8
Ramanagaram sample 1996	69.5	62.7	66.1
Ramanagaram Hindus	66.2	66.0	66.1
Ramanagaram Muslims	70.0	68.0	69.0
Ramanagaram Christians	92.9	86.0	89.5

* Figures taken from the 1991 Census

In comparison with the female literacy figures for India, Karnataka and Bangalore rural district, in percentage terms, a much greater proportion of the women in the sample said that they were literate. However, it must be remembered that the women were only asked if they

could read and write their primary language, and that if they said that they could, this was not explicitly tested. Moreover, it was my impression that many of the women may have felt embarrassed to admit that they could not read or write their primary language of communication fluently, and that even a few years of attendance in school was believed to constitute 'literacy'. However, in order to cross-check the veracity of the women's answers, they were also asked how many years of schooling they had actually had. In response to this question, and despite the optimistic percentages in Table 3, the mean number of years of education for the women of the Ramanagaram sample was still (as already remarked) very low at only 5.5 years for the 187 married women. Therefore, in the present study we measure women's education by the number of years of education, rather than by whether they said that they were literate. However, Table 3 does illustrate the interesting finding that in Ramanagaram today, women do feel that education is a 'good thing', and something to be aspired to.

In the sample as a whole, 76 women (37.8%) had no education at all, 21 (10.4%) had between 0 and 5 years, while 69 (34.3%) had between 5 and 10 years of learning. It is interesting that of the women who had been to school, 47 (23.3%) had completed their Secondary School-Leaving Certificate (SSLC) Examination, equivalent to ten years of schooling after two years of kindergarten. I observed in my fieldwork that women either had not been to school at all, or if they had, those who went up to secondary school studied till the tenth-grade level. However, after attaining this level of education, most women appeared to stop. Only 35 (17.4%) women in the sample actually went on to higher education in excess of ten years of schooling.

Education levels also varied across religious groups, as is shown in Table 4.

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[4] See, for instance, Cochrane and Farid, 1990: 144 -54; Caldwell, Reddy and Caldwell, 1985: 29-51.

Table 4: Mean level of years of education by religion, Ramanagaram sample (1996)

Mean Years of Education	All women	Hindus	Muslims	Christians
Mean years of education (all women)	6.0	5.9	5.6	9.2
Mean years of primary education	3.0	2.8	3.1	4.3
Mean years of secondary education	2.6	2.6	2.3	4.1
Mean years of university education	0.4	1.4	1.1	3.3
Mean years of education (187 married women only)	5.5	5.3	5.4	9.0

The Christians in the sample are the best educated in terms of primary, secondary and university education. They have 9.2 total mean years of education (9.0 years for married women) as opposed to 5.9 (5.3 years for married women) and 5.6 years (5.4 years for married women) for the Hindus and Muslims respectively. In fact, the Christians are also the most likely of all the religious communities to go on to higher education. Interestingly, the Muslims had higher rates of mean primary school enrolment, but lower mean secondary school years of education than the Hindus. This may be explained by girls' education being the first casualty as the size of the family increases, or this may be because of the code of purdah which the Muslim families observed. The difference between the mean total years of education between Hindus and Muslims was tested at 95% confidence level and was not found to be statistically significant, which suggests that the code of purdah was not important in this respect. However, there was a statistically significant difference between Christian and Muslim mean levels of education, and between Hindu and Christian levels of education.

VI. Primary and secondary occupations

Of the sample of 201 women, 66.7% worked outside the household. In Table 5, the main occupational categories, so grouped so as to be relevant to an analysis of fertility, are listed. 'Farming and allied activity' covers all those activities concerned with agriculture and agro-based processes. 'Home-related activity' deals with all those activities that are undertaken by the women from their homes and includes house-work and income-earning work such as silk-

rearing. The latter are compatible with child-rearing. 'Sole trader/small-scale/cottage entrepreneur' refers to instances where the woman was involved in managing and running a shop - for example, as a sweets seller or a betel-shop owner. 'Small-scale/cottage unit worker, other labourer' refers to those occupations where the women were either hourly-rate workers in a small-scale unit (such as agarbatti workers or silk reelers), or daily-wage labourers such as bricklaying and construction workers. 'Government department employee' refers to those women who were working in offices connected with the government, such as clerks and stenographers in the Zila Parishad Office, or women officers in the Block Development Office. 'Service-related and others' refers to occupations connected with the service industries. These included Anganwadi and other school teachers, domestic servants, cooks, nurses, and tailoring class teachers. Women who were seeking jobs, but were unemployed at the time of interview come under the 'unemployed' category. Those women under the 'none/not applicable' category were those who were not employed and who were not seeking work.

Table 5: Primary occupations of women, Ramanagaram sample (1996)

Category of employment	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Home-related activity	68	33.8	31	28.0	30	40.0	7	46.7
Small-scale/cottage unit workers and other labourers	50	24.9	25	22.5	23	30.6	2	13.3
Service-related and others	49	24.4	27	24.3	17	22.7	5	33.3
Government department employee	14	7.0	10	9.0	4	5.3	0	0.0
Farming and allied activity	14	7.0	12	10.8	1	1.3	1	6.7
Sole trader and small-scale/cottage unit entrepreneur	5	2.5	5	4.5	0	0.0	0	0.0
Unemployed	1	0.5	1	0.9	0	0.0	0	0.0
None/Not applicable	0	0.0	0	0.0	0	0.0	0	0.0
Total	201	100.0	111	100.0	75	100.0	15	100.0

For all women, home-related activities predominated, followed by work in small-scale/cottage units and service-related occupations. In later chapters, we use various measures of women's occupations based on the data from Table 5.

Some of the women (about 20% of the total) also had secondary occupations, the most popular of which was coolie work (bricklaying/construction work), farming, housewife, silk rearing and tailoring. The major secondary occupational categories depicted in Table 6 show that farming and allied activities form the main secondary occupations for women in the sample.

Table 6: Secondary occupations of women, Ramanagaram sample (1996)

Category of employment	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Home-related activity	8	4.0	8	7.2	0	0.0	0	0.0
Small-scale/cottage unit workers and other labourers	7	3.5	6	5.4	1	1.3	0	0.0
Service-related and others	11	5.5	7	6.3	1	1.3	3	20.0
Government department employee	1	0.5	1	0.5	0	0.0	0	0.0
Sole trader and small-scale/cottage unit entrepreneur	1	0.5	1	0.5	0	0.0	0	0.0
Farming and allied activity	12	6.0	10	9.0	2	1.8	0	0.0
Unemployed	0	0.0	0	0.0	0	0.0	0	0.0
None/not applicable	161	80.0	78	70.2	71	94.6	12	80.0
Total	201	100.0	111	100.0	75	100.0	15	100.0

VII. Husband's characteristics

Information about the women's husbands sheds light on the links between the husband's characteristics and the couple's fertility. For example, it is hypothesised that greater educational attainment by the husband contributes to lower fertility for the woman.

The mean age of the husbands in the sample was 39.4, 37.9 for the Hindus, 41.4 for the Muslims and 40.3 for the Christians. On average, there was a difference of about 5 years between the ages of the women and those of their spouses, and this was uniform by religious group.

The mean educational level of the husband was 5.7 for the whole sample, 5.5 for the Hindu men, 5.2 for the Muslim men, and 8.0 for the Christians. Thus, for the sample as a whole, husbands had marginally higher mean years of education than their wives. However, if we

consider all 201 women, which includes the single women, the mean years of education for women was 6.0 years. This suggests that women who had remained single went on to pursue higher education, compared with women who married, who tended to do so much less. At the 95% confidence level, there was no statistically significant difference in husband's education between Hindus and Muslims and between Hindus and Christians, although there was a statistically significant difference between Muslims and Christians.

The husbands also performed a wide variety of occupations, as shown in Table 7.

Table 7: Primary occupations of husbands, Ramanagaram sample (1996)

Category of employment	Total		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Home-related activity	9	4.9	6	5.9	3	4.3	0	0.0
Small-scale/cottage unit workers and other labourers	41	21.9	25	24.3	16	22.9	0	0.0
Service-related and others	38	20.3	15	14.6	16	22.9	7	50.0
Government department employee	17	9.1	9	8.7	6	8.6	2	14.3
Sole trader and small-scale/cottage unit entrepreneur	31	16.6	16	15.5	14	20.1	1	7.1
Farming and allied activity	44	23.5	30	29.1	11	15.7	3	21.4
Unemployed	7	3.7	2	1.9	4	5.7	1	7.1
Total number of ever-married men	187	100.0	103	100.0	70	100.0	14	100.0

The most popular occupational categories among the husbands were farming, small-scale and cottage unit labourers and sole traders, and service-related occupations. Among these, the most popular individual occupations were 'business', coolie, factory worker, farming, silk filature, silk merchant, silk rearer, silk reeler and toymaker. This reflects the dominant agricultural and small-scale economic interests of the area. There were no major differences in occupational profiles between the three religious communities, except perhaps that the Christians were in higher-status occupations on the whole.

The secondary occupations of the women's husbands by general category are listed in Table 8.

Table 8: Secondary occupations of husbands, Ramanagaram sample (1996)

Category of employment	Total		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Home-related activity	5	2.7	5	4.9	0	0.0	0	0.0
Small-scale/cottage unit workers and other labourers	6	3.2	2	2.0	4	5.7	0	0.0
Service-related and others	3	1.6	1	1.0	1	1.4	1	7.1
Government department employee	1	0.5	1	1.0	0	0.0	0	0.0
Sole trader and small-scale/cottage unit entrepreneur	3	1.6	0	0.0	3	4.3	0	0.0
Farming and allied activity	13	7.0	12	11.7	1	1.4	0	0.0
Unemployed	0	0.0	0	0.0	0	0.0	0	0.0
None	156	83.4	82	79.6	61	87.1	13	92.8
Total number of ever-married man	187	100.0	103	100.0	70	100.0	14	100.0

Of all husbands in the sample, 83% did not have a secondary occupation. Among those husbands who did have a secondary occupation, these were in farming, small-scale labouring work and home-related activity. Among the husbands there was a negative (although small) correlation between having a secondary occupation and the level of education, suggesting that those with less education more often had a secondary occupation.[5]

VIII. Income

In this study, several questions were asked for the purpose of estimating the families' incomes. This was because direct questions on income (of the nature 'What is your total monthly income?') rarely yield reliable answers in a questionnaire survey and have to be backed up by extensive cross-checking as to their reliability. This is for several reasons. First, respondents are usually hesitant to reveal figures pertaining to their earned income to urban interviewers who are far removed from their sphere of life.[6] Second, there may be a tendency to understate incomes.[7] For poor households, detailed questions on income may 'unintentionally expose the extent of their poverty in a humiliating manner, especially where the interviews are conducted in a "public" setting.'[8] There may also be a natural reticence

[5] The correlation coefficient between education and existence of a secondary occupation was negative and took a value of -0.14.
[6] Nag, 1985.
[7] Christensen, 1992: 124-137.
[8] Christensen, 1992: 126.

about disclosing precise measures of economic status; this is particularly observed among the very rich and the very poor, because if this information were widely known, 'it could lead to increased demands on wealth for those who were rich and/or prejudice access to resources to those who are poor'.[9]

It is necessary to discuss the theoretical justification for using income or consumption measures as the most appropriate measure of household welfare. The role of expenditure as an appropriate measure of consumption has also been debated. This issue is particularly relevant for countries such as India where poverty measurement to determine household welfare and distribution issues has been the subject of much debate.[10]

Using income as an indicator of household welfare has been criticised. If short-run income is used to measure long-run income, it is likely to show great variability because, as Anand and Harris outline, particularly in poor countries, there may be an absence of regular employment for many people, there may be great seasonality in employment (particularly in agriculture), and there may be lifecycle effects.[11] Moreover, 'the direct information on expenditures provided by household budget surveys may be of more value, since a household's chosen level of expenditure presumably reflects its own evaluation of its long-term economic position.'[12]

There is some consensus that consumption (measured by expenditures) may be a better indicator of household welfare than income[13], because individuals engage in consumption smoothing over time. The degree of smoothing will depend on the intertemporal pattern of real interest rates, on current tastes, and on future tastes. Moreover, as households undertake

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[9] Christensen, 1992: 126.
[10] Sen, 1976: 219-31; Lipton, 1997; Thimmaiah, 1977; Lipton and Ravallion, 1995: 2572-2575.
[11] Anand and Harris, 1989.
[12] Kay, Keen and Morris, 1984: 169-181: 169.
[13] Blundell and Preston, 1994.

child-bearing and child-rearing, their tastes and needs may change. Consumption then reflects this change in household composition. The basic problem facing all those who attempt to measure, firstly, household welfare by consumption and, secondly, consumption by expenditure is that household consumption is almost impossible to observe. Thus, any assessment of household living standards needs to be gleaned from observed expenditures.

However, there are also certain problems with using expenditure to proxy consumption in order to assess household welfare, as we will be attempting to do in the Ramanagaram study. A first problem is that typically, expenditure data show the purchase of commodities at a point in time whereas consumption itself is continuous. A second problem is that durable commodities such as transistors, cycles, televisions and so on, which do contribute to the household's long-term welfare but which are not purchased continuously, may not have been purchased in the period covered by the interview. Typically, respondents are asked about 'total monthly expenditure' reckoned from the month preceding the interview and therefore, purchases of durable items need to be treated carefully. Nevertheless, despite these problems, and in situations where one can assume that the respondents are not indulging in systematic misreporting, a household's aggregate expenditure is still an unbiased estimator of its aggregate consumption, though the variance of this estimator may be considerable.[14] In the Ramanagaram sample, own-grown cereal consumption was very small, and any food grown and consumed was in the form of fruits and vegetables rather than grain. In fact, all the women interviewed stated said that they purchased their supplies of rice, wheat and ragi needed by the household from the 'ration' (or fair-price) shops in Ramanagaram town.

Another measure of household welfare is that suggested by Anand and Harris, using Sri Lankan data from the Consumer Finance Survey 1981/82.[15] Since long-run average income is unobservable, they test four potential indicators as proxies for it: income per capita, total

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[14] Kay, Keen and Morris, 1984: 169-181.

expenditure per capita, food expenditure per capita, and foodshare (the proportion of food in total consumption). The measure which they recommend to predict long-run income is per capita food expenditure because, as they argue, it is the only stable element of household consumption, it is least likely to be adjusted in the face of short-run income fluctuations, and because they find no evidence of variability when this measure is used to rank individuals.[16]

Finally, for developing countries, Chaudhuri and Ravallion argue that consumption smoothing arrangements tend to work imperfectly for the poor in developing countries due to the existence of liquidity constraints.[17] The problems with expenditure and consumption are measurement errors: first, expenditure may include durables expenditure, and second (a particular problem for agricultural households) the value of consumption from own production has to be calculated. They raise the interesting policy issue that for best targeting of redistributive schemes, the ordering of households in terms of long-term living standards is what is most important. Therefore, they argue that identifying the most stable intertemporal indicator, which has been the focus of the Anand and Harris study and other studies, may not necessarily be the best method to indicate the ordering of households that is essential to identify those which are the poorest. In fact, in their analysis they conclude that short-run income is probably a better measure to identify the chronically poor than is per capita food expenditure.

Based on these theoretical considerations, information was collected in the Ramanagaram study on five different variables which may act as proxies for income. These variables are total expenditure in rupees, per capita expenditure in rupees, total foodgrains expenditure in rupees, per capita foodgrains expenditure in rupees, a dummy variable for whether the family owned land or not, and an index of the number of items of consumer equipment owned by the

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[15] Anand and Harris, 1989.
[16] Anand and Harris, 1989: 43-44.
[17] Chaudhuri and Ravallion, 1994: 367-394.

family. This index was calculated as the sum out of a total of eight possible consumer items (transistor, bicycle, television, chair/bench, watch, fan, cot, and scooter/moped). These variables are discussed in turn.

A. Land ownership

In the survey, a basic question on land ownership was posed to the respondents: 'Do you own any land? If yes, is it self-owned or leased-in?'. In the sample as a whole, 115 women (57.2%) said their families had no land, 86 (42.7%) said they possessed land, 1 (0.5%) said they had land but that it was part of the joint family and undivided, 2 (1.0%) did not know and 1 (0.5%) refused to answer.[18] The land owned ranged in size from 0.5 to 18 acres. Altogether, 95.3% of the families that had some land said that it was self-owned. Land-ownership varied across religions: 61 Hindu women (55%) came from families with land, 19 Muslim families (25%) had land, while 7 Christian families (46%) owned land. The average amount of land owned per household was 1. 57 acres for the Hindus, 0.38 acres for the Muslims, and 0.77 acres for the Christians. Thus the Muslims, who had a higher mean fertility than the Christians, also owned less land on average than the Christians. Altogether, of the 86 families that possessed some land, 3 families (3.5%) said that the land they cultivated was leased-in, 1 woman (1.2%) did not know, while 82 (95.3%) said that their land was self-owned. Among those households which leased land, one was Muslim and the other two were Hindu.

Ownership of land is often deemed an important variable because there is a demand for child labour in order to work the land. However, in the Ramanagaram sample, as will be observed in the section on children's occupations, the demand for child labour is not so much for tilling the land as for employment in cottage industry. The unimportance of land ownership

as a variable affecting demographic decisions is also borne out by the fact that the Muslims, who have the highest mean level of fertility, possess the least amount of land of all three religious groups in the Ramanagaram sample.

B. Consumer expenditure

The women interviewed were acutely aware of the money that they spent per month, and were able to give accurate descriptions of the amount spent on food, their children, and themselves. I therefore would place considerable reliance on these figures (except for those relating to alcohol, as discussed below).[19] In many cases, the women reported the amount they spent in terms of the quantities of goods that they bought per month. I have multiplied these quantities by the local prices prevailing in February 1996 in the main mandi (market) in Ramanagaram in order to obtain estimates of the women's expenditures in rupee terms at current prices. The information on mean total and per capita monthly expenditure volunteered by the women is reported in Tables 9 and 10.

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[18] The question in the questionnaire on land ownership related to ownership of land, and not to land operated.

[19] One reason why it is justified to place considerable reliance on the figures relating to women's expenditures is that the estimates provided by the women correspond very closely to one another. This is particularly true of responses given by women who belonged to the same religion, and who also belonged to the same socio-economic class. Given that the interviews were conducted on an individual basis, this suggests that the women's ability to recall information relating to their expenditure was accurate, even if it might have been subject to recall bias. If recall bias was present, it seems likely that it affected all respondents similarly.

Table 9: Mean monthly total expenditure by religion, Ramanagaram sample (1996). (Rupees)

Category of expenditure	All women		Hindus		Muslims		Christians	
	Expenditure	%	Expenditure	%	Expenditure	%	Expenditure	%
Rent	64.7	4.4	37.4	3.7	355.2	14.8	150.0	7.8
Foodgrains								
Rice	297.2	20.3	246.9	24.2	368.8	15.4	333.0	17.3
Ragi	88.6	6.1	100.5	9.8	70.6	3.0	84.3	4.4
Wheat	103.7	7.1	32.8	3.2	207.6	8.7	124.0	6.5
Pulses	5.4	0.4	6.4	0.6	3.8	0.2	5.8	0.3
Foodgrains total	494.9	33.8	386.6	37.8	650.8	27.2	547.1	28.5
Other food items								
Vegetables/fruits	36.4	2.5	27.9	2.7	50.2	2.1	32.5	1.7
Meat/fish	505.5	34.5	339.7	33.2	779.2	31.5	568.6	29.6
Milk	7.2	0.5	6.6	0.7	8.6	0.4	5.4	0.3
Other foods total	549.1	37.5	374.2	36.6	838.0	35.0	606.5	31.5
Leisure								
Alcohol/tobacco	18.8	1.3	6.7	0.7	40.4	1.7	3.5	0.2
Cinema	9.7	0.7	11.0	1.1	11.4	0.5	12.4	0.7
Leisure total	28.5	1.9	17.7	1.7	51.8	2.2	15.9	0.9
Children	231.7	15.8	129.7	12.7	373.5	15.6	478.6	24.9
Miscellaneous								
Soaps/saris/hair oil	96.5	6.6	76.5	7.5	125.1	5.2	125.1	6.5
Total*	1465.4	100.0	1022.1	100.0	2394.4	100.0	1923.2	100.0

*Prices are those prevailing in the market of Ramanagaram town in February 1996.

Table 10: Mean monthly per capita expenditure by religion, Ramanagaram sample (1996). (Rupees)

Category of expenditure	All women		Hindus		Muslims		Christians	
	Expenditure	%	Expenditure	%	Expenditure	%	Expenditure	%
Rent	14.4	5.0	9.5	4.6	21.8	5.9	13.9	3.2
Foodgrains								
Rice	55.9	19.6	47.6	22.8	63.8	17.2	78.2	18.0
Ragi	18.2	6.4	22.4	10.7	12.3	3.3	17.4	4.0
Wheat	17.4	6.1	5.7	2.7	32.4	8.8	29.2	6.7
Pulses	1.1	0.4	1.2	0.6	0.7	0.2	1.9	0.4
Foodgrains total	92.6	32.4	76.9	36.9	109.2	29.5	126.7	29.2
Other food items								
Vegetables/fruits	7.4	2.6	6.2	3.0	9.0	2.4	8.0	1.9
Meat/fish	100.4	35.1	69.4	33.3	138.6	37.5	138.9	32.0
Milk	1.4	0.5	1.3	0.6	1.6	0.4	1.8	0.4
Other foods total	109.2	38.2	76.9	36.9	149.2	40.3	148.7	34.2
Leisure								
Alcohol/tobacco	2.6	0.9	1.2	0.6	4.9	1.3	0.9	0.2
Cinema	2.1	0.7	2.2	1.1	1.6	0.4	3.1	0.7
Leisure total	4.7	1.6	3.4	1.6	6.5	1.8	4.0	0.9
Children	43.8	15.3	24.7	11.8	59.2	16.0	108.4	25.0
Miscellaneous								
Soaps/saris/ hair oil	20.9	7.3	17.2	8.3	24.1	6.5	32.7	7.5
Total*	285.7	100.0	208.6	100.0	370.0	100.0	434.5	100.0

*Prices are those prevailing in the market of Ramanagaram town in February 1996.

These estimates of per capita income are lower than the national per capita income figures, probably because (as discussed below) the savings and alcohol estimates do not reflect actual levels. Muslims have the largest mean total consumer expenditure, followed by the Christians and the Hindus. If we look at per capita consumer expenditure, the Christians have the highest per capita consumer expenditure, followed by the Muslims and then the Hindus. The differences between Hindus and Christians and Hindus and Muslims were statistically significant at the 95% level, but the difference between Muslims and Christians was not. These findings suggest that the Hindus had the lowest expenditure per capita compared to the Muslims and the Christians. Of all three religious communities, Christians spent the most (25% of per capita expenditure) on children, perhaps reflecting a 'quantity-quality' trade-off in Christian fertility because, as we will see in Chapter 6, the Christians had the lowest fertility of all three religious groups.

Some of the women explained that they did not deliberately save money and in the event of ill-health or a daughter's wedding, would borrow money at the required time. For those who did save, I was unable to determine exactly the extent of their savings, if any. Nevertheless, I was able to ask a qualitative question to establish what the women would do for extra income, which was 'What do you do about income in the event of an unforeseen occurrence such as illness?' This question had six options which the women were asked to give 'yes/no' responses to. These were: the children leave school, son/daughter sends you money from the city, use savings, borrow from neighbours, pawn jewellery and other strategies such as someone else helps out. Using savings was not the most popular recourse. Rather, borrowing from friends and neighbours was preferred: this response was given by 38% of Hindus, 25% of Muslims and 53% of Christians.

The women were very happy to reveal their monthly expenditure on betel leaves and tobacco. However, they were extremely reluctant to speak of alcohol consumption either by themselves or by their husbands. The reticence of all but a very few women about revealing their expenditure on alcohol is one drawback of the estimates of consumer expenditure derived from the responses to the questionnaire. Alcohol accounts for 0.9% of total consumer expenditure per capita, which is very low compared to the scale of the alcohol problem which emerged in qualitative evidence collected during my fieldwork. Therefore, the figures in the alcohol/tobacco category of Tables 9 and 10 mainly refer to tobacco consumption, rather than to alcohol.

Cinemas were popular, as well, and an average of about Rs. 10 in total or Rs. 2.1 per capita was spent per month on entertainment. However, these cinema shows were attended by the Hindu and Christian women, but not at all by the Muslim women, mainly due to purdah restrictions. The price of a cinema ticket in February 1996 was about Rs.6 per person, implying that women went to the cinema on average about once or twice a month. The expenditure on cinema-going is relevant to questions of fertility because messages about infant and child care were advertised at the cinema, prior to the screening of a film.

Women also allocated 7.3% of their monthly expenditure per capita to miscellaneous items for themselves personally. These chiefly included clothes for themselves (usually bought once or twice a year at festival times), soap (both for clothes and for bathing), white talcum powder, coconut oil and flowers, face cream, kohl, and the stick-on bindis for Hindu women. Three products - hair oil, talcum powder and face cream - essentially formed the core cosmetics for the Ramanagaram women.[20] My impression was that the unusual level of expenditure on these items (35.4% of the total expenditure on miscellaneous items), was caused by the influence of the media through radio, television and billboards, in promoting

these products through advertising. However, the bathing soap, hair oil, powder and face cream were used not just by the women of the household, but also chiefly by their adult sons and a bit less frequently by elderly relatives living in the household.[21]

One reason that it is important to describe and discuss the composition of consumption expenditure in detail is that it provides qualitative evidence about women's lives in the taluk. It is important to know how much women spend on basic necessities for the household compared to expenditures on themselves or on their children. One important qualitative finding from the breakdown of consumer expenditure is that the Christians, on average, spend more on their children than do the other two religious groups. As Christian fertility in the taluk was also lower than the fertility of Hindus and Muslims, this is consistent with a view that Christians favoured child-quality over child-quantity and were investing more in their children. Given the enormous academic literature which has been devoted to the quantity-quality trade-off and the relationship between income and fertility, it seemed worthwhile to analyse in detail the composition of consumption expenditure in the Ramanagaram sample.

C. Consumer equipment

The questionnaire also posed questions concerning ownership of certain consumer durable assets: a transistor, a bicycle, a fan, a cot, a moped/scooter, a watch, a television and a chair/bench. The number of families owning these items of consumer equipment is shown in Table 11.

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[20] The powder was made by Ponds India Ltd. and called 'Pond's Dreamflower Talc' while the cream was rather enticingly named 'Fair And Lovely', produced by Hindustan Lever Ltd.

[21] During the interviews, the women would meet me only after they had applied their creams and powders and tidied their hair. No amount of coaxing that they should not waste their cosmetics on me seemed to deter their resolve to literally put 'best faces forward' to strangers. If I did not inform them earlier that I was coming, this invariably meant that I would have to wait about 5-10 minutes on the doorstep while the women prepared themselves to be interviewed. Frequently, when I sought interviews with women, they would be at home oiling their daughter's hair or their own with the coconut oil.

Table 11: Ownership of items of consumer equipment by religion, Ramanagaram sample (1996)

Consumer item	All women		Hindus		Muslims		Christians	
	Number	%	Number	%	Number	%	Number	%
Transistor	103	51.2	64	57.7	27	36.0	7	46.7
Bicycle	83	41.2	47	42.3	31	41.3	5	33.3
Fan	86	42.8	39	35.1	38	50.7	9	60.0
Cot	83	41.3	35	31.5	39	52.0	6	40.0
Moped/scooter	33	16.4	21	18.9	8	10.7	4	26.7
Watch	115	57.2	64	57.7	40	53.3	11	73.3
Television	100	49.6	50	45.0	40	53.3	10	66.7
Chair/bench	124	61.7	69	62.2	42	56.0	13	86.7

For the sample as a whole, televisions, transistors, watches and chairs or benches were the most popular items of consumer equipment in Ramanagaram.

The ownership of a transistor might indicate the extent that the family would be aware of outside influences, as well as its relative prosperity. This is related to fertility because most public information about contraception and family planning in rural areas of India is provided via the radio and television. In the sample, 51% of the total possessed a transistor, 58% of Hindus, 36% of Muslims, and 47% of Christians. At the 95% confidence level, while the differences between Hindu and Muslim mean ownership of transistors was found to be statistically significant, the difference between Christian and Hindu and Christian and Muslim mean ownership of transistors was not.

Ownership of a television in Ramanagaram is a sign both of wealth and of prestige. This item is particularly interesting from the perspective of contraceptive choice because the media in Karnataka play an important role in the dissemination of information about family planning services. Televisions were very popular in Ramanagaram, particularly within the Muslim community. One Muslim woman interviewed explained to me that since the Muslim women were not allowed to go to the cinema due to the strict code of purdah their main source of

entertainment was the television at home. Of the total number of households, 50% had a television: 45% of Hindus, 53% of Muslims and 67% of Christians.

A bicycle was much prized in Ramanagaram, mainly because one of its primary uses was to carry water.[22] Because, as my fieldwork revealed, nearly 27 pots were required on average per family per day, with 2.2 hours on average per person per day devoted to water collection, a bicycle considerably reduced the number of hours spent collecting water. This is relevant to an analysis of fertility, because it has been hypothesised that children may be used for water and firewood collection in areas which lack suitable infrastructure.[23] Of the families in the sample, 41% had a bicycle: 42% of Hindus, 41% of Muslims and 33% of Christians. A reason for the smaller percentage of Christian households who owned a bicycle may have been that many Christian homes possessed water taps. However, at the 95% confidence level, there was no statistically significant difference between religious groups. Moreover, a greater percentage of Christians owned mopeds and scooters.

Fans are another indicator of relative prosperity of the family, even though most of these were not ceiling fans but cheaper table fans. Indeed, insofar as they may be regarded as oriented toward personal comfort rather than economic necessity, they may be assessed as a measure of the ability to afford a luxury. In the sample as a whole, 43% had a fan in their homes, 35% of the Hindus, 51% of the Muslims, and 60% of the Christians. This is another indication that the Christians were comparatively better-off. This fact is also reflected in the higher proportion of Christians who owned a chair or bench (87% compared to 62% for Hindus and 56% for Muslims).

Ownership of a cot may again be considered a luxury, in that it is meant for comfort, rather than economic necessity. In most rural homes in this region, people sleep on the floor.

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[22] Normally eight pots of water could be strung with rope across the body of the bicycle.

Therefore, the ownership of a cot probably indicates a higher income level for the family. In the sample as a whole, 41% of families possessed a cot. A greater percentage of Muslims owned cots, followed by Christians and Hindus. This suggests that something other than merely income influences this aspect of consumption, since the Christians were the wealthiest group. Perhaps it is because Muslim women are compelled to spend almost all their time in the house because of the purdah restrictions, and consequently would make more continuous use of this consumer item.

Time-keeping in the Ramanagaram economy was typical of most Indian towns. There were no public clocks except in workplaces or schools, and therefore many families did possess at least one watch, in order for both men and women to get to work for the morning shift. Of the families in the sample, 57% had a watch, 58% of the Hindus, 53% of the Muslims, and 73% of the Christians. It is interesting that this pattern concerning watch-ownership does not appear to follow precisely differences in other measures of income between communities, either, since by other measures Hindus appear poorer than Muslims yet more of them owned watches.

Correlation coefficients among these various possible measures of income were calculated, as shown in Table 12.

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[23] See Dasgupta, 1993a: 343-370.

Table 12: Correlation coefficients between different measures of income, Ramanagaram sample (1996)

Measure of income	Total expenditure	Per capita expenditure	Land ownership	Total food expenditure	Consumer equipment	Per capita food expenditure
Total expenditure	1.00					
Per capita expenditure	0.77	1.00				
Land ownership	-0.16	-0.04	1.00			
Total food expenditure	0.56	0.23	-0.21	1.00		
Consumer equipment	0.16	0.16	0.22	0.10	1.00	
Per capita food expenditure	0.38	0.57	-0.11	0.65	0.05	1.00

Most of the measures of income were highly correlated with each other. The exceptions were land-ownership and the ownership of items of consumer equipment. Total monthly expenditure in rupees was highly correlated with per capita expenditure in rupees and expenditure on foodgrains. There was a low correlation between land-ownership and total expenditure, and between ownership of consumer items and total expenditure. This may be because better-off families were not necessarily land-owners, but instead earned incomes through cottage industry or services.[24] Moreover, ownership of consumer items may not have been related to current total monthly expenditure because the items were one-off purchases obtained from past savings.

In the models of marriage age, contraceptive choice and fertility presented in chapters 4, 5 and 6, one of the measures of income used is total expenditure. However, in order to control for the fact that some households' expenditure might be greater not because they are richer but because they have more members, the number of female extended family members (which is very highly correlated with total household size), is used as an additonal regressor in the models. Measures of per capita expenditure are not used, on the grounds they take into

[24] As Janakarajan and Seabright argue, increased landlessness can be interpreted as a sign either of greater poverty or of better opportunities outside agriculture. In their survey, houscholds which reported improvements in economic circumstances possessed less land and were characterised by a greater decrease in landowning and livestock ownership than average, but showed greater improvements in ownership of consumer durable goods. See Janakarajan and Seabright, 1996.

account completed family size, and are endogenous in a model of fertility. In some of the models, an alternative indicator of well-being, an index of items of consumer equipment possessed by the household, is also used.

In conclusion, the census information on the sample shows that Ramanagaram women are, on average, poorly educated and very often perform more than one occupation. Their husbands are, on average, slightly better-educated than they are, and mainly perform only one occupation. Higher proportions of men, compared with women, perform skilled occupations. Measures of income in terms of consumer expenditure and ownership of consumer equipment show that the Christians in Ramanagaram are better-off than Hindus and Muslims. In later chapters these measures of education, occupation and income are three major variables incorporated into our models of age at marriage, contraception, and fertility.

IX. The nature of the dependent variable: age at first marriage, the decision to use contraception, and children ever born

Before considering in detail the econometric analysis of the determinants of women's age at first marriage, their decision to use contraception, and their fertility, it is important to examine the characteristics of the dependent variables used in the multivariate analysis. This question will be examined first in terms of the average values and standard deviations of these three demographic characteristics, and then in terms of the distributions of these three variables in the Ramanagaram sample. We first consider women's age at first marriage.

Table 13 shows the means and standard deviations of the woman's age at first marriage for the whole sample and for Hindus, Muslims and Christians separately.

Table 13. Woman's age at first marriage, Ramanagaram sample (1996)

Category	Mean	Standard deviation
All women	17.27	0.28
Hindus	16.94	0.35
Muslims	17.66	0.51
Christians	17.64	0.82

It is evident from the table that that there was little difference in mean age at first marriage between Muslims and Christians, although there was a difference between Hindus and Muslims and between Hindus and Christians. Interestingly, the mean age at first marriage for all women in the Ramanagaram sample is lower than the prescribed legal minimum age at first marriage which is 18 years for women in Karnataka.

Another useful way of looking at age at marriage is by examining the number of years since the woman's first marriage, and this is shown in Table 14. The reason this is important is that theoretically, if the sample of women belonging to one religious community in the sample have been married, on average, for a longer duration than women belonging to another religious group, this might be manifested by the first group of women showing higher fertility than the second group.

Table 14. Years since first marriage, Ramanagaram sample (1996)

Category	Mean	Standard deviation
All women	17.59	0.82
Hindus	16.46	1.00
Muslims	19.00	1.02
Christians	18.78	1.03

The Muslims and Christians interviewed had been married longer than the Hindus. Mean number of years since first marriage differ between Hindus and Muslims and between Hindus and Christians, although not between Muslims and Christians.

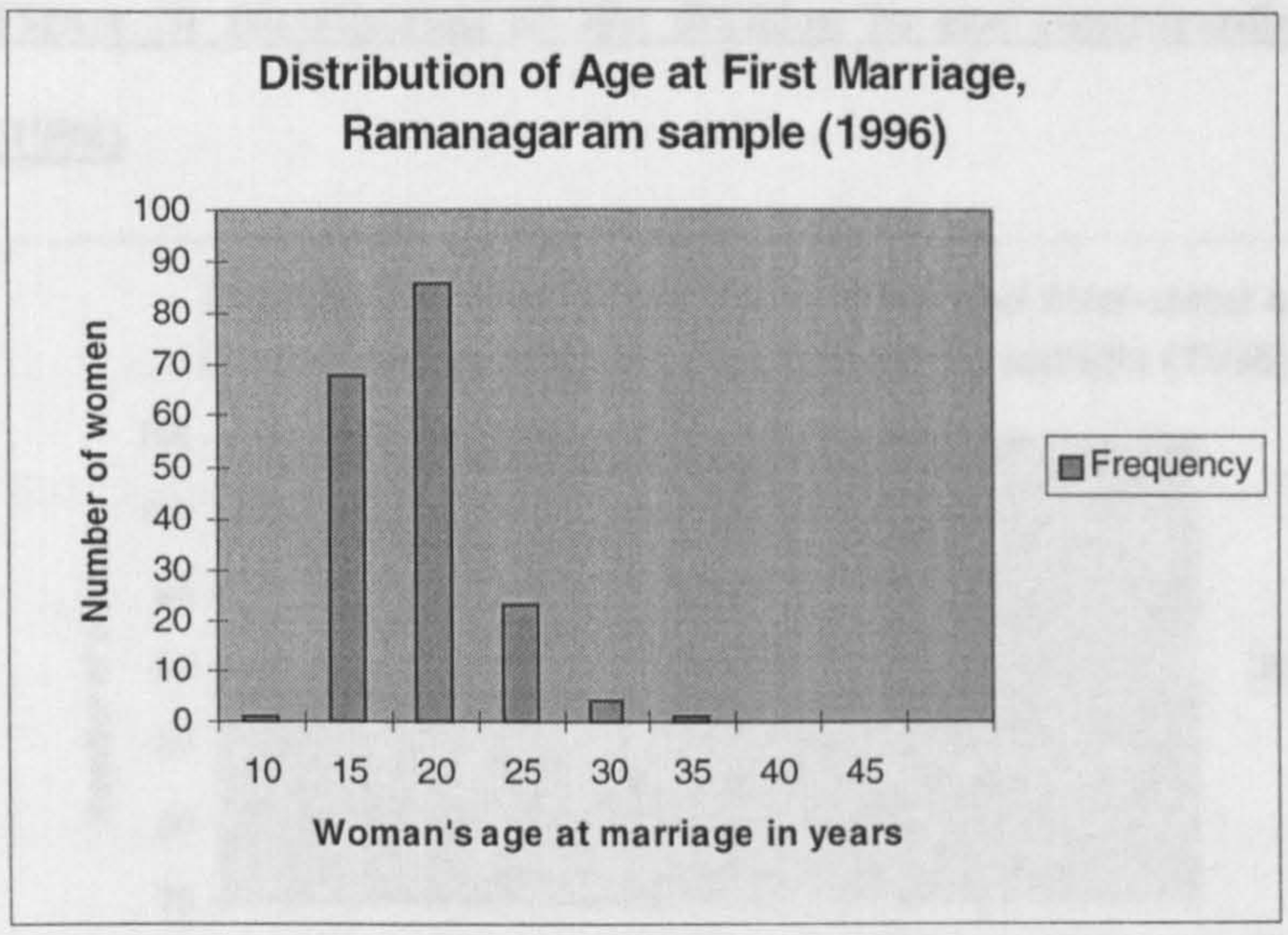
An important preliminary to deciding on the appropriate method of econometric analysis of the determinants of women's age at first marriage, is to consider the characteristics of the

distribution of the dependent variable. The variable is measured in years, and is more-or-less normally distributed as can be seen in Table 15 and Figure 1. A majority of the women interviewed were married between the ages of 11 and 25. Only 1 woman was married between the ages of 1 and 10; only 1 woman was married between the ages of 31 and 45. There is no heaping of the variable at 'favourite' ages to marry, and hence no justification for defining the dependent variable as a 'count' variable or a categorical variable. The distribution of the variable is continuous across practically all values between 11 and 30. It is for this reason that Ordinary Least Squares (OLS) methods are used in the econometric analysis of the models of marriage age presented in Chapter 4.

Table 15: Distribution of the age at first marriage, Ramanagaram sample (1996)

Woman's age at first marriage in years	Frequency
0-10	1
11-15	68
16-20	86
21-25	23
26-30	4
31-35	1
36-40	0
41-45	0
More than 46	0

Figure 1: Distribution of the age at first marriage, Ramanagaram sample (1996)



The second of our dependent variables, the one whose determinants are analysed econometrically, in Chapter 5, is the decision to use contraception. In the survey, the Ramanagaram women were asked if they had ever used any method of birth control. The question was answered in the affirmative by 53% of ever-married women in the whole sample, 86% of Christians, 57% of Hindus and 40% of Muslims, as can be seen in Table 16.

Table 16. Women's decision to use contraception, Ramanagaram sample (1996)

Category	Mean	Standard deviation
All women	0.54	0.04
Hindus	0.57	0.04
Muslims	0.41	0.05
Christians	0.92	0.07

In the econometric analysis of the determinants of contraceptive use in chapter 5, the dependent variable used is whether or not the woman had ever used a method of contraception, where the variable takes a value 1 if the woman had ever used a contraceptive method and 0 otherwise. This variable follows a binomial distribution, as evident in Figure 3 and Table 17. A logistic regression procedure is therefore used in chapter 5 in order to estimate the determinants of contraceptive adoption in Ramanagaram.

Figure 3: Distribution of the decision to use contraception, Ramanagaram sample (1996)

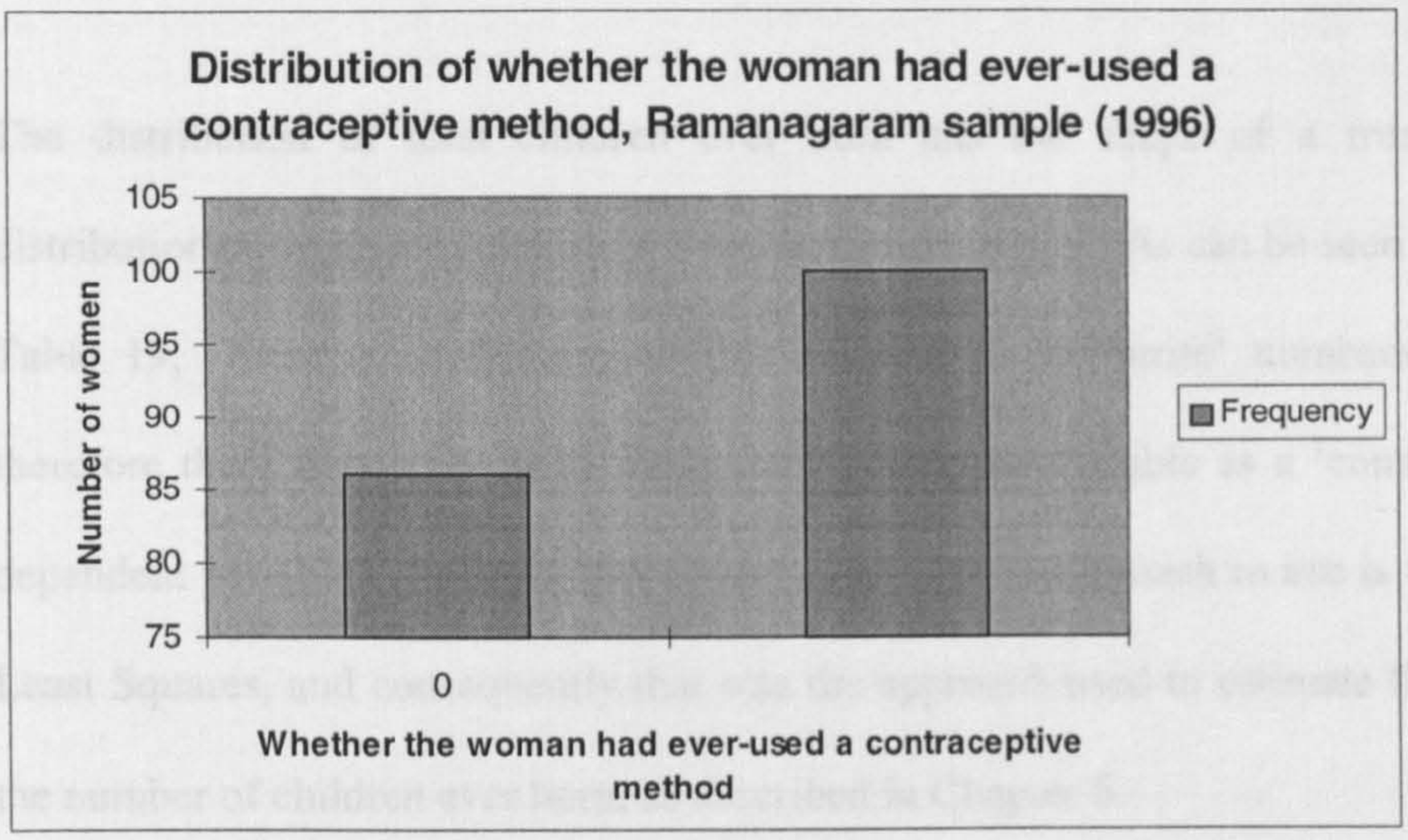


Table 17: Distribution of the decision to use contraception, Ramanagaram sample (1996)

Whether the woman had ever used a contraceptive method	Frequency
0	86
1	100

Our dependent variable in the econometric analysis of fertility outcomes in Chapter 6 is the number of children ever born to a woman. The means and standard deviations for each religious group are shown in Table 18.

Table 18. Children ever born, Ramanagaram sample (1996)

Category	Mean	Standard deviation
All women	3.05	0.14
Hindus	2.66	0.16
Muslims	3.72	0.27
Christians	2.46	0.33

The mean number of children ever born varied by religion, with the Muslims having one child more, on average, than the Hindus. The Christians had the lowest fertility of all three religious groups.

The distribution of total children ever born has the shape of a truncated continuous distribution between a minimum of 0 and a maximum of 9. As can be seen from Figure 2 and Table 19, there is no heaping of this variable at 'favourite' numbers of children, and therefore there is no case to be made for defining the variable as a 'count' or 'categorical' dependent variable. The moct appropriate econometric approach to use is therefore Ordinary Least Squares, and consequently that was the approach used to estimate the determinants of the number of children ever born, as described in Chapter 6.

Figure 2: Distribution of children ever born, Ramanagaram sample (1996)

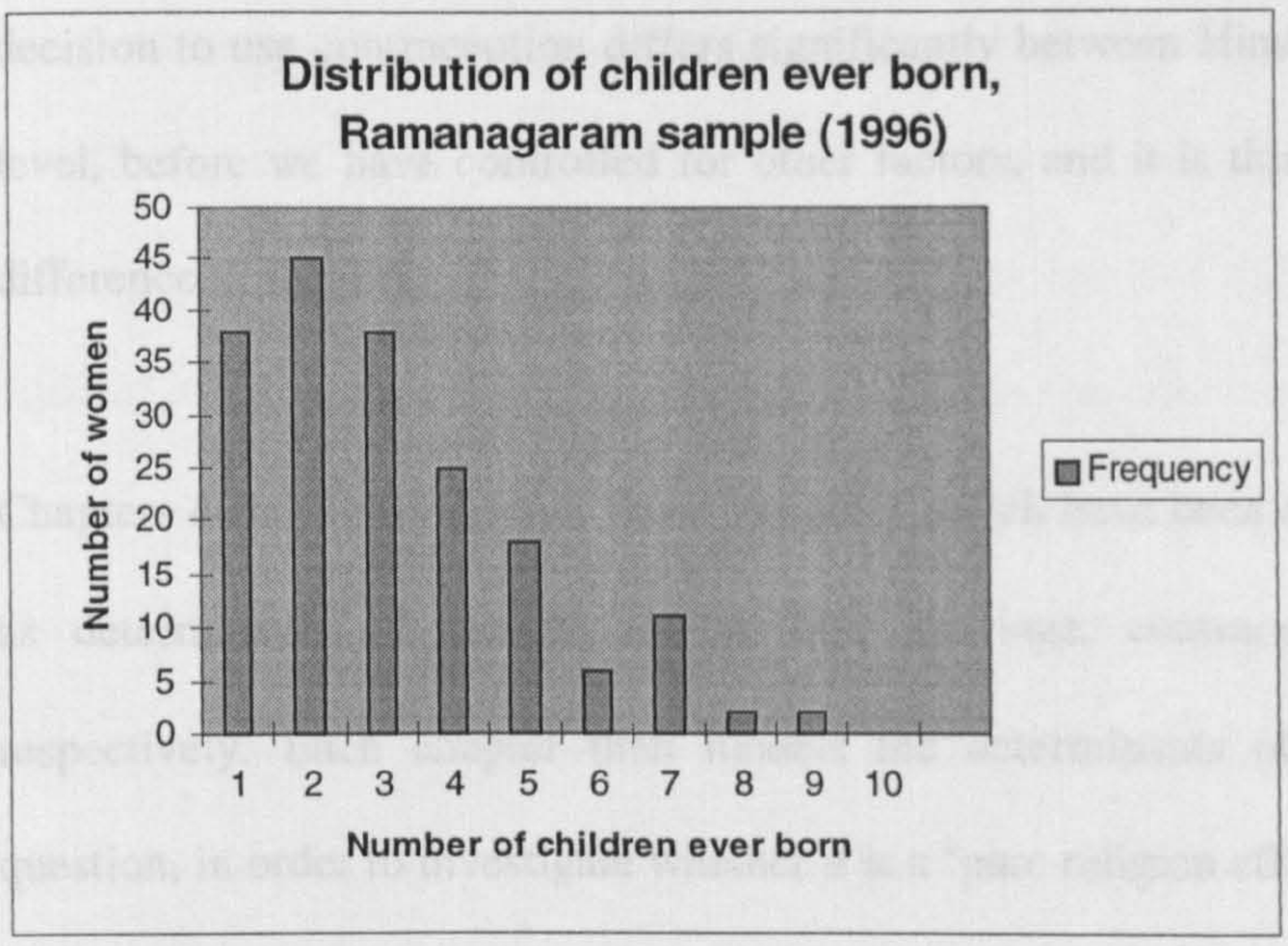


Table 19: Children ever born, Ramanagaram sample (1996)

Number of children ever born	Frequency
1	38
2	45
3	38
4	25
5	18
6	6
7	11
8	2
9	2
10	0
More than 10	0

The means and standard deviations presented raise the following issues. First, the number of children ever born differs between Hindus, Muslims and Christians, with the Muslims having one child more, on average, than women of the other two religious groups. However, women's age at first marriage does not differ significantly between Hindus and Muslims. The decision to use contraception differs significantly between Hindus and Muslims at the mean level, before we have controlled for other factors, and it is this which may account for the difference in fertility.

Chapters 4 through 6 discuss those variables which have been argued in the literature to act as determinants of female age at first marriage, contraceptive choice, and fertility, respectively. Each chapter then models the determinants of the dependent variable in question, in order to investigate whether it is a 'pure religion effect' or the influence of socio-economic 'characteristics' which influences fertility and its two major proximate determinants. OLS methods are used in order to estimate the determinants of the age at first marriage and the determinants of children ever born, and a logit model is used to estimate the determinants of the decision to use contraception in Ramanagaram. The quantitative findings are compared and contrasted throughout both with the qualitative findings which emerge from the statements of the women interviewed, and with data from other parts of India.

CHAPTER 4

The Determinants of Nuptiality: The Age at First Marriage in Ramanagaram

The age at first marriage is an important demographic variable that is a vital aspect of a woman's fertility decisions. Economists postulate that marriage occurs when the utility of being married exceeds the utility of staying single, taking into account the costs of finding a mate and the opportunity costs of being married.[1] The most important aspect of the economic theory of marriage is that male and female earning abilities determine household production and the gains from marriage. An increase in men's earning abilities increases the gains from marriage for them because high-quality (or high-wage) men can attract higher-quality women; this is Becker's 'positive assortative mating' theorem.[2] This implies that higher-wage men will marry earlier than other men. On the other hand, the earning ability of the woman reduces the gains from marriage for her because those women who have higher earnings gain less from marriage than other women, since their higher earnings reduce the couple's demand for children and, as Becker argues, 'the advantages of the sexual division of labour within marriage'.[3] Moreover, Sander argues that higher wages for women also reduce the shadow price of divorce for women.[4] It is also significant that the wage-opportunity costs of being married are normally positive for women and negative for men, due to the gender division of household work and the effect of child care. This theoretical reasoning suggests that women will marry only when the utility of being married exceeds the utility of staying single after taking into account the costs of searching for a partner. The possible factors, both economic and social, which may influence the woman when she contemplates the marriage decision are elaborated below.

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[1] Becker,1974b: 299-344; Becker, 1991.
[2] For more on this see Becker, 1981: Chapter 4 on 'Assortative mating in marriage markets'.
[3] Becker, 1981: 231.
[4] Sander, 1995.

I. Factors influencing the age at first marriage

The age at first marriage can be influenced by a number of different factors.

A. Education

Theoretically, the educational level of the woman can influence the age at marriage in five ways.[5] First, there may exist more opportunities for the woman outside marriage if she is educated, specifically in terms of opportunities for higher education or employment outside the home. This may delay her marriage.

Second, education may enable a woman to obtain a better-educated husband or one with an urban job, increasing the search time for finding a suitable partner, and delaying marriage. This clearly influenced some women in Ramanagaram, as shown by the remark of a Hindu woman, Padmabai, age 40, who said, 'I want my daughter to do her B.Ed. [teacher's training degree] first, become a teacher and then only think of marriage - find a good educated husband, and marry only after 20. I don't save aside any jewellery for her because I am giving her an education. Vidya [education] is the jewel I am giving her.' This was echoed by a Muslim woman, Sofia Banu, also age 40, who remarked, 'I have given my daughter an education so that she can do employment and find a good husband - it is a better investment than jewellery.'

Third, the returns from investment in education are reflected in increased productivity in both household and market production. Increased household productivity affects the opportunity cost of marriage through increased labour market opportunities for women, which increases the returns to marriage. Moreover, since acquiring education involves a considerable amount

of time, there is less gain to be had from specialising in the home and rearing children as a result of marriage. Thus, education will delay marriage because the education-related increment to the gains from marriage can only be reaped when education is complete.

Fourth, as the employment prospects of women are better if they are better educated, they are able to support themselves economically while being single and spend a greater amount of time in searching for a suitable partner - i.e. they can finance a longer search-process.[6] Finally, education may also influence women's ideas about marriage, via 'learning values'.

However, the manner in which schooling is supposed to affect marriage empirically is not always clear-cut. In their empirical analysis of one Hindu and one Muslim caste in two villages in north India, for instance, Jeffery and Jeffery argue that women's schooling is seen more as a means to enhance a woman's prospects in the marriage market because education helps women with the discharge of 'status production' duties and in the management of household accounts.[7] 'Status production' work refers to those aspects of women's domestic duties which enhance the status of the family. Jeffery and Jeffery argue that an educated wife is regarded as having better manners, being more socially competent, and being better able to teach her children good manners and good habits, than an uneducated one. An educated wife is also perceived as being able to help with children's schoolwork, go shopping by herself, make records of exchanges with the extended kinship network, and visit her natal home alone and without difficulty.[8]

For Karnataka, there is evidence that education is associated with a later age at first marriage. The National Family Health Survey 1992-93 showed that for the state as a whole, the median

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[5] See Caldwell, Reddy and Caldwell, 1983: 343-361; Shapiro, 1996: 89-103; and with particular reference to Karnataka the Mysore Population Study, 1961: 98-99.
[6] See Keeley, 1977: 238-250.
[7] Jeffery and Jeffery, 1997: 186-192.
[8] Jeffery and Jeffery, 1997: 203-206.

age at first marriage for women in 1993 was 6 to 7 years later among women who had completed high school than among illiterate women in all five-year age cohorts from age 20 to age 49.[9] Empirical evidence is also available from many other countries.[10] Singh found that between 1950 and 1990 there has been a rise in the age at marriage of rural women in Himachal Pradesh from less than 12 years to 19 years, and his findings suggest that this is mainly due to the rise in education in this area.[11] Because women's education has emerged as an important determinant of age at marriage in other studies, its effect on marriage age in Ramanagaram was also investigated.

Primary schooling in Karnataka spans five years (from Standards 1 to 5), and secondary school spans another five years (from Standards 6 to 10). At the end of the tenth year of schooling are SSLC examinations. After this, girls are allowed either to read for Standards 11 and 12 in school, or the option of a two-year pre-university course. After this, there are undergraduate degrees, lasting either three or four years, followed by Master's courses lasting two years.

In the questionnaire, the women were asked separately about their primary, secondary and university-level education. In Chapter 3 we looked at the distribution of educational levels in the Ramanagaram sample. It may be recollected from that discussion that the mean years of education for the sample as a whole was 6.0 years. In the multiple regression models tested later in this chapter, the various measures of education used are the woman's total years of education, her primary education, her secondary education, and her university education.

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[9] National Family Health Survey 1992-93, Karnataka, 1995: 50-51.
[10] There is a voluminous literature on this issue. For example, see Birdsall, 1989: 23-50; Cochrane, 1979; Carlson, 1979: 341-353; Keeley, 1977: 238-250; Summers, 1994; Appleton, 1996: 139-166; Brien and Lillard, 1994: 1167-1204; Caldwell, Reddy and Caldwell, 1985: 33.
[11] Singh, 1992: 123-130.

The educational level of her husband is another variable which may influence a woman's age at marriage.[12] The way in which this influence might work would be that a better educated man prefers to marry a woman who is older, whether because he wants a better educated spouse, because he believes that it is better to marry someone who is more mature, because he believes that a better educated wife will earn more, or because he believes she will cause their children to be better educated. This is Becker's theorem about 'positive assortative mating' or the 'mating of likes'.[13] Becker argues that the mating of likes occurs when such marriages maximize aggregate commodity output over all marriages, irrespective of whether the traits of men and women are financial, biological or psychological. The theorem is as follows: Assume men and women differ only in their quantitative traits (A_m and A_f) and each trait has a positive marginal productivity. This implies that

$$\frac{\partial z\,(A_m, A_f)}{\partial A_m} > 0 \text{ and } \frac{\partial z\,(A_m, A_f)}{\partial A_f} > 0 \qquad (1)$$

A sorting of large A_m and large A_f and small A_m and small A_f maximises aggregate output if and only if increasing both A_m and A_f adds more to output than the sum of the effects of separate increases in A_m and A_f. In this case, an increase in A_m reinforces and raises the effect of an increase in A_f. Positive assortative mating is optimal when

$$\frac{\partial^2 z(A_m, A_f)}{\partial A_m \partial A_f} > 0 \qquad (2)$$

because aggregate output is then maximised. Further, the gain to a man M_i from marrying a woman F_j rather than staying single is

$$G_i = (Z_{ij} - Z_{is}) - Z^f_j \qquad (3)$$

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[12] Sander, 1995.
[13] Becker, 1981: Chapter 4.

where Z^f_j is the given income of woman F_j, Z_{ij} is the output of the *i*th man married to the *j*th woman, Z_{is} is the income of man M_i if he stays single, and the term in parentheses increases with the quality of M_i when A_m and A_f are complements and decreases when A_m and A_f are substitutes. In this case, the gain from marriage to a women of a given quality is greater for a superior man when traits are complements and greater for an inferior man when traits are substitutes. A higher quality women marries a higher quality man because she raises the productivity of a superior man and vice versa. Thus, for the market, positive assortative mating or the mating of likes is optimal when aggregate output is maximised over all marriages.[14]

In the Ramanagaram sample, the husband's education variable was measured in a similar manner to the number of years of the woman's education. However, one could justifiably expect the education of the woman and her husband to be highly correlated with each other. This is confirmed by the fact that the correlation coefficient between wife's and husband's education in the Ramanagaram sample was high and positive at 0.63. This suggested the need to investigate the effect of these two variables, holding each other constant, and that was in fact done in the multivariate models estimated below.

B. Women's employment

The availability of better employment opportunities for women outside the home increases the opportunity cost of women's time in marriage. Labour market participation and better pay levels may enable women to contribute to the costs of marital search for a longer period, enabling women to find more suitable grooms. This may work to delay female marriage age. In this context, there is evidence that the age at marriage for women rises markedly when

[14] For more on this see Becker, 1981: Chapter 4.

women and men are employed in skilled rather than unskilled jobs.[15] This variable was not included in the multivariate models estimated because a majority of the ever-married Ramanagaram women interviewed took up an occupation only after their marriage, and because full employment histories of all women before marriage were not available.

C. Income

A third primary influence on marriage age is income.[16] However, the manner it which it is supposed to affect marriage age is complex. It is possible that income is positively associated with marriage age, in the sense that a greater income earned by a woman herself will reduce her expected gains from marriage, thereby increasing her marriage age. However, increased income earned by a man may enable him to afford the expenses of supporting a wife who is not earning an income, as well as the costs of possible children, thereby enabling him to marry earlier. A higher-income man may also be able to afford to marry a young woman who has not already received an inheritance from her parents, and who has not had a long time to save up for marriage. It is this reasoning which lies behind the claim that as a general rule in pre-industrial Europe, wealth and income were negatively associated with marriage age, with richer farmers marrying younger than poorer ones or landless people, and with the gentry and nobility marrying the youngest of all.[17]

However, the relationship between income and marriage age is still more complex than this. In some societies, at the time of their marriage, children have a claim on a proportion of the savings of parents and this takes the form of dowries.[18] Where a dowry system still operates,

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[15] Anderson, Hill and Butler, 1987: 223-34.
[16] Ermisch, 1981: 347-356.
[17] See Kriedte, Medick and Schlumbohm, 1981: Chapters 2 and 3 by Medick; see also Ogilvie, 1997: Chapter 8.
[18] Dowries in Karnataka (as perhaps in much of South Asia) do not typically involve land or other fixed assets. As Agarwal argues, dowries are in fact 'movable'. They usually take the form of gold

as in India, the ability of parents to meet dowry payments may influence the daughter's age at marriage. In south India since the 1950s, the main shift concerning marriage payments has been from bridewealth to dowry. Caldwell, Reddy and Caldwell argue that in India dowry payments 'order' a marriage market characterised by hypergamy (the practice of women marrying into wealthier families of the same caste). This is because dowry serves as a compensation to the richer family for contracting the alliance.[19] Thus, if parents feel that they are unable to afford the costs of a wedding (and this is quite likely if there is more than one daughter to be married), marriage for the daughter (especially if she is of lower birth order) may be delayed and hence her age at marriage higher.[20] Naturally, this complicates the postulated relationship between income and age at marriage. In Ramanagaram, for example, wedding costs were quite high. Sakamma, age 42, a scheduled caste woman from village C remarked, 'I want to perform a grand wedding for my daughter. I would need one lakh (hundred thousand rupees) to marry my daughter'.[21] Having said that, parents may also expect dowry demands to become even higher in the future and hence decide that if they can afford it, it is better to marry daughters as soon as possible.

The 'search time' required for finding a suitable partner may affect the age at first marriage.[22] Taking a cue from option theory, *ceteris paribus*, the search time for finding a partner will be long when the option of being single is highly valued. This is important in societies such as India, where marriage, though near-universal, is usually irreversible, and for the woman the cost of divorce, both social and economic, is very high. The cost of remaining unmarried is also very high. The search time is influenced by the ability to finance the 'search costs' of finding a partner. This will be influenced by the income and other characteristics of the

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jewellery, utensils, items of consumer equipment, small farm animals and money. For more on this, see Agarwal, 1994.

[19] Caldwell, Reddy and Caldwell, 1983; Rao, 1993: 666-677.

[20] Scarlett Epstein, 1973: 193.

[21] For evidence that the 'marriage squeeze' in South Asia has manifested itself in rising dowries, see Rao, 1993: 666-677.

[22] Sander, 1995.

woman and her parents.[23] A woman who is more highly educated and perhaps also employed may be in a position to delay marriage by being able to finance the costs of searching for a partner whom she regards as more suitable (e.g. more educated). If her parents are also highly educated and in employment, they may also be able to take on the search costs of finding a more suitable partner for their daughter, thereby delaying her marriage. In societies such as India, where daughters stay at home with their parents until marriage, parents are more likely to decide how many resources to allocate to search costs and to assist in paying them.

Ideally, in order to assess the impact of income on marriage age, it would be desirable to consider the 'income of origin' for the woman prior to her marriage rather than the 'income of destination' i.e. the income of the family that the woman marries into. However, although the income of the family after marriage is an ex-post factor, given the strict codes for marriage in Ramanagaram, whereby marriages were mainly arranged among families of a similar socio-economic class, it is not unrealistic to assume that the 'income of destination' is highly correlated with the 'income of origin'.[24] In the Ramanagaram sample, out of a total of 187 marriages, only one was an inter-caste marriage by choice. All the other marriages were arranged by parents and took place within the same jati.[25] Though not all jatis in Ramanagaram are economically homogeneous, one of the central features of these arranged marriages is that the economic status of both families is taken into account in the marriage negotiations. [26] For example, referring to the marriage negotiations for her sixteen year-old daughter, which were taking place at the time of interview, Chandramma of village A stressed, 'We are looking very carefully. It is important for us to find a "good house" for our

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[23] Sander, 1995.
[24] Rao, 1993: 674.
[25] Although marriages were 'arranged' in a traditional sense, there was some degree of choice for the marriage partners in that they were consulted for their consent, after meeting with each other in the presence of other relatives.
[26] In this context, it should be noted that an economic analysis of the arranged marriage system has an intrinsic principal-agent problem, and that the standard Beckerian framework needs to be modified. This is because in the case of arranged marriages, it is the parents of women and men who undertake the search for marriage partners for their children, and who attempt to optimise that decision.

daughter. After all, they must be in a position to take care of her well.' Thus, we have good reasons for believing that most women married into families which belonged to a broadly similar income bracket. It is also reasonable to assume that women's husbands' incomes as married adults were positively correlated with their own 'incomes of origin'. Other researchers have made similar assumptions in their models of marriage and have shown them to be empirically justified.[27] However, it must be acknowledged that the lack of information on the income-generating characteristics of the women's original households is a deficiency of the Ramanagaram dataset.

This deficiency was unavoidable for several reasons. The married women settled in Ramanagaram, who formed the basis for the sample, were acutely aware of the income generated in their households (once they were wives), but were unable to provide accurate data on the income generated in their parental homes. Moreover, not all of the women's parental homes were in the Ramanagaram area. Collecting information on their incomes of origin would therefore have been difficult due to geographical distance and because in some cases the parental homes did not exist due to the demise of one or both parents since the woman's marriage. In the absence of any reliable source of information on women's incomes of origin, it was decided to rely upon the existence of at least some degree of correlation between women's 'income of origin' and their 'income of destination' and to use various measures pertaining to income of destination in order to investigate possible links between income and women's age at first marriage. It is acknowledged that, as with most data on income in less developed countries, the measure of income which is used in the models presented in this study is imperfect, at best. However, it is better to have some measure of income, however imperfect, than to have no measure at all. It is for this reason that in the models of marriage age, the income of destination is used as a proxy for the household's income of origin.

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[27] Rosenzweig and Stark, 1989: 905-926.

In this study, based on our assumption that women's income of origin is highly correlated with their income of destination, measures of per capita expenditure, either per capita total expenditure or per capita foodgrains expenditure, cannot be used because intuitively, per capita measures take into account the completed family size after marriage, and thus will not necessarily shed light on the income of origin (or destination) affecting the age at marriage.

Consumption measured by total expenditure was chosen as the most relevant measure of income because it was correlated with several other important income measures, it was the variable the women were best able to describe accurately and provide information on, and it has been used by other studies.[28] Taking into account the limitations of a cross-sectional survey that measures observed expenditures at a point in time in relation to consumption, and the fact that female respondents were able to give more accurate information on monthly expenditures than on aggregate incomes, total consumption expenditure is arguably the best single guide to consumption and welfare in Ramanagaram, at least in the context of an analysis of the determinants of marriage age.

In our estimates of total expenditure we will not include ownership of consumer durables on the grounds that the latter would have probably inflated the former if included in a single measure, and is endogenous in a model of the determinants of marriage age. I believe that the total consumer expenditure measure used here is still able to distinguish between households at different levels of income. Additionally, as we saw in Chapter 3, the very low correlation coefficient (0.16) between the total expenditure variable and the ownership of consumer equipment illustrates that measuring household welfare in Ramanagaram is complex. Moreover, given the endogeneity of this variable, in attempting to assess the determinants of the age at which women were married (in most cases, many years before the purchase of

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[28] Blundell, Preston and Walker, 1994; Ketkar, 1979.

these consumer durables) it seemed better to leave out this measure, for the moment, in models of marriage age, but to include the index of ownership of items of consumer equipment later in models of fertility, where it would be possible to assess the impact of durables ownership on family size.

D. Social norms

A fourth factor that is widely theorised as influencing marriage age consists of social norms concerning marriage. Dasgupta defines social norms as 'injunctions on behavioural strategies, accepted by members of society generally.'[29] He points out the evidence in rural societies for the existence of many reciprocal insurance agreements, and suggests that three main factors sustain compliance with these insurance agreements. Firstly, rural communities function like small states, with the structures of authority invested in some and recognised by all members. Secondly, individuals internalise social norms so that their utility function is 'a reflection of ordering over actions in part driven by social norms. By internalising a norm, a person makes the springs of his actions contain the norm ... in short, his upbringing ensures that he has a disposition to obey the norm.'[30] Finally, a third factor sustaining a norm is that if there is a 'sufficient' number of individuals adhering to a norm, no one individual wishes to deviate because if he or she does so, there will be sanctions against him or her imposed by the others for as long as he or she does not conform. Dasgupta argues that this results in an externality, with a certain pattern of behaviour being sustained and replicated even when the rationale for such behaviour may have long since disappeared. This is particularly true of matters such as the 'proper' time to marry. The individual's utility is an increasing function of the average level of activity of all others, thereby sustaining a mode of behaviour and actions with no incentive to deviate from them. This behavioural pattern is easily illustrated from statements made by women in Ramanagaram, where some women mentioned that their

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[29] Dasgupta, 1993a: 210.

daughters 'should be' married before 21, but could not actually give precise reasons why this should be so, barring that their community would not look well upon parents who did not do their 'duty' by their daughters in finding husbands for them.[31] For example, Nagama, age 36 and a mother of four daughters, from village D, remarked, 'I will marry my daughters at 15. I know it is wrong, but I do it because it is expected, we live in a "society", though personally I want to improve them.' Another woman, Laxmiamma, age 29, from village A, remarked, 'Marriage at 15 is the norm here. I feel I have suffered enough, why should I make her suffer? But, society matters too.'

Identifying changes in social norms about marriage age is difficult, because economists postulate that social norms are subsumed within the utility function. However, one possible way to measure changes in norms is to examine changes over time and one possible way to examine changes over time empirically is to compare the year of marriage across women. It is hypothesised that the woman's year of marriage will affect the age at marriage if there has been a general trend (most likely upwards) in norms about marriage age in the region in which she lives that is not accounted for by differences in educational attainment, income or any other variable. Thus, women who marry in more recent decades may marry at later ages.[32] This is likely to happen if there has been a change in social norms over time toward a view that later marriage age is better, a view that takes hold irrespective of the individual's specific circumstances. There was mixed evidence of such 'ideational change' in the group discussions involving the Ramanagaram women. Both literate and illiterate women, older and younger women, and especially those who were still single, opined that in the 1990s, the mid-

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[30] Dasgupta, 1993a: 210.

[31] In fact, one woman, Padmavatamma, said that it would be considered highly irresponsible if parents did not look after the matrimonial interests of offspring, especially daughters. When asked if daughters could choose partners for themselves, she said that when she was young she had had no choice but that she realised that youngsters nowadays thought otherwise. She went on to attribute youngsters' desires to choose their own partners to the influence of the cinema.

[32] This is shown clearly by Janakarajan, Olsen and Seabright, 1996. In their study of 496 marriages in two villages in Tamil Nadu in south India, they find that the female age at first marriage rose from 15.4 in the 1950s to 18.6 in the 1980s.

twenties was the 'appropriate' time for marriage. It is my guess that the women obtained this idea from the heavily advertised government-sponsored media campaigns on radio and television which spread information that marrying daughters before 18 was 'wrong', illegal and not in the best health interests of daughters. The actual impact of time on marriage age is identified in a multiple regression context (as explored below).

E. Religious, ethnic and caste differences

The age at marriage may depend on religious, ethnic or caste differences in the population.[33] This has been argued in many studies.[34] In his analysis of marriage, divorce and fertility among American religious groups in the 1980s, for instance, Sander finds that there is a statistically significant difference in marriage and divorce rates between Catholics and non-Catholics even after controlling for income and educational differences.[35] In their study conducted in Bijnor district between 1990 and 1992, Jeffery and Jeffery find that the age at first marriage for Muslim Sheikhs was consistently less than that for Hindu Jats for all age cohorts.[36]

Religion may have a direct impact on the age at marriage as a system of beliefs, values, or ideas.[37] Alternatively, it may exert an indirect effect via its impact on women's status within the family or community.[38] The age at marriage may also depend on church sanctions and religious prescriptions.[39] For example Caldwell *et al* argued that the main motivation for

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[33] Carlson, 1979: 341-353; Frisbie, 1986: 99-106; Brien and Lillard, 1994: 1167-1204. Brian and Lillard argue that in Malaysia there are differences in marriage age and in fertility between the Malays, the Chinese and the Indians, even after controlling for socio-economic effects such as a rise in female education and rapid economic growth.

[34] See Sander, 1995: Chapter 2; Mcquillon, 1989: 331-346; Ketkar, 1979: 479-488.

[35] Sander, 1995.

[36] Jeffery and Jeffery, 1997: Chapters 5 and 6.

[37] We have dealt with the normative content of religion on marriage in detail in Chapter 1.

[38] See Chamie, 1977: 365-382; Obermeyer, 1992: 33-60.

[39] For example, a related issue (which we do not explore in this chapter) is the question of remarriage. The Mysore Population Study of 1961 argued that remarriage in towns such as Ramanagaram was as low as 1%, because religious tradition among higher caste Hindus, forbade the remarriage of widows.

early marriage in Karnataka 'was provided by divine sanctions against girls who failed to marry before menarche.'[40] Religion can also affect the search time of finding a suitable mate because of the higher costs to members of some religions of making a wrong marital choice. This argument is applicable in Ramanagaram where the costs of making a wrong choice of marital partner are high. However, whether such costs differ between Hindus, Muslims and Christians, leading to a higher age at marriage for one religious group vis-à-vis the others, is a question that needs further investigation. In the 7th Round of the Indian National Sample Survey undertaken in 1953-54, it was found that Muslim women in Karnataka were marrying 1 year later than Hindu women, while Muslim men were marrying nearly 1.5 years later than Hindu men.[41] This study, however, did not control for other socio-economic variables, so these findings must be interpreted with caution.

In order to assess the influence of religion on the age at marriage for the Ramanagaram dataset, three dummy variables were created. The first was for Hindus versus non-Hindus, and the second for Muslims versus non-Muslims, having the Christians as the base category. Third, since this study is particularly concerned with Hindu-Muslim differences, a dummy variable was created for Muslims versus Hindus, excluding the Christians.

The Mysore Population Study and the National Family Health Survey argued that in Karnataka, caste has an important influence on the age at first marriage.[42] This is regarded as

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However, the study noted that remarriage was permitted among scheduled castes and that 2% of the scheduled caste women in the towns had remarried more than once. Among males, however, remarriage was common. See the Mysore Population Study, 1961: 106-107. Thus, religious attitudes towards remarriage may also affect marriage age.

[40] Caldwell, Reddy and Caldwell, 1983: 345.

[41] As reported by Caldwell, Reddy and Caldwell, 1983: 344.

[42] The Mysore Population Study found that among the Hindus, Brahmin women in the birth cohort 1918-1932 had the highest median age at first marriage (16 years) of all castes in the sample. The study also found that among the Christians in Bangalore city, there was a caste-like division. There were Indian Christians, Anglo-Indians and Europeans. Of these three, the study spoke of 'marked differences between the Indian Christians and the other two. Indian Christians showed greater similarity to Hindus and Muslims, than to Anglo-Indians and Europeans, both in the level and trend of age at marriage'. For more on this, see the Mysore Population Study, 1961: 98.

operating either through custom, or, as in the case of economically disadvantaged castes, through there being a strong economic reason for women to marry at young ages.

Although Indian Muslims and Christians also have a sort of 'caste system', in the Ramanagaram sample the widest array of castes was unquestionably found amongst the Hindu respondents. When asked about their caste, it is interesting that Muslim and Christian respondents categorised themselves in religious divisions, providing answers such as 'Mehdavi', 'Sunni' or 'Protestant'. However, since 'caste' for Muslims and Christians was essentially coterminous with 'religion', nothing could be gained by including it as a separate variable in explaining their marriage ages. Therefore, the castes for the Hindus alone were classified into three broad categories for analysis: high castes, low castes and scheduled castes; and correspondingly three separate dummy variables were created for them.[43] The number of observations was reduced to 111, since only the Hindu women in the sample were considered.

F. Husband's occupation

The primary occupation of the husband may have an indirect impact on the age at first marriage of the woman. Men who are in skilled jobs may prefer marrying women who are older, or more educated, or employed outside the home. This may be because such women earn additional income, or raise better 'quality' children. Alternatively, men employed in occupations requiring cheap child labour (such as domestic industry) may marry at a young age and consequently also marry younger women than others.[44] Farmers may also desire more

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[43] The high castes included brahmins, gowdas, and vokkaligas; the low castes included aswajanas, balijas, bestru, kumbhar, kurubas, lingayats, maduvar, and viswakarmas; and the scheduled castes included the ekesu, lambani, ganigas, gangemata, upasadus and those who did not give a caste name but described themselves as 'sc', i.e. scheduled castes.

[44] This has been argued theoretically in proto-industrial populations in Europe as described in Kriedte, Medick and Schlumbohm, 1981. However, the empirical findings do not provide support for this view: see Ogilvie and Cerman, 1996.

child labour for farming requirements although this implicitly assumes that they are unwilling or unable to hire market labour.[45] On the other hand, if the husband is earning a very high wage, he may be able to afford the costs of keeping a wife and raising a family, thereby reducing female age at marriage.

In order to assess these hypothesized relationships between husband's occupation and age at marriage for Ramanagaram women, this variable was measured in three ways. First, husband's occupation was measured as taking a value of 1 if the husband was employed in a skilled occupation and 0 if he was employed in an unskilled occupation. Second, it was measured as taking a value of 1 if the man was a farmer, and zero otherwise. Finally, it was measured as taking a value of 1 if the husband was employed in domestic industry, and 0 if he was employed in any other occupation.

G. Age at menarche

The age at menarche is an important demographic variable and it is sometimes argued that it exerts an autonomous effect on the age at marriage.[46] Trends in the age at menarche have been mainly researched by those working in the field of medicine. The most important finding of this research is that there has been a secular decline in the age at menarche over time in Europe.[47] In a pioneering article in Nature in 1973, Tanner argued that there was a secular declining trend in the age at menarche in five European countries - the U.K., Norway, Denmark, the Netherlands and Hungary. More recent evidence for Denmark, collected by Boldsen, confirms this secular decline in the age at menarche, as well as a significant decline in its variance.[48] Though we will not go more deeply into this research area, various studies

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[45] Thorner, Kerblay and Smith, 1986.
[46] Caldwell, Reddy and Caldwell, 1983: 353-355.
[47] Tanner, 1973: 95-96; Frisch, 1982: 1033-1035; Ostersehlt and Dankerhopfe, 1991: 647-654; Boldsen, 1992: 167-173.
[48] Boldsen, 1992: 167-173.

have concluded that trends in the age at menarche are related to changes in stature and nutrition, and that there is seasonal variation in menarche with different mean ages at menarche for girls born in different seasons.[49]

In the demographic research on south India, Caldwell, Reddy and Caldwell have postulated that marriage traditionally took place shortly after menarche.[50] This is supposed to have been due partly to a belief in divine sanctions[51] and partly to a common social custom which forbade a girl attaining menarche from continuing to perform agricultural work or paid work for other households; she was allowed to resume such work only after marriage. This created an economic pressure to marry early. Traditionally, Karnataka was characterised not so much by child marriage as by very early marriage of teenage girls. The Mysore Population Study found that 42% of women born in Karnataka between 1893 and 1902 were married before the age of 13.[52] By comparison, Caldwell, Reddy and Caldwell found that in 1980 only 1% of 10-year-olds were married, and 31% of 15-19-year-olds, indicating a high percentage of girls who were not being married as children, but who were probably being married a few years after menarche, rather than immediately after it. Caldwell, Reddy and Caldwell postulated that this was because there had been a change in perceptions, according to which the proper time to marry was now regarded as being some years after menarche. In addition, the process of looking for and fixing up a suitable alliance took a year or two and this delayed marriage until some years after menarche. Jeffery and Jeffery argue that traditionally in north India, as

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[49] Boldsen, 1992: 167-173. Boldsen tests the theory that the onset of menarche peaks in the seasons of winter and summer, but finds no evidence for this in Denmark. He does however suggest that the seasonality of menarche is probably due to the seasonality of births.
[50] Caldwell, Reddy and Caldwell, 1983: 350-355.
[51] For example, Hindu scriptures such as the Dharma sastras advise that marriages of girls should not be delayed long after puberty. They recommend that girls be kept unmarried for a maximum of three years after puberty, and then only if suitable husbands cannot be found for them. For more on this see, Radhakrishnan, 1947: 169.
[52] Mysore Population Study, 1961: 93.

well, marriage shortly after menarche is popular though there is normally a gap of several months between marriage and cohabitation.[53]

In the present study, the Ramanagaram women were asked at what age they attained menarche. Boldsen has argued that girls are more likely to remember the exact time of menarche if it took place close to an important event in the family or a major festival, holiday or birthday. In addition, I would suggest that those who might not otherwise remember the precise age at menarche may remember the class that they were studying in if they were at school at the time and may thus be able to give precisely the year of the onset of menarche.[54]

In order to test the hypothesis of a secular decline in the age at menarche for the Ramanagaram sample, a five-year moving average of the age at menarche among the women of the sample was calculated and a linear trendline plotted through this graph. This procedure does not show any rise or decline in the age in menarche over time. In fact, the age at menarche appears to fluctuate more or less around the same level, approximately 14 years, for all birth cohorts in the sample. This does not exclude the possibility that age at menarche influenced the age at marriage, but it excludes the possibility of a systematic influence caused by change over time.

The hypothesis that the gap between menarche and marriage was widening over time was tested by plotting a linear trendline through a graph which looked at the gap between menarche and marriage against the year of marriage. The result showed that for the women of the Ramanagaram sample, the gap between the age at menarche and the age at marriage increased from about 2 years for women who married in the 1940s to almost 5 years for women who married in the late 1990s.

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[53] Jeffery and Jeffery, 1997.

[54] It has been found that women's recalled ages at menarche are very reliable. For more on this, see Livson and McNeill, 1962: 218-221.

Given the theoretical arguments concerning the relationship between the age at menarche and the age at marriage, this variable was included in the multivariate models estimated below.

H. Marital consanguinity

Another factor postulated as influencing marriage age is the extent of consanguinity between spouses in a population. In Karnataka in particular and in south India more generally, consanguineous unions are quite common even today; this is not the case in north India.[55] Those who have particularly referred to consanguinity in Karnataka include Srinivas, Conklin, Scarlett Epstein, Hill, Radha Rama Devi *et al*, Caldwell, Reddy and Caldwell, and Bittles, Coble and Appaji Rao.[56] Janakarajan, Olsen and Seabright also found that in their study of 496 marriages in two villages in Tamil Nadu, 59% of marriages which took place in the 1980s were consanguineous unions.[57] More recently, the National Family Health Survey estimated that 36% of ever-married women in Karnataka had married a relation and that rural women were more likely to marry relatives than urban ones.[58] Consanguinity was also more common for Hindus (37%) and Muslims (31%) than for Christians (22%). In Karnataka, the nature of the consanguineous relationship varies between religious communities. For example, Muslims have traditionally married first cousins while Hindu women have traditionally married their maternal uncles. It is possible that this may have led Hindu women to marry at a younger age so as not further to delay marriage for their uncles.[59]

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[55] Bittles, 1994: 561-584; Agarwal, 1994: 391-402.
[56] See Srinivas, 1965: 146-150; Conklin, 1973: 53-63; Scarlett Epstein, 1973: 197; Hill, 1982: 204; Caldwell, Reddy and Caldwell, 1983: 343-361; Bittles, Cobles and Appaji Rao, 1993: 114 -115.
[57] Janakarajan, Olsen and Seabright, 1996.
[58] National Family Health Survey 1992-93: Karnataka, 1995: 54-55. See also Rao, Inbaraj and Jesudian, 1972: 174-178; Rao and Inbaraj, 1977: 281-288.
[59] Bittles, Cobles and Appaji Rao, 1993: 111-116.

The existence of consanguinity between spouses can be attributed to five causes.[60] First, it is supposed to be influenced by cultural traditions. Second, it is supposed to be necessitated by the reduced need for dowry payments in consanguineous unions, where payments are often of lower value or non-obligatory.[61] Thirdly, compared to earlier decades, improvements in public health may ensure increased numbers of children surviving to marriageable age. Therefore, with larger numbers of potential partners to be found within the family itself due to better health provision, marriage to a close relative may be made easier. A fourth reason for consanguineous unions is the desire to maintain full control over ancestral property and landholdings. Finally, consanguineous marriage may be one form of risk-diversifying behaviour in which the household minimises risk by keeping the income from land or the returns from family enterprise strictly in the hands of family members as well as enjoying better opportunities for monitoring the behaviour of other family members.

Given these theoretical considerations, it seemed important to take this variable into account in assessing the determinants of the age at first marriage in Ramanagaram. Marriage between relatives was widely prevalent in the Ramanagaram sample, where 40% of women had married a relative, 38% of Hindus, 41% of Muslims and 47% of Christians. The high percentage of consanguineous marriages among Christians in the Ramanagaram sample is inconsistent with the results for all of Karnataka as reported by the National Family Health Survey.[62] At the 95% confidence level, the differences in marrying relatives was not found to be statistically significant between any of the three religious groups. The exact nature of the relationship with the husband before marriage in the 80 consanguineous marriages is reported in Table 1.

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[60] Bittles, 1994: 561-584.
[61] Govinda Reddy, 1988: 263-268; Centerwall and Centerwall, 1966: 1160-1167.
[62] National Family Health Survey 1992-93: Karnataka, 1995: 54-55.

Table 1: Marital consanguinity by religion , Ramanagaram sample (1996)

Nature of consanguineous relationship	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
First cousin on father's side	14	17.5	4	9.5	8	25.8	2	28.6
First cousin on mother's side	30	37.5	13	31.0	15	48.4	2	28.6
Maternal uncle	18	22.5	16	38.1	2	6.5	0	0.0
Other blood relation	4	5.0	4	9.5	0	0.0	0	0.0
Other non-blood relation	1	1.3	1	2.4	0	0.0	0	0.0
Second cousin on father's side	7	8.8	2	4.8	3	9.7	2	28.6
Second cousin on mother's side	6	7.5	2	4.8	3	9.7	1	14.2
Total consanguineous marriages	80	100	42	100	31	100	7	100

For the sample as a whole, the most popular forms of consanguineous marriage was to first cousins on both the mother's and father's sides. There were also 23% of women who had married their maternal uncles; these were mainly Hindu, as this relationship is disallowed by Islam.

In the present study, marital consanguinity was measured by a dummy variable which took the value 1 if the woman had married a relation and 0 otherwise. An alternative way of measuring consanguinity was also attempted. This was the coefficient of inbreeding used by Bittles.[63] This coefficient is a statistical measure of the proportion of gene loci at which an individual is homozygous, and is used to describe the mean level of inbreeding in a population. It takes a value between a minimum of 0 (unrelated) and a maximum of 0.125 (double first cousin or uncle-niece marriages, where partners have two sets of grandparents in common). The average coefficients of inbreeding for the three communities were 0.03 for the Hindus, 0.03 for the Muslims, and 0.02 for the Christians, which are all high by the standards of other populations.[64]

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[63] For more on the calculation of the coefficients of inbreeding, see Bodmer and Cavalli-Sforza, 1976: 361-379. I am grateful to Dr. D. N. Rao and Prof. N. Appaji Rao of the Department of Biochemistry, Indian Institute of Science, Bangalore for enabling me to understand better how these coefficients are calculated and used in empirical work.

[64] Bodmer and Cavalli-Sforza, 1976: 361-379.

I. Other factors

It has been argued that the age at marriage in urban areas is higher than it is in rural areas, mainly because of the higher average educational and employment status of women in urban areas, and peer-level effects whereby a higher age-at-marriage norm in some urban communities influences members of these communities to adopt similar behaviour patterns.[65] Location thus affects marriage age by altering the attractiveness of the unmarried state, the costs of marital search, and the incentive to marry. This variable is not used in the multivariate analysis conducted below mainly because of the close proximity of the five villages surveyed to Ramanagaram town and the close associations between the town and the villages (as discussed in Chapter 2).

Age at marriage may also depend on the welfare system. For example, as Ogilvie argues, in some pre-industrial European societies one could get poor relief from the village or town community, and this reduced the incentive to have many children for welfare and insurance purposes.[66] In developing societies such as India, where children are valuable means of insurance in old age and there is no widespread or national system of social security, women who are never married, or do not have children, are often in a precarious position. This creates an economic compulsion that may result in early and near-universal marriage.[67] This variable was not included in the multivariate models conducted below, because it does not vary sufficiently across the Ramanagaram sample.

Another factor thought to influence the age at first marriage includes the family system and the manner in which marriage is arranged. This refers particularly to whether a new family is expected to set up an independent household, or if young couples live in extended or multiple

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[65] Shapiro, 1996: 89-103.
[66] Ogilvie, 1997: Chapter 8.
[67] Dasgupta, 1993a: 323.

family households with parents and other siblings. Traditionally, the latter system will have the effect of lowering the age at marriage because young brides may be preferred, whose 'personality can be moulded by both her husband and his parents.'[68] Also, this means that couples do not have to wait until they can afford to buy or rent a separate dwelling, or inherit one, before getting married. This factor is quite important because it has been shown in studies of pre-industrial Europe, that waiting to own a dwelling had a significant impact on raising the marriage age there. Laslett argues that in north-west Europe marriage was dependent on the extent of saving for marriage so that only those who were 'successful enough under prevalent economic circumstances to create their own households' were eligible for marriage.[69] This was because couples were required to marshall their own resources and set up independent households after marriage, rather than living with parents. These resources were to be marshalled through life-cycle service, with young men and women working as servants or 'trainees' with other households or production units. In such situations, the individuals were required both to give up a portion of the product of their labour to their employer, and at the same time to accumulate and save funds for marriage. The system of life-cycle servants served the dual purpose of inculcating values of thrift and saving in individuals, and fostering independence in order to be able to own separate dwellings and eventually set up separate households.[70] The obvious consequence of such a system was that marriage was delayed until such time as couples saved enough to marry and set up separate households, and Laslett argues that it was this which led to the quite high marriage ages observed for both men and women in pre-industrial Europe. However, because the structure of the family system and the way in which marriage was arranged did not vary significantly across the Ramanagaram sample, this variable was not included in the multivariate analysis conducted below. ***[Response to 46] Moreover, nuclearity of the family and household structure is endogenous in a model of marriage age because the age at

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[68] Caldwell, Reddy and Caldwell, 1983: 345.
[69] Laslett, 1988: 236.
[70] Laslett, 1983.

marriage is chosen before the household is formed. It might be appropriate to include marriage age may be included in a model of the determinants of household structure, but to do the opposite involves clear endogeneity problems which would invalidate the entire econometric analysis. Household structure usually also changes over time, which further complicates the relationship between household structure and marriage age. For all these reasons, this variable was not included in the models of marriage age presented later in this chapter.

The existence of polygyny or polygamy can also influence the age at marriage and hence fertility.[71] It is possible that in societies where polygamy is popular, age at marriage for women is lower and fertility higher.[72] In the Ramanagaram sample, this factor is unimportant mainly because there were only four polygynous marriages (less than 2% of the entire sample).

The age at marriage may also depend on attitudes towards sexual activity and fertility outside marriage and the fate of illegitimate children. In societies such as Ramanagaram where sexual activity outside marriage is generally considered taboo, at least among Muslims, Christians, and higher-caste Hindus, couples who wish to be sexually active have to marry, and this will tend to lower marriage age. This variable also did not vary significantly across women in the Ramanagaram sample and therefore it was not included in the models of marriage age presented below.

Female autonomy in decision-making, the status of women in the household, and the extent of female mobility in the community may all affect age at marriage. It is possible that in areas where a purdah system operates, women are less geographically mobile, and that coupled

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[71] Hern, 1992: 53-64.

[72] This factor is relevant indirectly in the Indian context as right-wing political propaganda has routinely spoken of the 'excesses' of Muslim fertility due to the religious sanction for polygamy.

with lower female autonomy, this results in lower ages at first marriage.[73] It must also be recognised that a woman's preferences may diverge from her family's preferences and that the extent of female autonomy will influence to what extent women's preferences regarding the right time to marry are realised. This variable was not included explicitly in the multivariate models of marriage age presented below because it is highly correlated with the religion dummies and the education variables, and is in any case difficult to measure accurately.

Finally, the age at marriage may depend on the inheritance system, particularly whether unmarried women are able to inherit land. If unmarried women are not allowed to inherit land, there may be a tendency for early marriage in order to gain access to land.[74] Agarwal argues that in south Asian communities which recognised women's rights in landed property, land was kept within members of the extended family by several means such as strict rules on land alienation, post-marital residence in the village taking the form of uxorilocality or matrilocality, and close-kin marriages.[75] In Karnataka, inheritance is patrilineal. The only exception is the Bant community in the south Canara district of Karnataka, who practise matrilineal/bilateral inheritance.[76] This variable was not used in the multivariate models conducted below, firstly because it was rare for unmarried women to inherit land in Ramanagaram, and secondly because other measures of income were also being used in the econometric models of marriage age.

As this brief survey shows, a wide range of variables can in theory affect the age at marriage. However, only certain variables have been included in the econometric analysis which

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[73] Vlassoff, 1992: 195-212; Jeffery and Jeffery: 1997.
[74] Agarwal, 1994. Agarwal argues that while in legal terms women have won extensive rights to inherit and control land, in practise this is not quite so. She writes that of those women who do own land, fewer exercise effective control over it.
[75] Agarwal, 1994: Chapter 3.

follows, as some variables do not vary across women in the same society or are not possible to obtain empirical measures for.

II. A survey of the trends in marriage age in Karnataka

There is a small existing literature on marriage age in Karnataka which focusses on explaining the rise in the age at first marriage over the last century or so.[77] The Mysore Population Study found that the age at first marriage in all the zones covered by the survey increased from 14.0 years for women in the birth cohort 1893-1902 up to 15.5 for women in the birth cohort 1928-32.[78] The National Family Health Survey found that between 1961 and 1993, the singulate female age at first marriage in Karnataka rose from 16.4 years to 19.6 years.[79] However, in the cross-section of 187 ever-married women studied in Ramanagaram, the mean age at first marriage was 17.3, reflecting the fact that women were of varying age-cohorts. Interestingly, the age at first marriage is higher for Muslims and Christians at 17.6 years, compared to 16.9 years for the Hindus. However, the 0.7 year difference between the Hindu and Muslim and the Hindu and Christian mean ages at first marriage is not statistically significant at the 95% confidence level.[80] Also, the mean age at cohabitation for the women

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[76]Agarwal, 1994: Chapter 3:II:2: 116-117. Agarwal argues that in south India the practice of matrilineal/bilateral inheritance is also documented among the Nangudi Vellalars, Nayars and Tiyyars of Tamil Nadu and the Phadiyas and Chettis of Wynad district on the Kerala-Tamil Nadu border.

[77] These include the Mysore Population Study, 1961: 88-108; Goyal, 1975; Caldwell, Reddy and Caldwell, 1983: 343-361; National Family Health Survey 1992-93: Karnataka, 1995: 47-55.

[78] Mysore Population Study, 1961: 91.

[79] National Family Health Survey 1992-93: Karnataka,1995: 47. The Mysore Population Study, conducted in 1961, found that there was not much change in the male age at first marriage for men in the birth cohort 1893-1902 and 1923-1927. The male age at first marriage for these cohorts was 23.3 and 24.1 years respectively. The study also argued that most men married between 18 and 30, and that it was unusual for a man to marry before 18 years. See Mysore Population Study, 1961: 95.

[80] The difference between Hindus and Muslims is not significant at the 5% level. At a higher level of significance, say 12%, it is difficult to gauge if the size of this impact on fertility outcomes would be large, even if Hindus and Muslims married at the same age and retained their age-specific fertility, because it is difficult to hold other factors constant. If we do not hold other factors constant, the resulting figure would merely be equivalent to a cross-tabulation of religion against fertility outcomes. Thus, although the question is an interesting one, it is not possible to assess the size of the impact on Hindus and Muslims (assuming it is statistically significant, which it is not) because it is necessary to hold other factors constant. It must be emphasised again that, at the mean, the t-test shows that the impact could easily be zero.

of the Ramanagaram sample is not very different from the mean age at first marriage. These findings are consistent with Basu's argument that, on average, there is a very small gap between marriage and cohabitation in south India.[81]

Table 2 presents data on the distribution of women's age at first marriage for Karnataka state and for the Ramanagaram sample. The most interesting feature of Table 2 is that over fifty percent of women in both Karnataka state and the Ramanagaram sample have married before the legal age of 18.

Table 2. Age-specific first marriage, Karnataka (1998); Ramanagaram sample (1996)

Woman's age at first marriage	% of women (Karnataka)	% of women (Ramanagaram)
0-7	4.3	0.5
8-12	17.9	4.9
13-17	42.9	50.0
18-22	26.5	34.8
23-27	7.3	8.7
28-32	1.0	0.6
Over 32	0.1	0.5
Total	100	100

(Source: Batliwala *et al*, 1998, p. 193)

Caldwell, Reddy and Caldwell suggested that the age at first marriage increased over the last century for women in Karnataka for a number of reasons. These included the decline of child marriage, the shift from bridewealth to dowry, the decline in marriages to relatives, a rise in life expectancy, a rise in the belief that pre-menarchic girls are immature, the difficulty in finding suitable grooms, changes in perceptions regarding the age which is commonly regarded as 'the threshold to maturity', the greater 'educational and occupational heterogeneity' in society caused by the diminished influence of caste in deciding occupation,

[81] Basu, 1993: 85-95.

increased education of girls, and increased migration which made it increasingly difficult for parents of daughters to find suitable matches, by causing a 'classic marriage squeeze.'[82]

There is evidence in support of some of these hypotheses. There is evidence that child marriage has declined in recent times.[83] There is evidence that the practice of giving and taking dowry, which has been mainly a post-Independence phenomenon, has gained predominance from the 1960s on.[84] There is evidence from the National Family Health Survey that marital consanguinity, though it has shown declines elsewhere in south India, is still widespread in Karnataka.[85] With reference to the 'classic marriage squeeze', in the Ramanagaram sample mothers did mention the problem of finding suitable grooms for their daughters, though rarely concern over finding suitable brides for their sons. This is despite the fact that Karnataka, like India as a whole, has had a steadily declining sex ratio over time.

However, there are also some weaknesses in Caldwell, Reddy and Caldwell's analysis and in the National Family Health Survey. Firstly, both studies are essentially univariate analyses that study the age at first marriage without controlling for differences in education, occupation, income or any other variable. Moreover, the Caldwell, Reddy and Caldwell study is a relatively old one now and a generation has passed since their work was carried out. The National Family Health Survey, though more recent, is a volume that essentially collates data from a large random sample survey rather than doing more complex analyses with the data

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[82] This is because each succeeding generation is larger than the one above it due to increased life expectancy and better health facilities with time. See Caldwell, Reddy and Caldwell, 1983: 343-361.

[83] The Infant Marriage Prevention Regulation was passed in 1894, prohibiting marriage of girls below 8 years and boys before 14 years. After the Sarda Act was passed in British India in 1929, Mysore state also enacted a legislation fixing the minimum age at marriage for girls at 14 years, and for boys at 18 years. However, the effort failed. In 1955 a revision of the Hindu Marriage Law which had validity throughout India established the minimum age at marriage for girls at 15 years and for boys at 18 years. The Mysore Population Study, 1961, also found that the percentage of those women marrying under the age of 13 had fallen from 34% for women in the birth cohort 1893-1902, to 18% for women in the birth cohort 1928-1932. See Mysore Population Study, 1961: 93.

[84] See Tambiah, 1973: 100-110; Rao, 1993: 666-677.

[85] National Family Health Survey 1992-93, Karnataka, 1995: 54-55. See also Bittles, Cobles and Appaji Rao, 1993: 114-115. For evidence on the decline of consanguineous marriage in one other sample survey see Janakarajan, Olsen and Seabright, 1996.

set. Moreover, the survey covered Karnataka as a whole, and provided no district-level or taluk-level data at all. Furthermore, neither of these studies primarily focused on differences by religion.[86] Caldwell, Reddy and Caldwell's study did not deal with this factor at all, and the National Family Health Survey, which did collect data on religion, mentioned that there were differences by religion but did not actually go into possible reasons for these differences. This analysis of the Ramanagaram sample will attempt to address and redress some of the gaps in the existing research on the determinants of marriage age in Karnataka.

Following Sander, this chapter uses Ordinary Least Squares (OLS) estimation procedures to identify the factors which influence the age at first marriage in this sample of Ramanagaram women.[87] Age at marriage is measured as the woman's age at the time of her first marriage for all ever-married women in the sample (N = 187).[88]

III. A model of the determinants of the age at first marriage in Ramanagaram

As discussed in the theoretical section above, nine variables were identified as being potential influences on the age at first marriage of the Ramanagaram women. These were the education of the woman, the education of her spouse, total household expenditure (as a proxy for income), the woman's age at menarche, the year in which the woman's marriage took place, the religion in which the woman was brought up, the woman's caste, whether her

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[86] One exception to this is the Mysore Population Study of 1961, which found that there were differences in the age at first marriage by religion. Marriage age for Hindu women in the birth cohort 1888-1897 was 12.9 years. The comparable figure for Muslim women was 15.1 years. On the other hand, the age at first marriage for Hindu women born in the birth cohort 1928-1932 was 15.3 years, while the comparable figure for Muslim women was 15.8 years. Thus, it emerged from the study that Muslim women had a higher age at first marriage than the Hindu women covered in the study. Muslim men, too, were marrying later than Hindu men. For men in the birth cohort 1888-1897, mean age at marriage was 22.7 for Hindu men and 24.3 years for Muslim men. This increased to 23.4 years for Hindu men and 24.9 years for Muslim men for those in the birth cohort 1918-1927. See Mysore Population Study, 1961: 96-98.

[87] Sander, 1995. Sander uses OLS regression procedures to investigate the effect of several factors, including religion, on fertility in America.

[88] 'Ever-married women' refers to those women who were married, widowed or separated at the time of survey.

marriage was a consanguineous union or not, and the primary occupation of the woman's husband.

Each of the nine variables was regressed individually against the age at first marriage.[89] This was for two reasons: firstly, to obtain a preliminary indication of its possible influence; and secondly, to explore the relative usefulness of different measures of the same factor, and possible functional specifications. At the first stage, the nine variables were placed in a multiple regression and some alternative ways of measuring them were explored. Thereafter, a number of zero restrictions were successfully imposed on the model according to the results of successive F-tests. This yielded the 'best' preliminary model of the determinants of female marriage age in Ramanagaram.

However, this preliminary model only allowed for religion to exert a shift effect on the age at first marriage. In order to assess whether it also exerted slope effects - i.e. whether the effect of various socio-economic variables on age at first marriage varied across religious groups - a second stage of analysis was undertaken, in which Hindu and Muslim interaction terms were created, to form a total of 36 explanatory variables. Of the variables discussed above, only the variable on caste was excluded, because it pertained to the Hindus only. This variable was, however, used in a multiple regression model of marriage age among the Hindu women only.

At the first stage, the starting-point of the most general preliminary model estimated in the first stage is represented in row 1 of Appendix A.4.1. Multiple regression with the nine variables shown in row 1 of Appendix A.4.1 resulted in the model represented in row 1 of Appendix A.4.2. Multiple regressions were performed using alternative measures of some variables, with the starting-point regressions shown in Appendix A.4.1 and the final results

shown in the corresponding row of Appendix A.4.2. The alternative measures used in regressions 2 through 8 were as follows.

Regression 2 explored an alternative way of measuring women's education, by breaking it down into years of primary, secondary and university education. Education is broken down into its components in order to examine whether education of a particular quality influences marriage age. Rather than the absolute number of years of education, it is important to understand whether it is primary, secondary or university education that influences the woman's marriage decision. Regression 3 looked at alternative measures of husband's education, breaking it down into years of primary, secondary and university education. This raised the number of explanatory variables from nine to thirteen. Regression 4 looked at an alternative measure of marital consanguinity by replacing a dummy variable for whether the woman had married a relation with the coefficient of inbreeding between the woman and her husband.

Regression 5 explored an alternative way of assessing the impact of religion. Regressions 1-4 had used two dummy variables for religion, a Hindu dummy variable (taking a value of 1 if the woman was Hindu and 0 if she was non-Hindu) and a Muslim dummy variable (taking a value of 1 if the woman was Muslim and 0 if she was non-Muslim), with the Christians as the base category. By contrast, regression 5 considered the effect of religion between Hindus and Muslims in the sample, excluding the Christians: it did this by defining a dummy variable which took a value of 1 if the respondent was Muslim and 0 if the respondent was Hindu. Thus, only 173 observations were used because the Christians in the sample were excluded.

The measures of religion used are listed in Table A.4.1 in the Appendix to this dissertation.

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[89] The results, however, are not reported here because these simple regressions suffer from omitted variable bias.

The next step (in regressions 6 and 7) was to use alternative measures of the primary occupation of the woman's husband. In regressions 1-5, this had been measured in terms of skilled versus non-skilled occupations. In regression 6, this was replaced by a measure of farming versus non-farming occupations. Then, in regression 7, it was replaced by a measure for whether the husband was employed in domestic industry versus in any other occupation.

In regression 8, for ever-married Hindus alone (n=103), the impact of caste on the age at first marriage was tested by using a dummy variable for scheduled castes vis-à-vis others and a dummy variable for high castes vis-à-vis all others (keeping the low castes as the base category). Finally, in regression 9, the 'best general model' (which turned out to be model 3) was estimated for Hindus only, but now excluding the caste variable.

Since all the final regression models presented here were linear models estimated by Ordinary Least Squares, they were individually tested for any violation of the assumptions of classical linear models, i.e. for violations of the linearity, normality, equality of variance and collinearity assumptions. No violations of these assumptions were found in the final models presented in Appendix A.4.2.

Of the preliminary model specifications explored, model 3 is the one which best explains variation in the age at marriage in Ramanagaram. Though a greater proportion of the variation is explained by model 5, which has an adjusted R^2 of 0.52, this model is estimated from a smaller sample size (n = 173) and excludes all the Christians in the sample. Therefore, we regard model 3 as the 'best' model of the age at marriage in Ramanagaram, because it includes all 187 observations, and thus all segments of the population under study.

Of the thirteen[90] variables used at the starting-point in estimating model 3, those which emerged as being significant determinants of female marriage age were women's secondary education, husband's primary education, age at menarche, whether the husband performed a skilled occupation, year of marriage, and total expenditure. In this model, a one-year increase in female secondary education is associated with a 0.34 year rise in female marriage age; a one-year increase in husband's primary education is associated with a 0.24 year rise in female marriage age; a one-year increase in the age at menarche is associated with a 0.43 year increase in marriage age; an additional later year of marriage is associated with a 0.11 year increase in marriage age; if the husband performs a skilled occupation, the woman married two and one-half years later on average; and a Rs. 100 rise in total expenditure is associated, on average, with a 0.05 year increase in female marriage age. The model explained 50% of the variation in the age at marriage in the sample.

The most interesting feature of model 3 is that when husband's education is broken down into primary, secondary and university education, the primary education variable is significant with the expected positive sign, while secondary and university education disappear from the model. It is necessary to ask why we do not observe husband's secondary and university education to be significant as well. One possible explanation is that the effect of higher education may be picked up in the 'husband's skilled occupation' dummy variable, which may measure 'effective education', i.e. the extent to which education affects the capacity to perform work efficiently and thus increases the opportunity cost of parent's time. Both secondary education of the husband and university education of the husband are correlated with the husband's participation in a skilled occupation (the correlation coefficients are 0.45 and 0.41 respectively). Moreover, the primary education of husband variable is also highly correlated with husband's secondary education (the correlation

[90] The number of explanatory variables has increased from nine in model 1 to thirteen in model 3 because women's and husband's education were both broken down into primary, secondary and university-education components.

coefficient is 0.72). Thus, the impact of husband's higher education may be acting through both the primary education and skilled occupation variables.

Another interesting finding of these preliminary regressions is the behaviour of the occupation variables: the coefficient on the husband's occupation variable (measured as a farming occupation) in model 6 was not significant, compared to models 1 through 5, where husband's occupation (measured as a skilled occupation) was a very significant determinant of female marriage age. Instead, in model 6 the religion variable was highly significant. It is interesting that dropping the skilled occupation of husband variable makes religion significant. This does not indicate that religion *per se* is a significant determinant of marriage age, but rather that it is appearing in a model where a significant economic variable - husband's skilled occupation - has been excluded. In all the other models where husband's skilled occupation is used, religion is not significant at all. In effect, the significance of the religion variable in model 6 is an illustration of the 'characteristics' hypothesis discussed in Chapter 1.

Finally, differences in caste status were examined in model 8 of the preliminary models, where the sample was restricted to ever-married Hindus only (n=103). The variables which emerged as significant determinants of marriage age for Hindu women were the year of marriage, woman's secondary education, whether the husband performed a skilled occupation, and whether the woman belonged to a high caste. An increase of one year in the date of marriage increased the marriage age by 0.16 years; an additional year of the woman's secondary education increased marriage age by 0.35 years; if the husband performed a skilled occupation this increased female marriage age by 1.97 years; and if a woman belonged to a high caste she was married, on average, 0.68 years later. The equation explained 47% of the variation in marriage age among Hindu women. When compared with the 'best' model 3 which included the Muslims and Christians, we find that the age at menarche, women's

university education, men's primary education, and total expenditure are the variables which were included in the models for all religions combined but not in this model for Hindus only. On the other hand, the high-caste variable was significant for Hindus. This suggests that some of the norms or customs of castes may operate to form a sort of 'caste culture' which exerts an influence on female marriage age irrespective of socio-economic distinctions between members of different castes.[91]

It emerges from the preliminary regressions that after controlling for the effect of other socio-economic variables, religion exercises no independent effect on the age at marriage. However, it is necessary to examine if the effect on marriage age of various socio-economic attributes differs across religious groups. That is, it is necessary to examine if the regression lines for Hindus, Muslims and Christians have different slopes, different intercepts or both.

The main purpose of this chapter was to find out whether or not religion exercises a significant effect on the age at marriage, with particular emphasis on differences between Hindus and Muslims. Therefore, at the first stage, the most general equality to be tested is whether the factors affecting marriage age are the same for Hindus as for Muslims. This hypothesis was tested by comparing the coefficients in the models estimated for the sub-samples of the Hindus and the Muslims separately (i.e. the 'unrestricted' model) against the coefficients in the model estimated for the pooled sample of Hindus and Muslims combined (i.e. the 'restricted' model). The sub-sample regressions were estimated by beginning with general model 3, and estimating it for Hindus and Muslims separately. The starting models contained eleven explanatory variables: woman's total years of primary education, woman's total years of secondary education, woman's total years of university education, husband's total years of primary education, husband's total years of secondary education, husband's

[91] When the 'best' starting-model 3 is run on Hindus only (n = 103), excluding the caste variable, in the resulting preliminary regression 9, the significant variables are women's secondary education, skilled occupation of husband and the year of marriage, which are similar to model 3.

total years of university education, total monthly expenditure, age at menarche, year of marriage, a dummy variable which took a value 1 if the husband performed a skilled occupation, and a dummy variable which took a value 1 if the woman had married a relative[92]. The estimation procedure then used successive F-tests of zero restrictions on the deleted variables. The results of this procedure for Hindus are reported in Tables 3, and for Muslims in Table 4. The sample size for Christians was too small (N=14) to estimate the model successfully for Christians only. The 'pooled' regression on Hindus and Muslims was likewise estimated using the same 11-variable general starting model. The results of this estimation are reported in Table 5.

[92] Note that compared with model 3, there are 11 rather than 13 explanatory variables in the sub-sample regressions because we exclude the Muslim and Hindu religion dummies.

Table 3: OLS estimates of the determinants of the age at first marriage, Hindus only (Ramanagaram, 1996)

Dependent variable is AGEMAR: the woman's age at first marriage in years

Sample: 103 ever-married Hindu women

Regressor	**Coefficient**		**Standard Error**	**T Ratio [Prob.]**
Constant (CONST)	-350.956	***	62.338	-5.630 [.000]
Woman's education				
Secondary education of woman (SEDU)	0.421	***	0.143	2.944 [.004]
Husband's occupation				
Husband's occupation is skilled (SKILL)	2.774	***	0.928	2.991 [.004]
Age at menarche				
Age at menarche (AGEMEN)	0.584	**	0.226	2.581[.011]
Income				
Total expenditure (EXPNRS)	0.005		0.005	0.929 [.355]
Year of marriage				
Year of marriage (YRMAR)	0.181	***	0.032	5.708 [.000]
R-Bar-Squared	0.547			
Residual sum of squares	892.621			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level.

Table 4: OLS estimates of the determinants of the age at first marriage, Muslims only (Ramanagaram, 1996)

Dependent variable is AGEMAR: the woman's age at first marriage in years

Sample: 70 ever-married Muslim women

Regressor	Coefficient		Standard error	T Ratio [Prob.]
Constant (CONST)	-85.384	**	44.665	-1.912 [.060]
Woman's education				
Secondary education of woman (SEDU)	0.611	***	0.155	3.951 [.000]
Husband's occupation				
Husband's occupation is skilled (SKILLED)	3.532	***	1.051	3.360 [.001]
Age at menarche				
Age at menarche (AGEMEN)	0.702	**	0.327	2.148 [.035]
Income				
Total expenditure (EXPNRS)	0.007	*	0.003	1.984 [.052]
Year of marriage				
Year of marriage (YRMAR)	0.046	*	0.023	1.990 [.051]
R-Bar-Squared	0.481			
Residual sum of squares	605.746			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level.

Table 5: OLS estimates of the determinants of the age at first marriage, pooled model of Hindus and Muslims (Ramanagaram, 1996)

Dependent variable is AGEMAR: the woman's age at first marriage in years

Sample: 173 ever-married Hindu and Muslim women

Regressor	Coefficient		Standard Error	T-Ratio [Prob.]
Intercepts				
Hindu religion dummy (HINDU)	-3.547		2.462	-1.440 [.152]
Muslim religion dummy (MUSLIM)	-2.858		2.411	-1.185 [.238]
Woman's education				
Secondary education of woman (SEDU)	0.735	***	0.104	7.096 [.000]
Income				
Total expenditure (EXPNRS)	0.005		0.003	1.598 [.112]
Husband's occupation				
Husband's occupation is skilled (SKILL)	2.482	***	0.690	3.598 [.000]
Age at menarche				
Age at menarche (AGEMEN)	0.739	***	0.194	3.805 [.000]
Year of marriage				
Year of marriage (YRMAR)	0.004	**	0.002	2.197 [.029]
R-Bar-Squared	0.443			
Residual sum of squares	1823.9			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level.

In order to compare the coefficients in the model estimated for Hindus and Muslims separately with the coefficients in the pooled model estimated for Hindus and Muslims combined (i.e. in order to test if the restricted and unrestricted models are the same), an F-test was used to test the following null hypothesis:

$$H_0: \exists_i^{Muslim} = \exists_i^{Hindu} \text{ for } i = 1.....k \text{ regressors}$$

against the alternative hypothesis:

$$H_1: \text{For at least one pair of regressors, } \exists_i^{Muslim} \text{ does not equal } \exists_i^{Hindu}.$$

Hence:

$$F(k, n-2k) = \frac{RSS^{Restricted} - RSS^{Unrestricted} / k}{RSS^{Unrestricted} / n-2k}$$

where k is the number of regressors in the pooled model, $2k$ is the number of regressors in the unrestricted model, and n is the number of observations in the pooled model. The unrestricted residual sum of squares ($RSS^{Unrestricted}$) equals the residual sum of squares for the Hindus-only model (RSS^{Hindu}) plus the residual sum of squares for the Muslims-only model (RSS^{Muslim}). Therefore:

$$RSS^{Unrestricted} = RSS^{Muslim} + RSS^{Hindu} = 892.62 + 605.75 = 1498.37$$

The restricted residual sum of squares ($RSS^{Restricted}$) is derived from the pooled regression for Hindus and Muslims combined, as set out in Table 10. The restricted residual sum of squares from the pooled model was:

$$RSS^{Restricted} = 1823.9$$

The number of regressors in the pooled or restricted model was $k = 7$. The number of regressors in the unrestricted model was $2k = 10$ ($2k = 5+5$).

Therefore, the value of the F-statistic is:

$$F(12,163) = \frac{1823.9 - 1498.3675/7}{1498.3675/163} = 5.059$$

The critical value of F(7,163) at the 0.05 level is 2.01. Since, F(7, 163) = 5.059 > 2.01, this implies that we can reject the null hypothesis that the way in which the explanatory variables affect marriage age for Hindus and Muslims is identical[93]. This implies that it is worthwhile to analyse the differences in the socio-economic determinants of marriage age between Hindus and Muslims.

Such an analysis was then undertaken by means of a multiple regression with interaction terms which included observations from all three religious groups. The general starting model included the initial starting-point variables of model 3 (the 'best' preliminary model), plus Hindu and Muslim interaction terms with each of the starting-point variables. The interaction-regression starting-model therefore consisted of 36 variables. Successive variable deletion tests, using a joint F-test of zero restrictions on the coefficients of groups of variables, were imposed on this general model. This yielded the specification shown in Table 6.

[93] Note that the F-statistic is rejected even at the 0.01 level (F = 5.059 > 2.64).

Table 6: OLS interaction model of the determinants of the age at first marriage (Ramanagaram sample, all religions, 1996)

Dependent variable is AGEMAR: the woman's age at first marriage in years

Sample: 187 ever-married Hindu, Muslim and Christian women

Base category: Christians

Regressor	Coefficient		Standard error	Tratio [Prob]
Intercepts				
Constant (CONST)	-381.5090	***	102.0155	-3.7397 [.000]
Muslim religion dummy (MUSLIM)	295.9298	***	112.2234	2.6370 [.009]
Hindu religion dummy (HINDU)	198.2441	*	110.9455	1.7869 [.076]
Woman's education				
Woman's secondary education (SEDU)	-0.275		0.217	-1.266 [.207]
Secondary education for Muslims (MSEDU)	0.888	***	0.269	3.300 [.001]
Secondary education for Hindus (HSEDU)	0.750	***	0.256	2.932 [.004]
Age at menarche				
Age at menarche (AGEMEN)	0.978	*	0.591	1.654 [.100]
Age at menarche for Muslims (MAGEMEN)	-0.273		0.663	-0.413 [.680]
Age at menarche for Hindus (HAGEMEN)	-0.267		0.618	-0.433 [.666]
Income				
Total expenditure (EXPNRS)	0.009	***	0.003	3.080 [.002]
Total expenditure for Muslims (MEXPN)	-0.002		0.005	-0.543 [.588]
Total expenditure for Hindus (HEXPN)	-0.005		0.004	-1.116 [.266]
Husband's occupation is skilled				
Husband's occupation is skilled (SKILL)	1.282		1.780	0.720 [.473]
Muslim husband's occupation is skilled (MSKILL)	2.246		2.078	1.081 [.281]
Hindu husband's occupation is skilled (HSKILL)	0.814		2.023	0.403 [.688]
Year of marriage				
Year of marriage (YRMAR)	0.195	***	0.053	3.680 [.000]
Year of marriage for Muslims (MYRMAR)	-0.149	**	0.058	-2.560 [.011]
Year of marriage for Hindus (HYRMAR)	-0.099	*	0.057	-1.732 [.085]
R-Bar-Squared	0.530			

*** = Significant at 0.01 level; ** = Significant at 0.05 level; * = Significant at 0.10 level.

All the models were tested for functional form using Ramsey's RESET test based on the square of the fitted value; for normality based on a test of skewness and kurtosis of residuals; and for heteroscedasticity, based on the regression of the squared residuals on squared fitted values.

In order to compare the behaviour of the Hindus with that of the Muslims and Christians, restrictions were imposed on the parameters of the final interaction model and Wald tests were performed to test the validity of these restrictions. In the discussion which follows the results of these tests are compared with those obtained from regressions on Hindus only (presented in Table 3) and Muslims only (presented in Table 4), as a check on the reliability of the estimates obtained from the interaction model.

The first set of hypotheses tested concerned the effect of women's secondary education on marriage age. A Wald test rejected the restriction that the sum of the coefficients on the variables SEDU and HSEDU was equal to zero, implying that secondary education has a significant effect on marriage age for Hindus. A one-year increase in secondary education increased Hindu women's age at marriage by 0.48 years.[94] A Wald test also rejected the hypothesis that the sum of the coefficients on SEDU and MSEDU were significantly different from zero, implying that secondary education has a significant effect on marriage age for Muslim women. A one-year increase in secondary education for Muslim women increased their marriage age by 0.61 years.

Did the effect of secondary education on female marriage age differ, however, between Hindus and Muslims? A Wald test accepted the restriction that the coefficient on HSEDU equalled the coefficient on MSEDU, implying that there was no difference in the effect of

[94] Note that since the model is estimated with interaction terms, the effect of secondary education on marriage age for Hindus is calculated by adding the coefficient on SEDU to the coefficient on HSEDU.

secondary education on marriage age between the two religious groups. These results are all wholly consistent with the results in Tables 3 and 4.

The next set of hypothesis tested concerned the effect of the age at menarche. An F-test rejected the hypothesis that the coefficients of AGEMEN, HAGEMEN And MAGEMEN were all equal to zero, implying that these variables should be retained in the model. However, only one of the three age-at-menarche variables (AGEMEN) was significant separately, and only at the 0.10 level. One possible reason for this finding is that the age at menarche is comparatively invariant relative to the age at marriage. The mean age at menarche in the sample is more or less the same for all religious groups, approximately 13.5 years. While the age at menarche varied between ages 11 and 16, the age at marriage varied much more widely, from age 7 to age 35. In the marriage models for Hindus and Muslims estimated separately, the age at menarche is a very important variable in explaining age at marriage, with coefficients significant at the 0.05 level. According to Table 3, a one-year increase in the age at menarche results in a 0.58 increase in the age at marriage for Hindu women; according to Table 4, a one-year increase in the age at menarche raises the age at marriage by 0.70 for Muslim women. Moreover, the size of these coefficients is similar to that found on the HAGEMEN (0.71) and MAGEMEN (0.71) variables in the interaction model in Table 6. These results considered together suggest that the age at menarche is important in explaining age at marriage.

The importance of the age-at-menarche variable was further borne out by the results of testing three hypotheses. A Wald test rejected the restriction that the coefficient on AGEMEN plus the coefficient on HAGEMEN equals zero, implying that the effect of the age at menarche for Hindu women was significant. A Wald test also rejected the restriction that the coefficient on AGEMEN plus the coefficient on MAGEMEN was equal to zero, implying

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This procedure is adopted for calculating the effects of all other interaction explanatory variables

that the age at menarche exerted a significant effect on the age at marriage for Muslim women. Finally, a Wald test accepted the restriction that the coefficient on HAGEMEN equals the coefficient on MAGEMEN, implying that there was no difference in the effect of menarche on marriage between Hindus and Muslims. The findings from these tests indicate that the age at menarche is a significant influence on the age at marriage for Hindus and Muslims, and that the insignificant t-ratios in the interaction model are probably due to the multicollinearity between the menarche-interaction terms and the religion dummy variables. However, the effect of age at menarche on age at marriage is similar between Hindus and Muslims.

The next set of hypotheses tested pertained to the total expenditure variables. In the interaction model, a 100-rupee rise in total expenditure significantly increased marriage age by 0.9 years. In the sub-sample regressions, expenditure did not significantly affect marriage age for Hindus; for Muslims the estimated coefficient is significant only at the 0.10 level. However, an F-test of zero restrictions on all three expenditure variables together in the interaction model was rejected, implying that the variables EXPNRS, HEXPN and MEXPN should be retained in the final interaction model.

A Wald test accepted the hypothesis that the sum of the coefficients on EXPNRS and HEXPN was equal to zero, implying that expenditure does not exert a statistically significant effect on marriage age of Hindus. This finding is consistent with the regression on the sub-sample of Hindus only, in Table 3. However, a Wald test rejected the restriction that the sum of the coefficients on EXPNRS and MEXPN was equal to zero, implying that expenditure exercises a significant effect on marriage age for Muslim women. This finding is consistent with the regression on Muslims only in Table 4.

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throughout this chapter.

Finally, a Wald test accepted the restriction that the coefficient on MEXPN was equal to the coefficient on HEXPN, implying that there is no statistically significant difference in the effect of expenditure on marriage age between Hindus and Muslims. This finding is consistent with our previous findings. As we can see from Table 4, for Muslims, even though expenditure is significant at the 0.10 level, the coefficient is extremely small, about 0.007, which is not very much different from that for the Hindus (which is 0.005). Thus, total expenditure does not appear to exercise a significant effect on the age at marriage for the whole sample, and even though it has a (marginally) significant effect on Muslim marriage age, this effect is not significantly different from its effect on Hindu marriage age.

The next set of hypotheses concerned the 'husband's occupation is skilled' variable. According to the results of the interaction model, none of the variables relating to skilled occupation for husbands (SKILL, HSKILL and MSKILL) were significant separately, as shown by their t-ratios. However, the hypothesis that all three variables had zero coefficients was rejected by an F-test. This implies that the variables should be retained in the model. The sub-sample regressions in Tables 3 and 4 show that for both Hindus and Muslims considered separately, the SKILL variable is highly significant with a large positive coefficient (2.8 for Hindus and 3.5 for Muslims). The sizes of these coefficients is similar to those estimated in the interaction model, at 2.1 for Hindus and 3.5 for Muslims. The reason why, in the interaction model, none of the SKILL variables have high t-ratios may be that the correlation between SKILL and HSKILL is quite high, at 0.63, as is the correlation between SKILL and MSKILL (0.63). The fact that these variables have significant coefficients in the sub-sample regressions, and the fact that an F-test rejects the hypothesis that all three should be excluded from the model, supports the view that husband's skilled occupation does have an important effect on marriage age, despite the insignificant t-ratios on each variable separately in the interaction model.

A Wald test rejected the restriction that the coefficient on SKILL plus that on HSKILL was equal to zero, implying that husband's occupation being skilled did have a significant effect on the age at marriage of Hindu women. A Wald test also rejected the restriction that the coefficient on SKILL plus that on MSKILL was equal to zero, implying that husband's occupation being skilled did have a significant effect on the marriage age of Muslim women. As discussed above, these findings are consistent with the sub-sample regressions in Tables 3 and 4. Finally, a Wald test accepted the restriction that the coefficient on HSKILL was equal to the coefficient on MSKILL, implying that husband's occupation being skilled did not have a significantly different effect on age at marriage for Hindus than for Muslims. Thus, the SKILL variable does appear to be a significant determinant of marriage age for both Hindus and Muslims, but there is no difference between the two religious groups.

Finally, the effect of the year-of-marriage variables was tested. A Wald test rejected the restriction that the coefficient on YRMAR plus the coefficient on HYRMAR equals zero, implying that for Hindus the year of marriage is a significant determinant of marriage age. This finding is borne out in the sub-sample regression in Table 3. A Wald test rejected the restriction that the coefficient on YRMAR plus the coefficient on MYRMAR was equal to zero, implying that the year of marriage significantly affected Muslim marriage age. By comparison, in the sub-sample regression on Muslims in Table 4, the year-of-marriage variable is significant at the 0.10 level, and the size of the coefficient is the same (0.05) in the interaction model. These findings taken together suggest that the year of marriage does significantly influence Muslim age at marriage. Finally, a Wald test accepted the restriction that the coefficient on MYRMAR was equal to the coefficient on HYRMAR, implying that the effect of the year of marriage on age at marriage for Hindus is not significantly different from its effect for Muslims.

One possible reason for the importance of the year-of-marriage variable might be legislation concerning the age at marriage in Karnataka. According to the Child Marriage Restraint Act of 1978, the minimum legal age for marriage in India is 18 years for women and 21 years for men.[95] However, the National Family Health Survey documented that for Karnataka as a whole in 1995, 51% of women in the 20-24 age group had married at 18 or younger. This proportion was as high as 59% in the rural areas and 36% in the urban areas. What the report stated of Karnataka as a whole was: 'Evidently many marriages in Karnataka do not abide by the legal regulations regarding age at marriage.'[96] If we consider mean age at marriage alone, many women in the Ramanagaram sample appear also not to have followed the legal prescription of 1978. The mean age at marriage for those marrying after 1978 was 18.2 years, while the mean age at marriage for those marrying before 1978 was 15.5 years. However, in order to see this issue more clearly, a five-year moving average for age at first marriage by year of marriage was calculated. This indicated a sustained rise in marriage age. In order to see if the observed rise in marriage age may have been partly in response to the change in the law, the percentage of women who married after the age of 18 according to marriage year in five-year intervals was also calculated. As evident from figures 1 and 2, after 1978 there does seem to be a gradual increase in marriage age, with a greater percentage of marriages taking place after the age of 18, which may be related to the passing of the law restraining child marriage.

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[95] Historically in India, early marriage and child marriage have been recognized as 'social problems' and early social reformers were involved in campaigns to increase male and female marriage age. In 1872, the Civil Marriage Act was passed largely due to the efforts of a social reformer in Bengal, Ram Mohan Roy. Later, in British India, the Sarda Act of 1929 fixed the legal marriage age for men at 18 and for women at 14. The latter was raised to 15 in 1949. However, where the 1978 Child Marriage Restraint Act differs from past legislation is that child marriage was made an offence punishable by law.
[96] National Family Health Survey 1992-93, Karnataka, 1995: 51.

Figure 1. Five-year moving average of age at first marriage

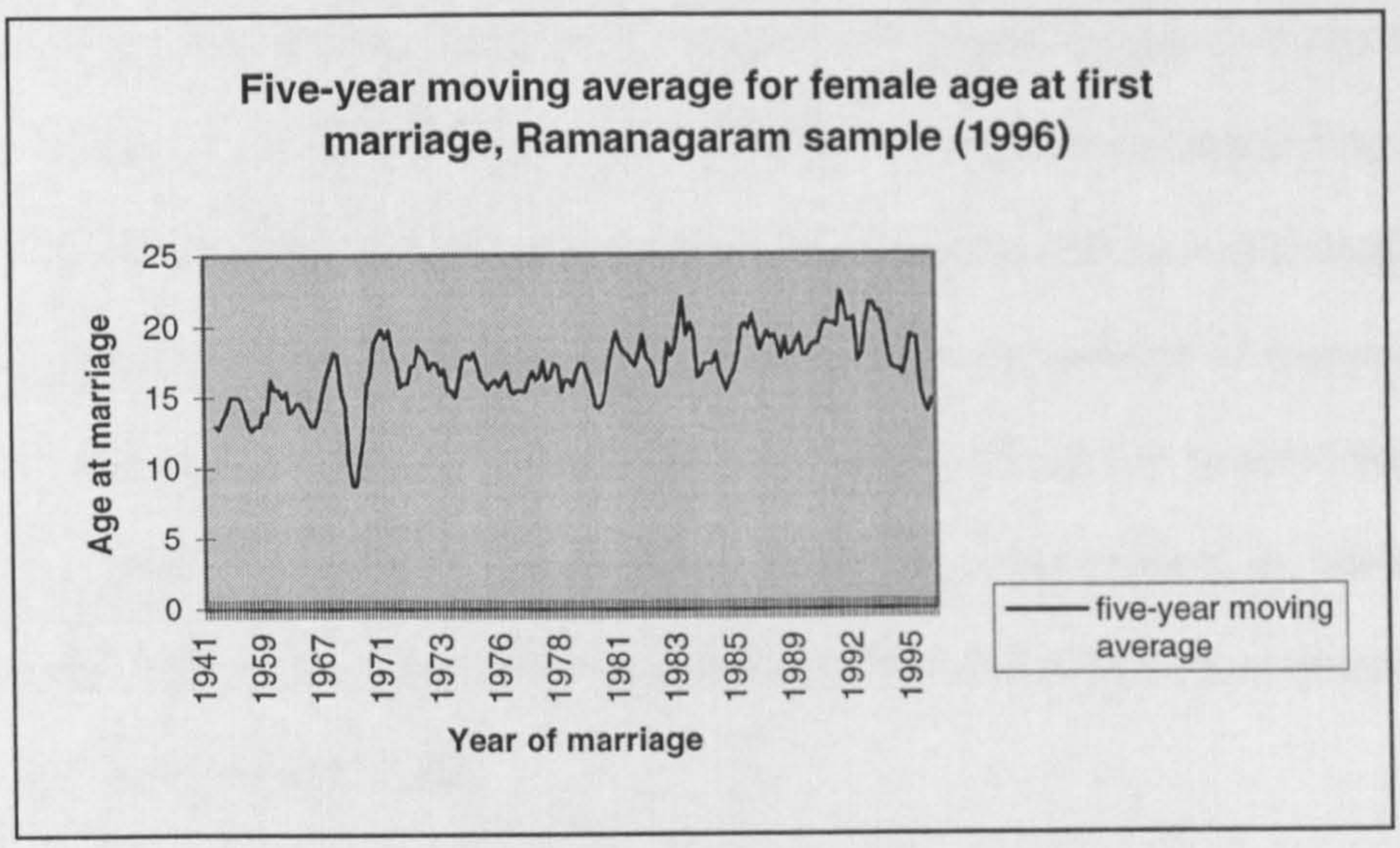
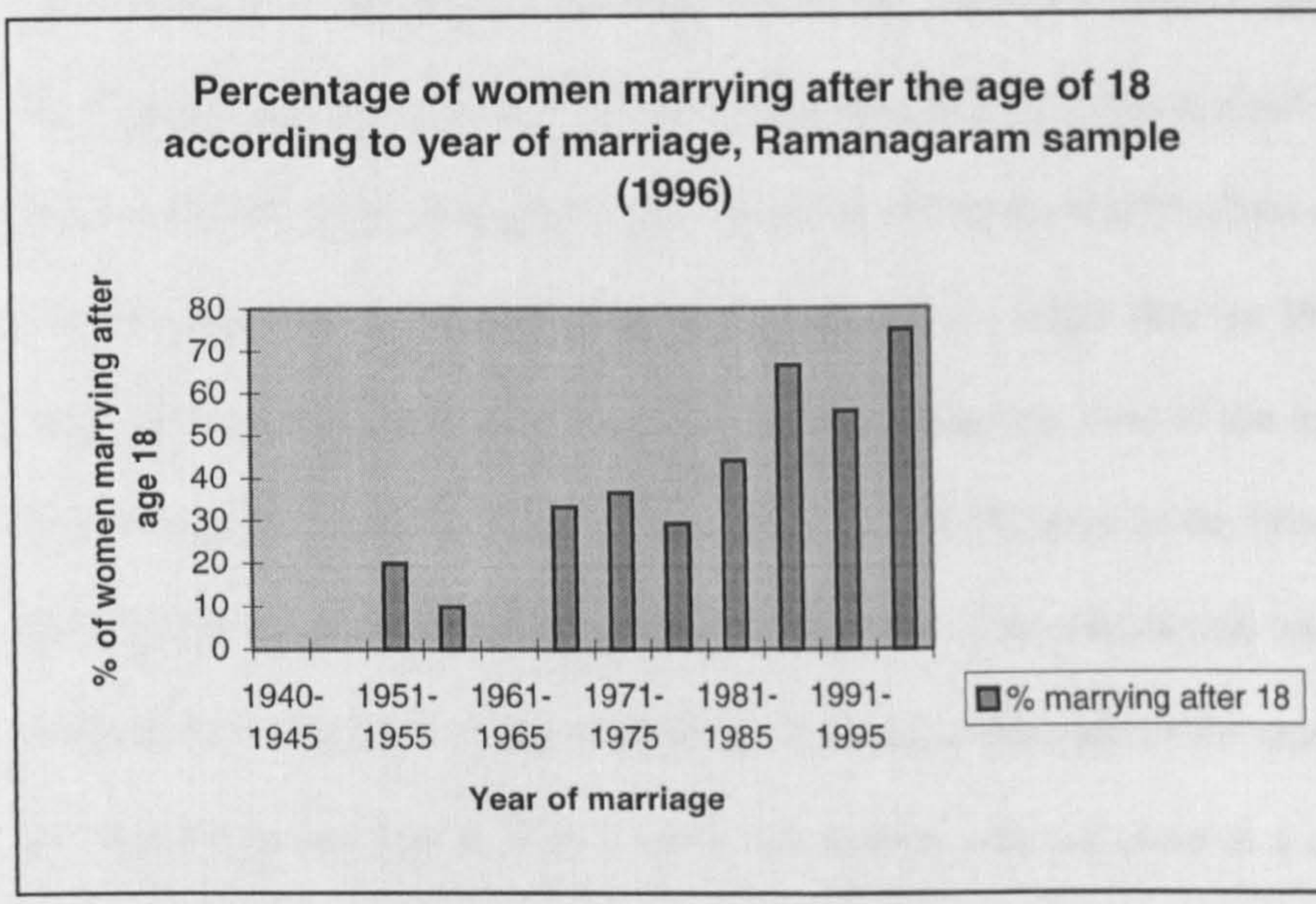


Figure 2. Percentage of women marrying after age 18



Finally, let us examine whether the intercepts are different across the three religious groups. A Wald test rejected the restriction that the coefficient on CONST was equal to the coefficient on CONST+MUSLIM, implying that the intercept for Muslims was different from that for the Christians. A Wald test also rejected the restriction that the coefficient on CONST was equal to the coefficient on CONST+HINDU, implying that the intercept also differed significantly between Christians and Hindus. Finally, a Wald test accepted the restriction that the coefficient on MUSLIM equals the coefficient on HINDU, implying that

the intercept for Hindus is not significantly different from the intercept for Muslims. These results taken together suggest that Hindus and Muslims do not have significantly different intercepts, but that the intercept for Christians is significantly different from those for both Hindus and Muslims. Membership of the Hindu instead of the Muslim religion does not have a significant effect on female age at marriage independently of socio-economic differences between the two religious groups. However, in the context of a model of the age at marriage, in which the dependent variable, and indeed all of the explanatory variables take values strictly greater than zero, it is not possible to draw interpretative conclusions from the size of the intercept coefficients.

As we have seen, Wald tests accept the hypothesis that there is no difference between Hindus and Muslims in their age at marriage; or in the socio-economic variables which influence their age at marriage. However, it may be recalled that an F-test applied to the sub-samples of Hindus and Muslims as against a pooled model of Hindus and Muslims did suggest that for at least one regressor, the coefficient for Hindus did not equal that for Muslims. The apparent contradiction in these two results needs some explanation. One of the reasons why we do not observe significant differences between Hindus and Muslims in the interaction model may be the high degree of multicollinearity between some of the interaction terms. Though this does not bias the estimates of the coefficients obtained, it does affect the standard errors on which the Wald tests are based. This may be one reason why we observe a contradiction between the results of the F-test and the results of the Wald tests. One reason to place some reliance on the results of the Wald tests is that, as we have seen in Section I, qualitative evidence (in the shape of remarks made by the Ramanagaram women) suggest that there was little difference between Hindus and Muslims in terms of women's ideas about the correct age at which to marry.

IV. Conclusion

Age at first marriage is a vital demographic variable that is widely held to have a profound impact on women's fertility. However, while much demographic research has focused on the age at marriage as an explanatory factor in models that seek to identify the determinants of women's fertility in India, there is relatively little work, whether theoretical or empirical, that looks into the determinants of the age at marriage itself.[97] This chapter is an attempt to fill this gap.

In the Ramanagaram sample, the only factors that influenced female marriage age were the educational level of the woman, especially secondary education; whether the woman's husband had a skilled occupation; the woman's age at menarche; the year in which the marriage took place; total monthly household expenditure (which was used in this study as a proxy for income); religion (Christianity versus all others, but not Hinduism versus Islam); and caste status.

Those variables that were not significant are interesting in that they illustrate where the Ramanagaram dataset is at variance with other theoretical and empirical literature on marriage age. Of the variables considered in our regression models, the marital consanguinity variables, no matter how they were measured, were insignificant. As discussed in the theoretical section, consanguineous marriage, especially the uncle-niece union, is thought to reduce female marriage age, mainly because of the large age gap between spouses. The widespread acceptance of consanguineous marriage in Karnataka, particularly in rural areas, has been noted in many empirical studies, and consanguineous unions made up almost 40% of the marriages in the Ramanagaram sample.

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[97] As also remarked in Singh, 1992: 123-130.

However, neither measure of consanguinity was found to be a statistically significant predictor of marriage age in the Ramanagaram sample. Although marital consanguinity may be a cultural tradition typical to south India that has reinforced greater female autonomy there because it keeps the woman close to her natal family, and although it may function as an important means of reducing dowry and as a way of diversifying risk for rural households, the Ramanagaram sample provides no statistical evidence that it reduces marriage age.

Husband's education is also theoretically supposed to affect marriage age, and did have a significant effect in the preliminary model, but not in the interaction model. Different theories have hypothesised diametrically opposed effects for this variable. Groom's education is hypothesised to increase female marriage age because better-educated men prefer to marry women who are older, whether because they desire a better-educated spouse, because they believe that it is better to marry someone who is more mature, because they believe that a better-educated wife would earn more, or because they believe she will cause their children to be better-educated. But, men's education may decrease female marriage age if better-educated men are able to afford to marry earlier in life. Also, if a wife is supposed to be near her husband's age or younger than her husband, then the wife's age at marriage may be lower if the husband's is.

In the preliminary models husband's education, particularly primary education, exercised a significant positive influence on female marriage age. However, husband's primary education was not a statistically significant determinant of marriage age for any of the three religions in the interaction model. One reason for this finding may be that the effect of men's education is being picked up by other variables such as husband's skilled occupation (which is discussed later in this section).

One way in which husband's occupation was measured was whether the husband performed a farming-related occupation. Historically in the case of pre-industrial Europe, it has been suggested that if the husband was a farmer, he was likely to marry later because he needed to wait until he or his bride inherited (or accumulated enough savings to purchase) a farm, thereby increasing both male and female marriage age. Alternatively, it has been suggested that in order to obtain more child labour for the family farm, men who were farmers married earlier and married younger women. In the econometric models this variable was not significant, perhaps because farming was not the only occupation in Ramanagaram which used some amount of child labour. Many occupations (particularly those connected with the silk industry such as boiling cocoons in the silk-reeling units and silk rearing) also required large quantities of child labour. Moreover, in Indian society a man does not need to wait to achieve economic independence through inheritance before he marries, but can cohabit as a married man with his own parents.

Another measure of husband's occupation was if a man was employed in domestic industry. This variable is hypothesised to decrease female marriage age because additional child labour may be required for such occupations, again a hypothesis widely advanced for pre-industrial Europe. In the econometric models this variable was not significant, again perhaps because child labour was important in so many income-earning occupations and in household activities in Ramanagaram.

Moving onto the variables which did emerge as significant determinants of female marriage age in Ramanagaram, let us first consider husband's skilled occupation. Theoretically, this variable is expected to exert an impact on female marriage age in different ways. First, there is a hypothesis that if a husband holds a skilled occupation rather than an unskilled one, he will tend to marry an older bride because he prefers to wait for a better-educated bride due to 'positive assortative mating'. Second, in a skilled occupation a man can earn additional

income and raise better-'quality' children, which may lead him to delay marriage so as to reduce child 'quantity'. Third, a 'skilled occupation' is a measure of 'effective education' or human capital investment. The implication of this finding is that there is a 'pure work influence' on female marriage age even after controlling for education. Fourth, men in skilled occupations may want to devote some years building up their careers before getting married, increasing their own ages at marriage, and hence leading them to marry older women. Finally, men in skilled occupations may be more influenced by their colleagues or peers in the workplace who are marrying later as well. In the preliminary regression models, husband's skilled occupation did emerge as a significant influence on female marriage age. Even though the t-ratios on the SKILL variables were insignificant in the interaction model, it was argued that this was probably due to multicollinearity, and that this variable is a significant determinant of female marriage age. This is supported by its importance in the models of marriage age estimated for sub-samples of Hindus and Muslims. If we examine differences in the effect of husband's skilled occupation on female marriage age by religion, there is no statistically significant difference in the effect of husband's skilled occupation on marriage age between any of the three religious groups.

The next variable which was significant was the education of the woman. Theoretically, female education is hypothesised to exert a powerful positive effect on female marriage age for a variety of reasons.[98] This hypothesised effect was borne out in the preliminary models. Both total education and - even more - secondary education appeared to increase women's marriage age. There are several reasons why secondary education may exert a larger effect than total education. First, higher education may have delayed marriage because of the tendency of women with such an education to have a longer search process, and their greater capacity to bear the search costs of doing so. Higher education also increases the opportunity cost of women's time (both in employment and the opportunity costs of leisure) and increases

[98] Birdsall, 1989: 23-50; Appleton, 1996: 139-166.

both productivity at home and in the market. It is also possible that when girls in Ramanagaram are in secondary school, which they enter at age 11 or 12, they are old enough to be amenable to educational teaching about high marriage age. When girls are in high school, they are able to read about the benefits of small families themselves or are influenced by the media (such as radio and television) on these matters. This was particularly evident to me during my fieldwork because the Anganwadi (courtyard) teachers were required to have passed the SSLC (tenth standard) examination in order to teach, and many of the single girls who had not as yet completed their SSLC were keen to do so in order to become courtyard teachers, and planned to marry only after completing their secondary education.

Women's secondary education was also highly significant in the interaction model. It exerted a significant and positive impact for Hindus separately and Muslims separately, although there was no statistically significant difference in its effect between the two religions. Interestingly, this variable is insignificant among the Christians, possibly because there was not much variation in education among Christians. From the qualitative information gathered during my fieldwork, it seemed likely that it was university education which exerts a significant effect on Christians' marriage age, although this could not be tested econometrically because the sample size of the Christians was too small.

The income variable, measured as total expenditure, emerged as very significant in the models of marriage age presented here. Theoretically, income is thought to exert either a negative or a positive impact on marriage age. It may increase marriage age for those women who earn higher incomes because these women expect to obtain fewer gains from marriage. On the other hand, higher incomes earned by men may enable them to support a wife with no income or to afford to have additional children, consequently leading to lower marriage ages for women. The income variable (measured as total expenditure) had a highly significant positive effect on marriage age. These findings have several implications. First, income of

destination may indeed have been a good proxy for income of origin, since it exerts a measurable effect on marriage age. Second, the fact that the positive effects of income outweigh the negative effects implies that it is making sense, at least in Ramanagaram in the 1990s, for the rich to marry later and the poor to marry earlier. This may be due to two causes. First, as suggested by the literature on income and marriage age, women who have higher incomes have lower expected gains from marriage, and hence may be marrying later. Second, the poor may require children for old-age support and insurance to a greater degree than richer parents with other means of saving and insurance, leading to lower ages at marriage for women who are from poor families in order to ensure that enough children are born to guarantee effective insurance cover. However, there is no statistically significant difference in the effect of this variable on marriage age between Hindus and Muslims.

Age at menarche also had a significant positive effect on marriage age, one which did not vary across religious groups. There are several possible reasons for this. First, menarche may be a sign of a woman being 'grown up' enough to marry 'soon'. Second, it may be a sign that a girl is now reproductively fertile and needs to be married off to prevent illegitimate pregnancies. The qualitative evidence collected during my fieldwork suggests that both of these factors may have been at work. Most important, however, was that two key desired characteristics in a potential bride in Ramanagaram were physical strength and long hair. This was because, for the rigorous life which many of the Ramanagaram women had to lead after marriage, stamina and strength were required to keep up with household activities. The women explained that this was also compounded by the fact that because both boys and girls were being sent to school, married women were bearing the burden of additional work formerly performed by children. Given the lack of alternative labour to help with household tasks, women were required to take huge burdens in terms of time and stamina on themselves. Hence, because physical strength increased household productivity, it was a highly desired characteristic for young women, contributing greatly to their eligibility in the marriage

market. Another desired characteristic, which was also reflected in Chapter 3 where we saw that one of the key items of personal expenditure for the Ramanagaram women was coconut oil, was long hair, which was prized as an asset. Interestingly, both desired characteristics - physical strength and long hair - are directly related to better nutrition and health, which in turn are medically known to be reflected in early menarche. The positive relationship between age at marriage and age at menarche may therefore have been because menarche is a good proxy for a woman's health and nutritional status and hence her desirability in the marriage market.

Year of marriage was included in the model as a possible proxy for changes in social norms and/or legislation over time, both of which would be theoretically postulated to increase marriage age. The econometric findings showed that a one-year later year of marriage was associated with a significant increase in marriage age for all three religious groups. The implications of the significant effect exerted by the year of marriage variable must be considered more carefully. With the imposition of the Child Marriage Restraint Act in 1978, there was a change in the practice of child marriage, with an average of 54% of the women who married after 1978 in the Ramanagaram sample doing so after the age of 18, compared to an average of 27% for those women who married before 1978. Although the law is still not wholly complied with, it appears to have exerted some influence on people's behaviour. This is borne out by the opinions expressed by some of the Ramanagaram women. For example, Sardamma of village C said 'My daughter can study as much as she wants to for now, and she must get married only at 18.' On the other hand, the law is certainly still being violated, as illustrated by Chandramma of village B who said that for her daughter 'it is best that she should get married at 15-16. As she is currently that age, I am looking out for an alliance for her.' The fact that we see the 'time' effect operating on age at marriage even after controlling for variations in other factors such as education, income and occupation may mean that the 1978 law is being better enforced.

An alternative interpretation of the positive effect of year on age at marriage is that the changes over time may be being brought about by changes in the set of expectations, social norms, and customs governing age at marriage and female status in the home, especially with regard to the 'proper time to marry' for women in younger birth cohorts. This is because for 'social behaviour' (such as fertility may be) an individual's utility-maximising level of that behaviour may be an increasing function of the average level of that activity undertaken by all others in a social reference group.

We find some support for the influence of norms in the responses to two questions on daughters' age at marriage in the Ramanagaram questionnaire. The women who had married daughters were asked at what age their daughters had been married, and, for those who had unmarried daughters, at what age they desired their unmarried daughters to be married. For all women who had married daughters, the mean age at which the daughters had married was 17.5 years. For those who had unmarried daughters, the proposed mean age at marriage was 18.9 years. It is interesting that both these figures are higher than the mean age at marriage for ever-married women in the sample as a whole (17.3 years), again indicating that 'normal' female marriage age may be rising.

The positive effect of year on age at marriage was observed among all three religious groups, with no significant difference in the effect between Hindus and Muslims, but a significantly larger effect among Christians.

A final variable which is theoretically claimed to influence marriage age in the Indian context is caste. In a model estimated for Hindu women only, high caste was found to exert a significant impact on Hindu marriage age even after controlling for the influence of other socio-economic factors. In the context of Karnataka, this may be because the high castes are

more exposed to urban influences or to relatives who have migrated away from Karnataka because of the strict government policy of reservations in academic institutions and government jobs for lower castes and scheduled castes. This may have contributed to a higher female age at marriage among high castes in Ramanagaram because of the desire to emulate the late-marrying behaviour of those who live in cities. Another fallout of the reservation policy which may contribute to higher marriage ages among women of high castes could be the lack of suitable marriage partners living close by, and consequently, the greater search time associated with finding suitable partners.

An explanation for why the scheduled-caste variable did not emerge as significant may be the very small differences in education and income patterns between them and the low castes in Ramanagaram. The mean level of education for women from the low castes was 4.95 years, and the mean level of education for women belonging to the scheduled castes was 4.14 years. The mean level of total monthly expenditure for households belonging to the low castes was Rs. 998.26, while the mean level of total monthly expenditure for households belonging to the scheduled castes was Rs. 844.75. For purposes of comparison, the mean number of years of female education among high caste women was 7.26 years, and the mean level of total monthly expenditure for households belonging to high castes was Rs. 1068.34. These findings reveal relatively small differences between the low castes and the scheduled castes, but considerable differences between them and the high castes. This in turn suggests that there may be little difference between the low and the scheduled castes in other variables which we cannot measure or control for.

The main purpose of this study is to identify differences between religions in the determination of demographic indices. Theoretically, religion has been hypothesised to have

a direct impact on the age at first marriage via its function as a system of beliefs or values, and an indirect impact via its impact on women's status.[99]

The religion variable was eliminated in almost all the preliminary models of marriage age in Ramanagaram. The only model in which it was retained was one which excluded the husband's-skilled-occupation variable. This illustrates the operation of the 'characteristics' hypothesis, i.e. that apparent differences by religion in marriage or fertility, are often due to socio-economic differences between members of various religious groups. Controlling for other socio-economic variables, religion by itself had no significant effect on female marriage age in Ramanagaram.

The interaction model then showed that there were also no differences between Hindus and Muslims in the effect of other socio-economic variables on marriage age. That is, the factors which determine marriage age in Ramanagaram do not differ between Hindus and Muslims. However, there were some differences in the socio-economic influences on marriage age between Christians and the two other religious groups.

These findings provide no empirical support for the concerns which have been put forward by the more extreme right-wing political parties in India since the 1990s about the so-called 'Islamic' effects on marriage, according to which that Muslim women have much lower autonomy (and hence lower marriage age) than other religious groups. The analysis for Ramanagaram shows that any observed difference in female marriage age across religious groups can be explained by other socio-economic differences between these communities such as access to secondary education, income, age at menarche, year of marriage and husband's occupation.

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[99] See Sander, 1995 for differences between Catholics, Protestants and Baptists in America; Thornton, 1979: 131-142; Jeffery and Jeffery, 1997: 212-254.

This chapter has investigated the determinants of the female age at marriage on the grounds that it is an important proximate determinant of women's fertility and a vital variable in explorations of economic demography in a society in which most reproduction occurs within marriage. Despite these facts, beyond the early theoretical economic models of marriage put forward in the 1970s and early 1980s, there has been little attempt, at least in the realm of economics, to integrate the theoretical literature on the determinants of marriage age with the discipline encouraged by concrete empirical findings.

This chapter has attempted to contribute to an understanding of the determinants of the timing of marriage in an economic and demographic context. It has been based on twin paths of scholarly investigation. First, it has attempted to highlight the most important theoretical and empirical issues that emerge in assessing the determinants of marriage age through a survey of the economic, socio-anthropological and medical literature that does exist. Second, it has carried out a detailed econometric investigation of the empirical evidence obtained from a sample from one taluk in Karnataka to investigate whether, in addition to the factors which have conventionally been used to account for differences in marriage age among populations, religion also plays a role.

This chapter found that after controlling for other socio-economic factors such as income, education, age at menarche and year of marriage, the religion in which the woman was raised did not exert an effect on the age at marriage in Ramanagaram. Nor did the effects of other socio-economic factors on marriage age differ between Hindus and Muslims. Discussions of fertility in poor countries have stressed that it is important to increase female age at marriage to lower fertility. This chapter supports the conclusion that in order to achieve this end, increasing the educational level of women, particularly secondary education, is essential. Skilled occupations and rising incomes also seem to play a role in delaying marriage. The age

at marriage is also influenced by biological factors such as the timing of menarche. However, this study also recognises that social factors such as the role of custom (which may be what is reflected in the significant 'year of marriage' variable), may come to bear on marriage decisions as well. All in all, this chapter hopes to have integrated economic argument and econometric analysis with a consideration of wider sociological factors to identify the most important determinants of female marriage age in Ramanagaram.

CHAPTER 5

The Determinants of Contraceptive Use in Ramanagaram

I have never adverted to the check suggested by Condorcet without the most marked disapprobation. Indeed I should always particularly reprobate any artificial and unnatural modes of checking population, both on account of their immorality and their tendency to remove a necessary stimulus to industry.[1]

There are two opposing views of the interaction between fertility regulation and the fertility transition. The first view is that fertility will decline in response to the supply of family planning services. The other is that fertility will decline in response to the decline in the demand for children.[2] This debate is particularly relevant for south India where in the past two decades there have been rapid declines in fertility, often approaching replacement levels, as in the case of Tamil Nadu. It is still unclear the extent to which these declines are due to the provision of family planning services, to socio-economic changes in education and women's employment, to changes in the institutional structure, to changes in ideas and norms, or to some combination of all of these factors.

The decision whether or not to practise contraception is based on the individual's evaluation of the costs and benefits of adopting a contraceptive method. The costs of practising contraception include factors such as the actual monetary costs of using a method, the time spent in travelling, payments to providers such as family planning clinics or hospitals, and psycho-social factors such as the 'fear of adverse health effects and disapproval of husband and other family members.'[3] The benefits of practising contraception are the reduced cost of additional children, as well as the reduced maternal health risks associated with repeated pregnancies.

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[1] Malthus, 1817: 393, as quoted in Folbre, 1992: 114. Although clearly Condorcet was in favour of contraception, as Folbre argues, 'Whether or not he was prudish, Malthus endorsed traditional religious views of contraception that other political economists of his day were willing to criticise.' See Folbre, 1992: 114.

[2] Pritchett, 1994 :1-2.

[3] Bongaarts, 1997a: 13; see also Bongaarts and Bruce, 1995: 57-75.

In the survey, the Ramanagaram women were asked if they had ever used any method of birth control. The question was answered in the affirmative by 53% of ever-married women in the whole sample, 86% of Christians, 57% of Hindus and 40% of Muslims. These percentages suggest that it is possible that religion does affect contraceptive use in Ramanagaraam. However, it is also possible that underlying characteristics of the three religious groups are what accounts for these differences. The basic issue which this chapter will address is whether contraceptive decisions are just a means to an end (i.e. of achieving a particular fertility outcome), or whether they have their own costs, i.e. the contraceptive decision is not totally transparent and therefore a study of the determinants of contraceptive choice is relevant.

At the outset it must be emphasised that this study will not deal with whether the supply of contraception and contraceptive usage acts as an independent determinant of fertility. This is not because the importance of this issue is not recognised, but because of the limitations of the dataset available for Ramanagaram. The Ramanagaram dataset is drawn from a sample over which contraceptive access is uniform and, indeed, very good. This is because the government family planning movement in Karnataka is well-organised and covers all parts of the state. In order to test whether contraceptive supply is an independent determinant of fertility, one would require a much larger sample drawn from areas which have quite different access to family planning services.

The best way of studying if contraceptive use has an independent effect on fertility would be to select samples from several areas all over India and then to estimate a simultaneous equations model using socio-economic determinants of fertility, the decision to use contraception, and proxies for the supply of contraception. A detailed micro-level dataset such as the one collected in Ramanagaram is more suited to the study of what characteristics

of women influence their decision whether to use contraception, and that is the question this chapter will explore.

This chapter is organised as follows. Section I reviews the literature on the importance of family planning programmes, whether the decision to use contraception ought to be studied separately from the decision whether to have a child, and the theoretical determinants of contraceptive use. Section II examines the empirical findings on contraceptive use in Ramanagaram. Section III considers the empirical evidence from the survey on fertility preferences in Ramanagaram. Section IV estimates a logit model of the determinants of contraceptive use for Ramanagaram. Section V presents the conclusions of this chapter.

I. Theories of the determinants of contraceptive use

Existing views of the importance of contraceptive use within the theory of fertility comprise two broad streams: that which dwells on the supply-side determinants of contraceptive use such as family planning programmes[4], and that which deals with demand-side determinants such as the role of desired fertility[5]. The first body of theory stems from the work of Easterlin and others.[6] The Easterlin 'synthesis' framework postulates that in the early stage of the demographic transition, mortality and natural fertility are dominant, social and cultural factors influence the number of children, and the supply of living children is lower than desired fertility. As survival rates improve, the desire for large families declines, and actual fertility exceeds desired fertility. In this scenario, actual fertility is still determined primarily by natural fertility because family planning is not used, due to the high perceived or actual costs of using family planning services. Eventually, fertility regulation is adopted, but actual

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[4] For example, Parker Mauldin argues that 'There is considerable empirical evidence that large-scale family planning programs, when well-managed, have a substantial effect on fertility.' See Parker Mauldin, 1983: 289.

[5] See The Economist, 1994: 21-23.

[6] Easterlin, 1975: 54-63; Bourgeois-Pichat, 1967: 160-163.

fertility is still greater than the demand for children. Finally, society progresses towards a regime in which couples adopt contraception and limit family size. The costs of regulating fertility are negligible, and actual fertility will equal the demand for children.[7] Thus, the Easterlin synthesis framework acknowledges a role for both demand- and supply-side factors: contraceptive use is determined both by the desire to achieve certain fertility outcomes and the costs of using contraception.

The fundamental issue which demographers and economists debate about is whether contraceptive use ought to be studied independently of fertility choice. This discussion has taken the form of debates about the impact and relative success of family planning programmes in effecting fertility transitions.[8] In 1960 only 10% of women in developing countries were using any form of fertility control, whereas by 1994 the figure had risen to 51%.[9] Figures such as these have led demographers to argue that there is a 'KAP-gap' (a gap in women's knowledge of, attitudes towards, and practice of birth control) and an 'unmet need' for contraception.[10]

However, there is considerable debate both about the existence and the size of the KAP-gap. Bongaarts argues that for the 15 major KAP surveys conducted, the average KAP-gap is of the order of 21%.[11] Bongaarts suggests that there are 'substantial levels of unmet need for contraception' because of 'limited access to and poor quality of family planning services, dissatisfaction with and/or lack of knowledge of available contraceptive methods, weak motivation to implement reproductive preferences, and opposition from the husband.'[12] The provision of adequate family planning services is one way to counteract the 'unmet need' for

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[7] One example of an application of the Easterlin model is Chen, Hicks, Johnson and Rodriguez, 1990: 408-24.
[8] Bongaarts, 1997b: 422-443.
[9] The Economist, 1994: 22.
[10] Bongaarts, 1991: 293-313; Thapa, 1993: 4.
[11] Bongaarts, 1991: 293-313.
[12] Bongaarts, 1991: 311.

contraception in poor countries, and is one of the most important arguments in favour of continuing investment in large-scale family planning programmes.[13]

However, the role of family planning programmes in the fertility transition has also been attacked. Demographers such as Westoff argue that the KAP-gap is negligible because the KAP surveys undertaken in the 1960s and 1970s do not distinguish between women who wish to limit their fertility and women who are not practising contraception because they are infecund or pregnant.[14] A recent and serious attack has come from Pritchett, who contends that desired fertility and the demand for children are the key factors in explaining changes in fertility, and that the supply of contraception is relatively unimportant.[15] Pritchett bases this view on three arguments. First, he contends that the supply portion of the unmet need is small, i.e. women are failing to use contraception not because access is restricted, but because of other factors affecting their demand for contraception. Second, he argues that the calculation of unmet need is over-stated because it includes a large number of currently pregnant women and amenorrhoeic women whose pregnancies were not planned. Third, he holds that the unmet need also includes a large proportion of women who have a demand for spacing births, rather than for limiting them altogether; providing such women with contraception will leave their final fertility unaffected. Finally, he argues that fertility is inelastic with respect to contraceptive costs, as the latter are small relative to the costs of children.[16] Pritchett substantiates his view by alluding to the unimportance of contraception for historical fertility transitions. He argues that 'contraceptive use is higher where fertility is lower primarily because desired fertility is lower which leads to both lower fertility and higher contraceptive demand, and hence higher contraceptive use.'[17]

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[13] See also Guilkey and Jayne, 1997: 173-189.
[14] Westoff, 1988: 225-232.
[15] Pritchett, 1994: 1-55.
[16] Pritchett, 1994: 3.
[17] Pritchett, 1994: 15-18. The conclusion that there is a negative relation between desired fertility and contraceptive use is also found in other studies, for example Entwisle, Hermalin and Mason, 1986; Hirschman, 1985: 35-59; Omondi-Odhiambo, 1997: 29-40. However, unlike for Pritchett, this factor is

Let us examine these arguments further. First, Pritchett is correct to argue that access to family planning alone does not have an impact on contraceptive adoption. However, as Bongaarts has suggested, family planning programmes not only provide access, but also aid in 'The diffusion of knowledge about fertility regulation and the social acceptability of private control over reproductive behaviour [which] have probably been more important in raising contraceptive use than has the mere physical accessibility of methods.[18] Moreover, as Egerö argues, 'The very act of providing services changes the context within which people operate, and could in certain situations be an important 'ideational' preparation for the couple-based decision-making about birth control simply by making birth control an open public issue.'[19]

Second, Pritchett's theory cannot explain entirely the rapid decline in fertility in Bangladesh and Indonesia in the past two decades, nor the declines in fertility which we observe in Tamil Nadu, Karnataka and Andhra Pradesh in India in the 1980s and 1990s, which have been attributed by other demographers to the increase in the supply of family planning here, along with information dissemination and a change in the social norms associated with controlling reproductive behaviour, at times independent of other demand-side socio-economic factors such as female education (as in the case of Andhra Pradesh).[20]

Third, Pritchett is correct to suggest that estimates of unmet need are overstated to the extent that they include currently pregnant women and that the efforts to reduce the unmet need for spacing are less important for their impact on fertility. However, Bongaarts has shown that

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only one among many other factors, including supply-side factors, found to be important in these other models.

[18] Bongaarts, 1997b: 427. See also Cleland and Wilson, 1987: 5-30.

[19] Egerö, 1994: 25.

[20] Retherford and Ramesh, 1996; Koenig *et al*, 1992; Egerö, 1994; Cleland and Wilson, 1987: 5-30.

even after adjustments for these factors are made, levels of unmet need in developing countries are still substantial.[21]

Fourth, Pritchett's argument that family planning programmes do not cause declines in unwanted fertility may have to be viewed in the context that over the fertility transition, unwanted fertility typically has an inverted U-shape. In the first part of the transition, unwanted fertility rises while overall fertility declines; in the last part of the transition, unwanted fertility also declines. Assessing the impact of family planning programmes on unwanted fertility is then difficult because 'family planning programs are often instituted in the early phases of the fertility transition when ... there is a strong upward pressure on unwanted fertility.'[22] Thus, the net effect of a family planning programme is not the expected decline in unwanted childbearing, but perhaps instead either a steady level of unwanted fertility (when the role of the programme is to prevent what would have been a substantial rise in unwanted fertility) or an increase (when the programme prevents an even larger rise than would have occurred otherwise).[23]

Fifth, given that attempts to quantify the unmet need for contraception have been performed and it has been shown to exist (as noted above), it seems unusual to assign such a small role to the provision of family planning in the fertility transition.[24] For these reasons, it seems more appropriate to argue that both the demand for children and the supply of contraception play an important role in the fertility transition:

> Making contraception more widely available will make it easier for women to have only the number of children they want, and to do so in safe and efficient ways. But changing the number they want to have will need a subtle mix of education, economic development, land reform

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[21] As Bongaarts argues 'In sum, the unquestionable existence of an unmet need for contraception, while not as extensive as the proponents of programmes believe, is more important than Pritchett suggests.' See Bongaarts, 1997b: 429.

[22] Bongaarts, 1997a: 30-31.

[23] Bongaarts, 1997a: 30-31.

[24] For example, see the Mysore Population Study which recorded that 80% of couples interviewed in Ramanagaram recorded abstinence for 6 months or more as the main means of post-partum birth control practised. See the Mysore Population Study, 1961: 136.

and improvements in the lot of women.[25]

Investigating if contraceptive use exercises a completely autonomous role on fertility is difficult, mainly because the investigation must be conducted in areas which have differential access to contraception. However, another option is to investigate empirically a testable model which introduces variables which may affect the decision to use contraception independently of the determinants of fertility. This chapter carries out such an analysis for the Ramanagaram sample. We therefore go on to discuss which factors may affect the decision to use contraception.

One of the most important factors postulated as influencing this decision is women and men's education. Rosenzweig and Schultz argue that couples with more schooling have a wider knowledge of contraceptive methods, use the methods better, and are better able to overcome biological constraints on their fertility, compared to couples with less schooling.[26] According to Ainsworth *et al*, educated women are more likely to use contraception because information about availability, correct use, side effects, and costs are less difficult and costly for educated women to assimilate.[27] In addition, women with some education have a stronger bargaining position within the family when it comes to decisions about contraception. These conclusions are supported by studies on a number of other countries.[28]

Women's education is also important in affecting contraceptive use in south India, as described in the Mysore Population Study.[29] In their study of birth control practices in Tamil Nadu, Dharmalingam and Philip Morgan find that education motivates higher contraceptive

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[25] The Economist, 1994: 23.
[26] Rosenzweig and Schultz, 1989: 457-477.
[27] Ainsworth, Beegle and Nyamate, 1996: 85-122.
[28] Chen, Hicks, Johnson and Rodriguez, 1990: 408-424; Schuler, Hashemi and Riley, 1997: 563-575; Guilkey and Jayne, 1997: 173-189; Shapiro and Tambashe, 1994; Jejeebhoy, 1992; Castro Martin, 1995: 187-202; Cochrane, 1979.
[29] Mysore Population Study, 1961: 163.

use, not necessarily by increasing women's autonomy, but by raising the cost of children.[30] The National Family Health Survey on Karnataka also found a positive relation between education and contraceptive use.[31] In the logit regression models presented later in this chapter, this variable is measured in terms of the total number of years of education of the woman.

Several studies also argue that husband's education is an important determinant of contraceptive use. Ainsworth *et al* argue that husband's education exerts an impact most particularly at low levels of husband's and wives' schooling, a conclusion substantiated by other studies.[32] Omondi-Odhiambo goes so far as to claim, for Kenya, that the net effect of husband's education on the desire to use contraception and on effective contraceptive use is larger than that of wife's education.[33] Husband's education, measured in terms of the total number of years of education, is used in the logit models presented later in this study.

Contraceptive choice may be affected by the occupations of women.[34] For example, women who are employed may be more likely to use contraception either for birth spacing or for birth limitation, if their occupations are incompatible with child-rearing.[35] Women who are employed in a skilled occupation may also use contraception more.[36] In a study of women's work and birth control in two villages in Tamil Nadu, Dharmalingam and Philip Morgan argue that those women who were employed outside their homes doing beedi-rolling[37] work

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[30] Dharmalingam and Philip Morgan, 1996: 187-201.
[31] National Family Health Survey 1992-93: Karnataka, 1995: 88.
[32] Ainsworth, Beegle and Nyamate, 1996: 85-122. For another example, in their study of 4184 women covered under the Demographic and Health Surveys (DHS) in Tunisia, Cochrane and Guilkey find that women's education had no effect on contraceptive adoption but that husband's education significantly increased the use of IUDs and traditional methods. For more on this, see Cochrane and Guilkey, 1995: 779-804.
[33] Omondi-Odhiambo, 1997: 29-40. He argues that educated husbands employed in higher-status occupations discuss family planning with their wives, and use more effective (44% of the sample of 1129) rather than less effective (23%) methods of contraception.
[34] Kraft and Coverdill, 1994: 593-602.
[35] Dharmalingam and Philip Morgan, 1996: 187-201.
[36] Dharmalingam and Philip Morgan, 1996: 187-201.
[37] Beedis are a relatively inexpensive hand-rolled cigarette, popularly smoked by people in India.

with independent sources of income, had much greater autonomy than women who mainly performed housework or were employed as agricultural labourers,[38] and were also twice as likely to adopt birth control.[39] In the econometric models presented later in this chapter, this variable is measured in three ways: first, so as to take the value 1 if the woman was employed in a home-related occupation and 0 otherwise; second, so as to take the value 1 if the woman was employed in a silk-related occupation and 0 otherwise; and third, so as to take the value 1 if the women was employed in a skilled occupation and 0 otherwise.

Contraceptive choice may also be affected by the occupations of men. Men who are employed in skilled occupations may encourage their wives to use contraception more if they want fewer or better-'quality' children. Men who are employed in domestic industry may encourage their wives to use contraception less, if more children are required for their labour. Finally, if a man is employed as a farmer, he may encourage his wife to use contraception less, if children are required for the family farm. In the econometric models presented, this variable is measured in three ways: so as to take the value 1 if the man was employed in a skilled occupation and 0 otherwise; so as to take the value 1 if the man was employed in domestic industry and 0 otherwise; and so as to take the value 1 if the man was a farmer and 0 otherwise.

Contraceptive use may also be affected by income. Families with higher incomes may be more likely to use contraception because they may be able to afford better access to contraceptive services. Alternatively, they may have a higher opportunity cost of the value of their time spent in leisure which may reduce their demand for children and increase contraceptive use to achieve lower desired fertility outcomes. This variable is included in the

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[38] Women employed in the beedi industry were 8.6 times more likely to say that they could support themselves independently, were 11 times more likely to enjoy greater freedom of movement and 3.3 times more likely to discuss finances and fertility decisions. These women were also the ones who were 1.27 more likely to report contraceptive use.

econometric models presented below and is measured in terms of total monthly expenditure, total monthly food expenditure and in terms of an index of ownership of items of consumer equipment.

The decision to use contraception may also depend on the age of the woman. Studies of contraceptive use argue that women in their mid-thirties to mid-forties, who have completed their childbearing, may have the highest demand for contraception compared with women who have not as yet completed their families.[40] Certainly, women who are older will have grown up in a cohort in which norms and values were more unfavourable to contraception than they were for younger women. This variable is measured in the econometric models in terms of the woman's age in years at the time of survey.

Contraceptive choice is affected by the institutional structure and by ideas and norms about contraceptive use. Dyson and Moore have argued that the extent to which women have access to social resources such as information, economic support, political support and their natal kin after marriage, has an important impact on their ability to enjoy greater autonomy. For example, family planning programmes need to take into account cultural constructs such as patriarchy, which may generate a desire for large families[41], because in countries where patriarchy is strong, 'using contraception may be regarded as a violation of fundamental moral taboos.'[42] The influence of ideas and norms on the decision to use contraception is supported by statements made by the Ramanagaram women. For example, when questioned about the ideal number of children, Kamalamma, age 45, said, 'Two is about right. The government tells us through the family planning programme. I got myself operated after two children. I do not know if the population is growing too fast, but we are all told that we

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[39] Dharmalingam and Philip Morgan found that women with education reported greater use of birth control by a factor of 1.42. See Dharmalingam and Philip Morgan, 1996: 187-201.
[40] Visaria and Chari, 1998.
[41] Frank and McNicoll, 1987: 212.
[42] Omondi-Odhiambo, 1997: 29.

should only have two.'[43] The woman's age variable, which is included in the econometric models, may also capture the effect of changes in social norms over time.

Related to the role of norms and social mores, another factor which may influence contraceptive use is religion. For example, in their study of Bangladesh, Schuler, Hashemi and Riley find that Hindu women are more likely to use a contraceptive method than Muslim women.[44] The Mysore Population Study found that in Karnataka post-partum abstinence was on average longer for Hindu than for Muslim women, with obvious contraceptive implications.[45] Amin, Diamond and Steele's study of Bangladesh found that religion is an important predictor of contraceptive use, but primarily via the religious practices of the community, rather than through individual religious observance.[46] Religion is included in the econometric models presented later in this chapter.

Another social characteristic which may influence contraceptive use is caste. For example, Dharmalingam and Morgan argue that in Tamil Nadu, the Nadar caste gives its women much greater autonomy (as defined by freedom of movement, decision-making authority and inter-spousal communication) than upper castes, and this has significantly raised contraceptive acceptance.[47] This variable is included in one preliminary logit model estimated for Hindus only.

Another factor which may affect contraceptive use is consanguineous marriage. It is possible that a woman who marries a relative may be more likely to consult with her extended family

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[43] The importance of the media is also observed in studies of fertility in other countries. For example, Ibrahim and Ibrahim argue that in Egypt, over 70% of Egyptian women acquire their knowledge about family planning from the television and that this is one of the most important factors accounting for fertility declines in Egypt in the 1980s and 1990s. See Ibrahim and Ibrahim, 1998: 19-52.
[44] Schuler, Hashemi and Riley, 1997: 563-575.
[45] Mysore Population Study, 1961: 137. Desired fertility between Hindus and Muslims was, however, similar at 3.7 births for Hindus and 3.8 births for Muslims. See Mysore Population Study, 1961: 141.
[46] Amin, Diamond and Steele, 1996.
[47] Dharmalingam and Philip Morgan, 1996: 187-201.

on matters relating to contraception. Alternatively, since consanguineous marriages in Karnataka have traditionally involved a large age gap between spouses, this may contribute to reducing inter-spousal communication on contraception, which may decrease contraceptive use. This variable is included in the econometric models presented below and is measured in terms of a dummy variable which takes the value 1 if the woman married a relative but 0 otherwise; and in terms of the coefficient of inbreeding (discussed in the preceding chapter).

Another important influence on contraceptive use is family composition.[48] For example, it is conventionally argued that female extended family members such as mothers and mothers-in-law have an important role to play in influencing a couple's decisions about using contraception.[49] Most often, the hypothesised direction of influence is thought to be negative. In this chapter, the influence of the extended family is measured in terms of the total number of female extended family resident in the household. The influence of female extended family on women's decisions to use contraception is also discussed in detail in the qualitative evidence presented in Section II below.

Another factor which may influence a woman's decision to use contraception is her autonomy and her mobility, as measured by her freedom of movement and of interaction with others.[50] For example, Schuler, Hashemi and Riley argue that in Bangladesh, greater autonomy for certain women has encouraged them to join credit programmes more readily than others, and that this has also increased their propensity to use contraception independent of other 'empowerment' variables, because it has removed psycho-social barriers to using contraception.[51] Morgan and Niraula studied two villages in Nepal and found that greater

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[48] Muhuri and Menken, 1997: 279-294.
[49] Srinivas, 1989: 123-144.
[50] Although autonomy is defined more widely in Chapter 6. See also Dyson and Moore, 1983: 35-60; Basu, 1992; Balk, 1994: 21-45.
[51] This is because women who earn independent incomes via the credit programmes are able to contribute to support their families, are less insecure because they own cash and other assets, feel less

autonomy increased contraceptive use and lowered the levels of the 'unmet need' for contraception.[52] This variable was included in the econometric models in the form of a question which asked women if they felt that access to a contraceptive method was easy for them. However, a more in-depth qualitative examination of how women's autonomy in Ramanagaram influenced the decision to practice family planning is also carried out in Section II below.

Another factor postulated as affecting contraceptive use is the preference for sons. Aly and Shields argue that given that children are born sequentially, *ceteris paribus*, son preference may be expected to result in higher contraceptive use for families with more sons than daughters.[53] These findings are also supported by Schuler, Hashemi and Riley for Bangladesh, Morgan and Niraula for Nepal, and the National Family Health Survey for Karnataka.[54] The Ramanagaram women themselves made statements indicating that the decision to use contraception was affected by the desire for sons. For example, one Hindu woman, Vasantakumari, age 24, remarked, 'I will have an operation (sterilisation) after I have a son. I will still try for a boy ... because I have three girls, who will look after me otherwise?' This variable was not included in the econometric models because it is endogenous in a model of contraceptive choice where the dependent variable is whether or not the woman had ever used contraception.

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vulnerable to the threat of abandonment, and are less worried about the physical side effects of taking contraceptives. See Schuler, Hashemi and Riley, 1997: 573.

[52] Morgan and Niraula, 1995: 541-561. Morgan and Niraula found that contraceptive use was 24% in the low autonomy area in Nepal which they studied compared with 40% in the area of high autonomy. In terms of the 'unmet need', the proportion of women using contraception who intended no more additional births was estimated in the low autonomy area to be 59%. The comparable figure for the high autonomy area was 45%.

[53] Using a sample of 8979 households from Egypt and non-linear maximum likelihood estimation procedures, Aly and Shields argue that contraceptive use increases dramatically at each parity as the number of sons increases. See Aly and Shields, 1991.

[54] Schuler, Hashemi and Riley, 1997: 563-575; Morgan and Niraula, 1995: 541-561; National Family Health Survey 1992-93: Karnataka, 1995: 89-90.

The incidence and period of breastfeeding may also affect contraceptive use. A longer period of breastfeeding may reduce the necessity for using temporary or permanent methods of contraception. Informal discussions with the women of Ramanagaram suggested that there were no significant differences between Hindus and Muslims in the number of months of breastfeeding after birth. In the questionnaire, there was one question on whether women breastfed their children, but no information was collected on the length of breastfeeding. The percentage of women who breastfed their children was 98% among the Hindus, 96% among the Muslims, and 100% among the Christians. In any case, breastfeeding must be regarded as endogenous with contraceptive adoption and cannot therefore be included in the model as an exogenous determinant of the latter.

Another factor thought to influence contraceptive practices is infant mortality. Gulati has argued that in India a decline in infant and child mortality generates a larger demand for contraceptive methods to regulate fertility, because of the increased survival of children into adulthood.[55] Retherford and Ramesh argue that one reason why contraceptive use in Tamil Nadu is high compared with other states in north India is that the infant mortality rate in Tamil Nadu is 68 per 1000 births, compared with 100 per 1000 births in Uttar Pradesh.[56] This variable is not included in the econometric models below because the infant mortality rate is unlikely to have varied greatly (or perceptibly) within Ramanagaram, and it would in any case have been impossible to assign an infant mortality rate to each woman in the sample. However, it is possible to estimate the mean level of infant and child deaths by religious group for the Ramanagaram sample, and the number of children ever born net of child deaths. These estimates are shown in Tables 1 and 2.

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[55] Gulati, 1992: 157-172.

[56] Retherford and Ramesh, 1996. For evidence from elsewhere see Guilkey and Jayne, 1997: 173-189.

Table 1: Infant mortality by religion, Ramanagaram sample (1996)

Infant mortality	All women	Hindus	Muslims	Christians
Mean	0.15	0.15	0.21	0.00
Standard deviation	0.03	0.04	0.05	0.00

Table 1 shows infant mortality by religion in the Ramanagaram sample. A statistical test shows that this difference is not significantly different between Hindus and Muslims. There is also evidence from Ramanagaram that total children ever born net of infant mortality is not significantly different to the differences between Hindus, Muslims and Christians in total children ever born. This is depicted in Table 2.

Table 2: Children ever born net of infant mortality, Ramanagaram sample (1996)

Children ever born net of infant mortality	All women	Hindus	Muslims	Christians
Mean	2.87	2.51	3.51	2.46
Standard deviation	0.13	0.15	0.22	0.33

The tables show that taking into account figures for infant mortality in the sample does not significantly alter the inherent differences between Hindus, Muslims and Christians in the mean level of their fertility.

Another factor which may affect contraceptive use is the degree of participation of men in decision-making about fertility. In his study of Kenya, Omondi-Odhiambo argues that men have been usually excluded from participating in many family planning programmes.[57] Moreover, since some traditional and modern methods of contraception do require the husband's consent, approval and financial support (or all three), it is important to take men's ideas about contraception into account when devising a family planning strategy. This is also important because in many less developed societies there is very limited inter-spousal

[57] Omondi-Odhiambo, 1997: 29.

communication on fertility.[58] This issue is particularly relevant to an analysis of women's decisions about contraception because though in the aggregate, men's and women's perceptions of contraception are similar, at the couple level, there is a relatively large amount of disagreement and this causes both lower contraceptive use and increased conflict over intentions to use contraception in the future.[59] In the econometric models presented below, this variable is not used because it is highly correlated with husband's education and occupation, and indeed, the level of participation by men may even be a result of the level of education. However, the role of husbands in decision-making about contraception in the Ramanagaram sample is discussed in detail in the qualitative evidence presented in Section II.

Of the factors postulated in the literature as being important determinants of contraceptive choice, therefore, eleven have been regarded as appropriate for inclusion in the econometric models estimated below for Ranmanagaram. These are woman's education, husband's education, income, woman's occupation, husband's occupation, marital consanguinity, woman's current age, woman's reported ease of access to a contraceptive method, resident female extended family, religion, and caste (used in one model for Hindus only). Before reporting the results of model estimation, however, let us briefly examine patterns of contraceptive use in Ramanagaram.

II. Contraceptive use in Ramanagaram

Before analysing the determinants of contraceptive use in Ramanagaram, it is important to examine the pattern of such use, as well as the Ramanagaram women's attitudes towards

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[58] In Omondi-Odhiambo's study, couples were more likely to use contraception if they discussed family planning with each other, and 73% of couples who discussed family planning actually used it. Omondi-Odhiambo, 1997. See also Caldwell and Caldwell, 1990.

[59] Biddlecom, Casterline and Perez argue that more than 50% of couples do not concur in their perceptions about the basic aspects of contraception. See Biddlecom, Casterline and Perez, 1996.

contraception. In the survey, the Ramanagaram women were asked if they had ever used any method of birth control. The question was answered in the affirmative by 53% of ever-married women in the whole sample, 86% of Christians, 57% of Hindus and 40% of Muslims. According to the 1991 Census, 44% of Indian couples are effectively protected by family planning methods.[60] There are significant regional differences, however, with rates as high as 50% in Tamil Nadu and Andhra Pradesh, but only 20% in Uttar Pradesh.[61] The Ramanagaram sample therefore resembles the states of Tamil Nadu and Andhra Pradesh which adjoin Karnataka geographically. According to the National Family Health Survey, knowledge of contraception is almost universal in Karnataka, with 99% of ever-married women (and 96% of currently-married women) in urban and rural areas reporting knowledge of at least one modern method.[62] However, the practice of birth control is lower, with only 53% of ever-married women having ever used a method of contraception.[63]

The survey also asked Ramanagaram women which method of birth control they adopted, and their responses are shown in Table 3.

Table 3: Method of birth control used, Ramanagaram sample (1996)

Method of birth control used	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Copper t	5	5.1	5	8.5	0	0.0	0	0.0
Mala d (pills)	18	18.2	8	13.6	7	25.0	3	25.0
Nirodh (condoms)	6	6.1	3	5.1	2	7.1	1	8.3
Operation	66	66.7	41	69.5	18	64.3	7	58.3
Mala d + operation	4	4.1	2	3.4	1	3.6	1	8.3

[60] Figures taken from the India Population Data Sheet, 1994.
[61] Retherford and Ramesh, 1996.
[62] National Family Health Survey 1992-93: Karnataka, 1995: 79-80.
[63] National Family Health Survey 1992-93: Karnataka, 1995: 79-80. Coincidentally, this figure is identical to that of ever-users of contraception in the Ramanagaram sample.

The most popular means of birth control was the sterilisation operation.[64] It is interesting that even women who were not currently using any contraception preferred the sterilisation operation to any other method. For example, one woman, Padma, from Ramanagaram town, age 23 remarked, 'I will have an operation after three children. Currently, I do not use any birth control techniques.' However, some women did have their reservations. For example, Gangamma, a Hindu mother of five, aged 33, from Ramanagaram town remarked, 'I am scared of undergoing the operation. That is why I have five children.' Another woman, Puttibai, from village A, age 35 remarked, 'The population is less today because operations are in vogue, but I will not have it because they are said to be painful.'

This predominance of the tubectomy is similar to findings from the National Family Health Survey which reported that female and male sterilisation is the most widely-known contraceptive method in Karnataka, and that knowledge of spacing methods is comparatively low.[65] Female sterilisation accounts for 87% of total current contraceptive practice in Karnataka and the median age at sterilisation is 25.2 years.[66] Sterilisation operations also account for 79% of all contraceptive use in Tamil Nadu and 95% in Andhra Pradesh, but only 66% in Uttar Pradesh.[67]

In the Ramanagaram sample, spacing methods were more popular among the Christians and Muslims than among Hindus. The second most popular method of family planning in the sample was birth control pills, which was used by one-quarter of Muslim and Christian women, but only 14% of Hindu women. By contrast, only Hindu women used the IUD.

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[64] This finding was also corroborated in interviews with doctors in Ramanagaram taluk, March 1996.
[65] National Family Health Survey 1992-93: Karnataka, 1995: 79-80. A 'modern' method refers to intra-uterine devices (IUDs), pills and condoms.
[66] National Family Health Survey 1992-93: Karnataka, 1995: 88. The survey found that sterilisation operations after the age of 35 were quite rare (approximately 4%). This finding is similar to the case of Tamil Nadu.
[67] The median age at sterilisation in Tamil Nadu is 26.2 years and in Andhra Pradesh is 24.5 years; the comparable figure for Uttar Pradesh is 29.6 years. See Retherford and Ramesh, 1996.

Why is a permanent method of contraception so favoured by the women of Ramanagaram, as indeed by women in other south Indian states? One contributory factor is that most family planning services are performed by the public sector which emphasises permanent methods of birth control, and hence sterilisation is less costly and more easily available than other methods. Another contributory factor is the very small degree of communication about contraception by couples, discussed below. The tubectomy is a contraceptive method which a woman can adopt without the need to discuss it with her husband or seek his consent. Thirdly, the tubectomy involves fewer costs in terms of post-operative care or trips to health centres or family planning clinics, making this option attractive to women who live further away from medical infrastructure, as well as to service providers.[68]

The National Family Health Survey found that couple communication in Karnataka is very low, with an estimated 58% of women in Karnataka ever discussing contraception with their husbands.[69] In the Ramanagaram sample, couple communication was even less frequent, with only 36% answering that they ever discussed contraception with their husbands, 37% of Hindus, 23% of Muslims and 93% of Christians. This variable was not used in the logit regression analysis (discussed below) because it was highly correlated with both women's and men's education and it seemed likely that it was a result of education.[70]

Earlier the importance of female autonomy in influencing women's decision to use contraception was discussed. Moreover, recent studies of family planning in India suggest that 'before accepting any contraceptive method, women generally seek the opinion of parents, husband and in-laws, in that order, and accept contraception only if these three

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[68] Visaria and Chari, 1998: 53-112.
[69] National Family Health Survey 1992-93: Karnataka, 1995: 104.
[70] The correlation coefficient between whether the woman discussed contraception with her husband and her total years of education was 0.56, while the correlation coefficient between whether the woman discussed contraception with her husband and his total years of education was 0.51.

parties approve.'[71] The Ramanagaram questionnaire therefore asked women which persons they consulted about family planning. Their responses are reported in Table 4.

Table 4: Person(s) influencing decisions about birth control, Ramanagaram sample (1996)

Persons influencing family planning decisions	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Couple	95	50.8	44	42.7	38	54.3	13	92.9
Couple + parents-in-law	2	10.7	2	1.9	0	0.0	0	0.0
Couple + nurse	1	0.5	0	0.0	1	1.4	0	0.0
Woman	36	19.3	26	25.2	10	14.3	0	0.0
Woman + mother-in-law	1	0.5	1	1.0	0	0.0	0	0.0
Woman + doctor/nurse	3	16.0	2	1.9	1	1.4	0	0.0
No response	49	26.2	28	27.2	20	28.6	1	7.1
Total	187	100.0	103	100.0	70	100.0	14	100.0

The most popular responses were that the woman took the decision either together with her husband or alone. In response to this question, one Hindu woman, Sanamma aged 36 years, from Ramanagaram town asked, 'What do you mean? In this house, I am the only head!'

Although half the sample reported taking the decision to use contraception with their husbands, it must be remembered that over 60% of women said that they did not discuss contraception with their husbands at all. It seems likely that this contradiction arises from many women's desire to display loyalty towards their husbands by reporting that they took the decision to use contraception together, whether or not they were actually doing so. It may also indicate that though communication was taking place, it was partial and limited. Finally, it may reflect the influence of the media, since family planning campaigns on radio and television continually urged couples to discuss birth control with each other.

In order specifically to assess the influence of female extended family members and friends, the women were specifically asked with whom they would discuss family planning apart

[71] Visaria and Chari, 1998: 97.

from their husbands, among five options: mother-in-law, sister-in-law, sister, mother and friends. The responses to this question are shown in Table 5.

Table 5: Influence of female extended family members or friends on family planning, Ramanagaram sample (1996)

Female extended family member	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
None	53	28.3	37	35.9	12	17.1	4	28.5
Mother	37	19.7	21	20.4	10	14.2	6	42.8
Friends	25	13.3	15	14.5	8	11.4	2	14.2
Mother-in-law	25	13.3	11	10.7	13	18.6	0	0.0
Sister	24	12.8	10	9.7	11	15.7	3	21.4
Sister-in-law	6	3.2	3	2.9	3	4.3	0	0.0
Nurse	1	0.5	1	0.9	0	0.0	0	0.0
Other	6	3.2	4	3.8	0	0.0	2	14.2
Breakdown of 'others'								
Aunt	1	0.5	1	0.9	0	0.0	1	7.2
Daughter + daughter- in-law	1	0.5	1	0.9	0	0.0	0	0.0
Niece	1	0.5	1	0.9	0	0.0	0	0.0
Co-sister*	2	1.1	1	0.9	0	0.0	1	7.2
Total	201	100	111	100	75	100	15	100

*husband's brother's wife

Mothers, friends, mothers-in-law and sisters were the chief confidants on family planning matters, and this was true for all three religious groups. Qualitative evidence suggests that one reason sterilisation operations are such a popular method of contraception in Ramanagaram is partly because female extended family or women-friends urge women to undergo these operations after they have achieved what is perceived to be an ideal family size of two or three children. For example, Devamma, a mother of three sons and two daughters, aged 51, a housewife from village C, said, 'I encouraged my daughter and daughters-in-law to have two children quickly and go in for the operation. Then they are not troubled any more. The girls have to go in one morning and come back later by auto. They take some rest and then they do not have to bother any more. There is no problem as with the pills, which they may not remember to take. After all, why should they be burdened with so many children as I?' [72]

[72] An auto is a three-wheeled motorised vehicle, short for 'auto-rickshaw'.

This study is concerned primarily with the impact of religion on demographic outcomes. One finding from the National Family Health Survey which is quite interesting from the point of view of the present study is that approval for family planning in Karnataka was highest among the Christians (92%) compared with Hindus (84%) and Muslims (81%).[73] All 201 women in Ramanagaram were asked what they thought was the position of their religion on contraception. The first question was, 'Does your religion permit contraception?', and the responses to it are shown in Table 6.

Table 6: Does your religion permit contraception? Ramanagaram sample (1996)

Response	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Yes	106	52.7	90	81.0	1	1.3	15	100.0
No	78	38.8	4	3.6	74	98.6	0	0.0
Don't know	17	8.5	17	15.3	0	0.0	0	0.0
Total	201	100.0	111	100.0	75	100.0	15	100.0

Over half the sample said that they thought that their religion permitted contraception, 100% of the Christians, 81% of the Hindus, but only 1% of the Muslims. However, there was considerable variation in Muslim women's presentation of what they regarded as the Islamic ban on contraception. Shamshed Banu, age 33 years, and a Muslim mother of 4 children, said, 'Whatever God gives is his will.' But another Muslim woman, Hussain Bi, age 63, mother of 7 children from Ramanagaram, said, ' God's will is fine, but how do we support the (larger) family?' Iqbal Banu, a Muslim social worker, explained the position of Islam on contraception to me as follows: 'Everyone is having an operation. The Koran says that we can take pills when the stomach [womb] is empty, but when there is a birth [conception], we can't take the tablets. We need to reconsider this.'

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[73] National Family Health Survey 1992-93: Karnataka, 1995: 107.

The women were then asked what their personal views were concerning the position of their religion on birth control. This second question was a very sensitive one and many women were reluctant to answer this openly. The women were for the most part happy to answer questions on this issue in general terms, but more hesitant when questioned on specific, individual preferences. This must be understood in the context of Ramanagaram society. In a small community such as Ramanagaram taluk, where the priests and mullahs wielded considerable power both in terms of their religious position and their high social standing, it was not very easy for the women to divulge openly (to what must be perceived as an urban stranger alien to their context) their true feelings on an issue as sensitive as religion and family limitation. Thus, there is perhaps a case to be made here that revealed preferences and stated preferences were different. Nevertheless, keeping this caveat in mind, it is possible to analyse the women's responses, which are shown in Table 7.

Table 7: View regarding position of religion on birth control, Ramanagaram sample (1996)

Response	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Agree	74	36.8	40	36.0	22	29.3	12	80.0
Disagree	29	14.4	4	3.6	24	32.0	1	6.6
Don't know	20	9.9	14	12.6	5	6.6	1	6.6
Did not answer	4	1.9	3	2.7	1	1.3	0	0.0
No view	74	36.8	50	45.0	23	30.7	1	6.6
Total	201	100.0	111	100.0	75	100.0	15	100.0

Perhaps the sensitive nature of this question is reflected in the large proportion (37%) who said that they had 'no view'. Among the Hindus in the sample, although 36% agreed with the position of their religion, there were 45% who said that they held no view. For example, Gaurama, a Hindu woman aged 26 from village C remarked, 'Our religion does not say anything, hence I have not hesitated to have an operation'. The number of Hindus who said that they had 'no view' is much higher (45%) than among the Christians (7%) and Muslims

(31%) probably because, as we saw in Chapter 1, Hinduism does not say very much scripturally about birth control.

The other interesting difference across religious groups is in the percentage disagreeing with the position of their religion on contraception. This was only 14% for the whole sample, but a shocking 32% for Muslims, compared to only 7% for Christians and only 4% for Hindus. This finding is interesting, because, as we have seen earlier, although there is debate about whether or not theologically Islam permits contraception, the perception among Muslim women in Ramanagaram is unambiguously that it does not permit birth control. Muslim women who did limit their fertility implicitly contrasted the position of priest and theological writings, as in the case of Shahzamma Husseini, from Ramanagaram town, aged 35, who remarked, 'I am educated, therefore I have a small family. We do not need to consult the priest because everything is written in the Shariat.' A Hindu woman, Saraswati, aged 38 from Ramanagaram town remarked, 'The Muslim religion does not allow contraception, unlike us Hindus'. These findings suggest that insofar as religion does influence contraceptive choice, it is through local community influences, and the manner in which theological beliefs are interpreted to women, rather than through the actual theological content of the religion world-wide.

In Karnataka, all forms of family planning methods and services are provided through government hospitals and urban family welfare centres in urban areas and through Primary Health Centres (PHC) and sub-centres in rural areas. Besides these government medical outlets, family planning services are also available from private hospitals, private clinics and non-governmental organisations. Sterilisation operations and IUD insertions are conducted mostly in government hospitals, PHCs and in sterilisation camps which are organised periodically by the government hospitals. Modern methods of contraception are available through both government and private sources; government health outlets supply 83% of

users. Sterilisation operations are performed almost exclusively at government facilities which conducts 95% of male sterilisations and 87% of female sterilisations.[74]

The Ramanagaram questionnaire asked several questions in order to find out whether women felt there was an 'unmet need' for family planning. First, women were asked how frequently they visited their local family planning health centre or hospital. Their responses are reported in Table 8.

Table 8: Frequency of visits to family planning centre/local hospital by ever-married women, Ramanagaram sample (1996)

Frequency of visits	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Do not go at all	69	36.8	37	35.9	29	41.4	3	21.4
Nurse comes to house	50	26.7	32	31.1	13	18.6	5	35.7
Go when ill	24	12.8	12	11.6	10	14.3	2	14.2
Often	20	10.7	4	3.8	12	17.1	4	28.6
Not often	15	8.0	12	11.7	3	4.3	0	0.0
Rare	4	2.1	4	3.8	0	0.0	0	0.0
Sometimes	4	2.1	4	3.8	0	0.0	0	0.0
Only in old age	2	1.1	0	0.0	2	2.9	0	0.0
Daily	1	0.5	0	0.0	1	1.4	0	0.0
Total	187	100.0	103	100.0	70	100.0	14	100.0

Of the entire sample, 37% said that they never went at all to the local hospital. This is in contrast to the doctors' views that women with inter-uterine devices ought to visit their doctors fortnightly, while those using other contraceptive methods ought to visit them weekly. Mothers were also asked to bring in their children on Thursdays for check-ups and vaccinations.[75] It has been suggested in other studies such as that by Arends-Kuenning of Bangladesh, that doorstep delivery is an important way to reduce fertility because it reduces the costs of contraception, particularly for women with little or no education and for those

[74] National Family Health Survey 1992-93: Karnataka, 1995: 111-126.
[75] Oral communication provided by doctors from Ramanagaram town.

who live in less developed areas.[76] The 27% of women who responded that they depended on the nurse who came round once a fortnight to provide family planning advice and services suggests that the system of doorstep delivery of contraceptives is effective in Ramanagaram. This was more prevalent among the Hindus (31%) and Christians (36%) than among the Muslims (19%). One Hindu woman, Sowbhagyamma, aged 20 years, from Ramanagaram town remarked, 'It is easy for us to get contraception as the nurse comes once in two weeks to give us pills.' Compared with Hindus and Christians, a higher percentage of Muslim women (41%) said that did not go to the health centre at all. The most important result of these findings is that women in Ramanagaram did have access to doorstep delivery of contraceptives by nurses and that the doorstep nurses would have gone to all homes, irrespective of religion, if asked. Thus, it seems that health care and contraceptive services are available in Ramanagaram, either through the hospital or through the nurses who regularly visited both town and villages.

Women were also directly asked was how easy it was currently for them to obtain at least one method of contraception. Their responses are shown in Table 9.

Table 9: Ease of obtaining contraception, Ramanagaram sample (1996)

Response	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Easy	71	37.9	42	40.7	20	28.6	9	64.3
Nurse provides	18	9.6	13	12.6	5	7.1	0	0.0
Not easy	5	2.7	4	3.8	0	0.0	1	7.1
Cannot get	2	1.1	0	0.0	2	2.9	0	0.0
Not applicable*	91	48.7	44	42.7	43	61.4	4	28.5
Total	187	100.0	103	100.0	70	100.0	14	100.0

*This stands for those who said that they did not currently use contraceptive services and thus had no need to obtain them from any particular source.

These responses also indicate that contraceptive services were easily available in Ramanagaram taluk and that the nurses who visited their localities once a fortnight were an

[76] Arends-Kuenning, 1997: 1.

important aspect of this access.[77] This view seems to be unanimous by religion. Another interesting finding from this table is the size of the 'not applicable' category, which is twice the size, in terms of percentages, for Muslim women as it is for Christian women. This suggests that contraception was used much less by the Muslim women than by women of other religions, at least before controlling for the influence of other factors, but that this was not because it was difficult to obtain.

In conclusion, these findings show that just over half the sample had used a method of contraception, the most popular of which for all religions was the sterilisation operation. The decision to use contraception was influenced by husbands and by other female family members and friends, but many women took the decision alone. Religion appeared to play a part in influencing family planning but women were hesitant to reveal their views about this openly. A greater proportion of Muslim women than of Hindus or Christians disagreed with what they perceived to be the position of their religion on contraception. Finally, contraceptive services are perceived as being widely available, though Muslim women used the doorstep delivery of contraceptives less than others. Together, these findings suggest strongly that the main motivation associated with contraceptive use was its acceptability rather than its availability. This illustrates the importance of examining the determinants of acceptability, which is undertaken in Section IV below.

III. Fertility preferences, ideal family size and unwanted fertility

A final step, before analysing the determinants of contraceptive use in Ramanagaram, is to examine what women themselves said about their fertility preferences.

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[77] Although doctors interviewed in Ramanagaram taluk said that Copper-Ts, were in 'short supply'.

A. Fertility preferences

Interpretation of data on fertility preferences is a matter of debate, for several reasons. First, at the time of interview women's attitudes towards fertility may not be fully formed. Second, these views may change over time. Third, the influence of others may have influenced women's preferences, or at least their expression of them. Women's stated preferences and their revealed preferences may therefore diverge. It can nevertheless be useful to explore what women state their fertility preferences to be.

The currently married women in the Ramanagaram sample were asked, first, if they wanted another child. In the entire sample, 33% of married women answered yes. The responses were almost identical between Hindus (at 35%) and Muslims (at 33%), although lower among Christians (at 21%). These findings are similar to the findings of the National Family Health Survey which found that 30% of women in Karnataka said that they wanted another child.[78]

The women who did want another child were then asked if they preferred a boy or a girl. Their responses are reported in Table 10.

Table 10: Preferences for children, Ramanagaram sample (1996)

Boy or girl	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Boy	34	54.8	23	63.9	10	43.5	1	33.3
Girl	14	22.6	8	22.2	6	26.1	0	0.0
One of each	2	3.2	1	2.8	0	0.0	1	33.3
Both	4	6.5	1	2.8	3	13.0	0	0.0
Either	8	12.9	3	8.3	4	17.4	1	33.3
Total	62	100.0	36	100.0	23	100.0	3	100.0

[78] National Family Health Survey 1992-93: Karnataka, 1995: 111.

By far the most women wanted a boy, at more than half of the whole sample. Preference for boys was highest among the Hindus, and lowest among the Christians. This strong preference for sons is similar to other studies of fertility preferences for Karnataka which show 44% of mothers wanting boys and only 16% wanting girls.[79]

The women gave a variety of reasons for their preferences which are shown in Table 11.

Table 11: Reasons for desiring another boy or girl, Ramanagaram sample (1996)

Reason	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
1 enough	1	1.6	1	2.7	0	0.0	0	0.0
1 more nice	1	1.6	1	2.7	0	0.0	0	0.0
3 nice	1	1.6	1	2.7	0	0.0	0	0.0
1 boring	1	1.6	1	2.7	0	0.0	0	0.0
Both nice	4	6.5	1	2.7	2	8.7	1	33.3
For husband	1	1.6	0	0.0	1	4.3	0	0.0
Girls expensive	2	3.2	1	0.0	1	4.3	0	0.0
God's will	5	8.1	0	0.0	5	21.7	0	0.0
In-law pressure	2	3.2	1	2.7	1	4.3	0	0.0
Insurance	20	32.3	13	36.1	6	26.1	1	33.3
Like girls	1	1.6	0	0.0	1	4.3	0	0.0
Help mother	6	9.7	5	13.8	1	4.3	0	0.0
Nice	1	1.6	1	2.7	0	0.0	0	0.0
No kids	1	1.6	1	2.7	0	0.0	0	0.0
Opposite sex	15	24.2	9	25.0	5	21.7	1	33.3
Total	62	100.0	36	100.0	23	100.0	3	100.0

For the sample as a whole, the most popular reasons for desiring an additional child were for insurance purposes (32%), in order to have a child of the opposite sex to existing children (24%), and to provide help to the mother (10%). There was little difference in response by religion. Jayalakshmi, a 27 year-old Hindu woman from village A, who was a mother of one son and who wanted her next child to be a daughter, said rather poetically that she wanted two children: 'One for love and one for property - a girl for aasé (love) and a boy for aasti (to bequeath property) is perfect for us.' Lakshmi, a Hindu woman, aged 20, who was single,

[79] See the National Family Health Survey 1992-93: Karnataka, 1995: 111-126.

said that she wanted two children, 'a girl for the aarti (lighting the oil lamp for prayer in the home) and a boy for keerti (family prestige).'

Pursuing the theme of gender preference, the entire sample of Ramanagaram women were asked if the birth of a boy was better news, worse news or similar news to the birth of a girl.

Table 12: Preferences between boys and girls, Ramanagaram sample (1996)

Category	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Boy better	87	43.2	47	42.3	38	50.6	2	13.3
Indifferent	96	47.8	53	47.7	30	40.0	13	86.6
Boy worse	7	3.5	3	2.7	4	5.3	0	0.0
Did not answer	11	5.5	8	7.2	3	4.0	0	0.0

Although 43% of the sample believed that the birth of a boy was better news, 48% said that they were indifferent. The highest son-preference was expressed by the Muslims (at 51%), but it was nearly as high among the Hindus (at 42%); only the Christians expressed low son-preference (at 13%). One woman, Jayantibai, aged 24, from Ramanagaram town, who was the wife of a silk unit owner, remarked, 'My first-born was a son, so I did not feel bad. So, I am indifferent between the birth of a girl or a boy from now onwards.' But even among the son-preferring Muslims there were deviant views, such as that of Najmunissa, age 60 years, from Ramanagaram town, who said, 'I always wanted a girl. I had six sons instead. I always wanted fewer boys and at least one girl, because for the mother, girls are so much closer.'

These answers seem to contradict those to the questions on preferences for a boy versus a girl as the next child, discussed in Table 10. It appears that when women are asked in abstract terms if the birth of a boy is better than that of a girl, as in Table 12, they are reluctant to express son-preference and opt to say that they are indifferent, whereas when women who were currently married and desired another child were questioned specifically if they desired their next child to be a boy or a girl, a majority preferred sons to daughters. Moreover, in the

latter case we are dealing only with 62 women compared with 201 women. One reason for these contradictory findings may be that media campaigns which encouraged families not to discriminate against the girl-child made women reluctant to divulge their true feelings, preferring instead to claim 'indifference'. This is again an example of stated preferences diverging from revealed preferences. Perhaps what is most significant, however, is the very small proportion of the sample - of whatever religion - who said that the birth of a girl was better news.

On comparing Table 10 with Table 12, son-preference seems far stronger for Hindus than for Muslims for the next child (as shown in Table 10), but general son-preference seems stronger for the Muslims, (as shown in Table 12). However, it is important to be aware that while Table 12 depicts responses for all 201 women, Table 10 shows only the responses of the 62 women who wanted another child. The empirical impact of son-preference cannot be explored in an econometric model of contraceptive choice because it is endogenous to the decision to use a contraceptive method. However, it can be, and indeed is, explored in the models of fertility presented in Chapter 6. The greater degree of son-preference among Hindus may also account for the higher levels of infant mortality and under-5 mortality found among Hindus than among Muslims in all of India. Although we do not go into the relationship between religion, infant mortality and son-preference more deeply here, this is an important area for future research.

The women were also asked if their husbands wanted another child. This may seem odd at first sight, given the reported infrequency of couple communication on fertility planning. However, this question is important as an indication of the influence of husbands over wives' fertility decisions. The responses are shown in Table 13.

Table 13: Whether husband wants another child, Ramanagaram sample (1996)

Category	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
No	105	66.9	59	68.6	36	62.1	10	76.9
Yes	37	23.6	20	23.3	14	24.1	3	23.1
Yes boy	11	7.0	4	4.7	7	12.1	0	0.0
Yes girl	4	2.5	3	3.5	1	1.7	0	0.0
Total	157*	100.0	86	100.0	58	100.0	13	100.0

*30 married women did not answer this question because they said that they did not know their husband's views. The non-answers varied by religion, given by 17 Hindus, 12 Muslims and 1 Christian woman.

In the sample as a whole, some two-thirds of women said that their husbands did not want another child, with fairly similar percentages among the Hindus and Muslims but substantially higher percentages among the Christians. The other striking finding was the 12% of Muslim wives who reported that their husbands specifically wanted another boy, which compared to very small percentages giving this answer in the other two religious groups.

Comparing husbands' desires with the women's own wishes, we find that the percentage of women who did not want more children along with the percentage of women who said their husbands did not want any more children was similar, at 67% of those who responded to this question. The percentage of women who did not want another child varied hardly at all among religions. There was greater variation in the corresponding percentages among their husbands, at 69% among Hindus, 62% among Muslims and 77% among Christians. Judging by these responses, a greater percentage of Muslim men than Muslim women want an additional child; while a smaller percentage of Christian men than Christian women want another child.

In order to assess the extent of use of birth control strategies in the sample population, all ever-married women were asked if the birth of their children had been planned or not. For the sample as a whole, a majority (71%) reported that the birth of their children had been

unplanned. There was considerable variation by religion, with this answer being given by 80% of Muslims, and 70% of Hindus, but only 21% of Christians.[80]

B. Ideal family size and unwanted fertility

One of the main criticisms of family planning programmes, as we saw in Section I, is that they are not associated with declines in unwanted fertility: as contraception aimed at reducing unwanted fertility has been increasing, the rate of unwanted fertility has been increasing as well. Bongaarts defines unwanted births as those births which occur after a woman has attained her desired family size, and estimated them as 22% of observed fertility in a sample of twenty developing countries in 1990.[81] Studies which emphasise the importance of contraceptive availability for reducing fertility calculate 'unwanted' fertility using ideal family size.

The Ramanagaram women were asked two sets of questions to ascertain their ideal family size. The first was, 'Do you have a desired or ideal number of children? If so, what is it?' Their answers are reported in Table 14.

Table 14: Do you have a desired/ideal number of children? Ever-married women, Ramanagaram sample (1996)

Category	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Yes	145	77.5	80	75.5	52	74.3	13	92.8
No	40	21.3	22	20.7	17	24.2	1	7.1
Don't know	2	1.1	1	1.0	1	1.4	0	0.0

[80] However, it must be borne in mind that the sample size of ever-married Christians is small relative to those of ever-married Hindus and Muslims.
[81] Bongaarts, 1997a.

Almost identical proportions of Hindu and Muslim women said that they did have an ideal number of children (at about 75%) but the percentage was much higher among Christian women (at 93%). Women were often amused by this question, as in the case of one Muslim woman, Sofia Banu, age 40, from Ramanagaram, a mother of five children, who remarked, 'What is the point of asking me about what I would have desired? If I had that much sense, I would have cut off my childbearing at two!'

The precise numbers of children women said they desire are shown in Table 15.

Table 15: Ideal number of children, Ramanagaram sample (1996)

Ideal number of children	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	2.51		2.48		2.65		2.21	
1	10	4.9	7	6.3	1	1.3	2	13.3
2	72	35.8	38	34.2	24	32.0	10	66.6
3	44	21.8	26	23.4	16	21.3	2	13.3
4	16	7.9	8	7.2	8	10.6	0	0.0
5	3	1.5	1	0.9	1	1.3	1	6.6
Don't know	55	27.4	31	27.9	24	32.0	0	0.0
God gives	1	0.5	0	0.0	1	1.3	0	0.0

The difference in the means between Hindus and Muslims, Muslims and Christians and Hindus and Christians was not statistically significant at the 95% confidence level. This is interesting because if the Hindu and Muslim women, who (as we will see in Chapter 6) show higher fertility than the Christians, desire similar numbers of children to the Christians, then it is essential to investigate those factors which are preventing Hindu and Muslim women from achieving their desired family size.

Most studies of the KAP-gap in the provision of family planning services employ the concept of 'unwanted fertility', which is measured either as the 'unwanted' component of the total

fertility rate expressed in births per woman[82] or as the number of living children less the ideal number of children stated by the respondent. The latter measure of unwanted fertility can be calculated for the Ramanagaram sample, as shown in Table 16.

Table 16: Unwanted fertility, Ramanagaram sample (1996)

Unwanted births	All women	Hindus	Muslims	Christians
Mean	0.85	0.55	1.44	0.07
Median	0	0	1	0
Mode	0	0	0	0
Maximum	7	7	7	4
Minimum	-4	-4	-3	-2

The mean for the entire Ramanagaram sample closely resembles the 0.8 found for rural women in Karnataka by the National Family Health Survey.[83] The mean for Muslim women is strikingly high compared to that for Hindus and Christians. This difference in the mean level of unwanted fertility between Hindus and Muslims and between Muslims and Christians is statistically significant at the 5% level, which suggests that Muslims in Ramanagaram are perhaps still more uneasy about contraceptive practice than Hindu and Christian women, despite the disagreement of some Muslim women with the perceived religious requirements of Islam on contraception. Again, this finding is similar to that of the National Family Health Survey, which found a mean of 1.0 for Muslim women in Karnataka. By this measure, there is substantial 'unwanted' fertility in the Ramanagaram sample. However, since this measure does depend crucially on women's stated 'ideal' number of children, and there may be a discrepancy between stated and revealed preferences, this finding should be interpreted with caution especially in the light of the evidence of easy access to contraception provided by women's answers to the other survey questions.

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[82] Bongaarts, 1997a.

[83] National Family Health Survey 1992-93: Karnataka, 1995: 125-126.

In order to approach the same question in a different way, the Ramanagaram women were asked if they would have wanted fewer children than they currently had. Their responses are reported in Table 17.

Table 17: Would you have wanted fewer children? Ever-married women, Ramanagaram sample (1996)

Responses	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Yes	34	18.2	8	7.8	24	34.3	2	14.3
Yes, wanted daughters	1	0.5	1	1.0	0	0.0	0	0.0
Yes, wanted two children	1	0.5	1	1.0	0	0.0	0	0.0
Yes, wanted fewer boys	1	0.5	0	0.0	1	1.4	0	0.0
Yes, wanted fewer girls	1	0.5	1	1.0	0	0.0	0	0.0
Yes (total)	38	20.3	11	10.7	25	35.7	2	14.3
No	142	75.9	88	85.4	42	60.0	12	85.7
No, want more girls	1	0.5	0	0.0	1	1.4	0	0.0
No (total)	143	76.5	88	85.4	43	61.4	12	85.7
Don't know	6	3.2	4	3.9	2	2.9	0	0.0
Total	187	100.0	103	100.0	70	100.0	14	100.0

In the entire sample, just over three-quarters of women said that they did not want fewer children, but answers varied significantly by religion, with about 85% of Hindus and Christians giving this answer, but only 61% of Muslim women. Most women of all religions apparently did not want fewer children than they had already. This finding is in striking contradiction to the estimates of unwanted births just discussed. When directly questioned, women were very loyal to existing children and did not want to suggest that any of them were actually 'unwanted'. However, when asked in abstract terms about their ideal family size, women gave answers implying unwanted births averaging almost one child per woman. These findings highlight that women's stated preferences and their revealed preferences can diverge considerably, and point to the fact that estimates of unwanted fertility depend crucially on the manner in which questions about these issues are asked.

The fertility preferences of Ramanagaram women were further explored by asking women why they did or did not want fewer children. Some women wanted fewer children but felt constrained by the demands of their families, as in the case of Nagamma, aged 36, from village D, the mother of four young daughters, who remarked, ' I have four daughters. I am trying for a son because my parents-in-law are pressuring me. Our religion says we need a son to look after us. But, I would definitely have liked fewer daughters. I do not send the girls to school now because my parents-in-law disapprove. Even though I know differently, I must listen to them. But I will definitely send my girls to school after they (in-laws) die.' The diverse range of reasons which women gave in response to this query is presented in Table 18.

Table 18: Reasons for wanting/not wanting fewer children, Ramanagaram sample (1996)

Reasons	All women No.	Hindus No.	Muslims No.	Christians No.
Reasons for not wanting fewer children				
1 each nice	3	0	0	3
1 enough	1	1	0	2
1 lives here	1	1	0	0
1 nice	3	3	0	0
2 enough	7	2	5	0
2 nice	18	12	3	3
2 right	1	0	1	0
3 enough	5	3	2	0
3 nice	9	4	4	1
4 nice	1	1	0	0
God's will	5	0	5	0
God's will + insurance	1	0	1	0
Happened	2	2	0	0
Income	1	1	0	0
Insurance + help mother	1	1	0	0
Insurance	17	12	5	0
Like all	2	0	2	0
Many will help with work	1	0	1	0
Love all	1	1	0	0
Large family is nice	1	1	0	0
Help mother	2	1	1	0
Nice	1	1	0	0
Currently have only 1 child	2	2	0	0
Currently have only 2 children	1	0	1	0
Planned	16	9	6	1
Wanted 3	1	0	1	0
Will do work	1	1	0	0
Reasons for wanting fewer children				
8 excessive	1	0	1	0
All are boys	1	0	1	0
Expensive	21	6	15	0
Girls expensive	2	0	2	0
Wanted less girls	5	1	4	0
Opposite sex	4	2	2	0
Pressure from parents-in-law	1	1	0	0
Don't know	2	1	0	1
Total	187	103	70	14

These responses suggest that women in the Ramanagaram sample desired children primarily for their services as consumer goods, producer goods and investment goods. For the sample as a whole, the most popular reason for desiring fewer children was that children were expensive to raise. The next most popular reason was the desire for fewer girls. The main reasons for not desiring fewer children were that 2 children was just right and that the current

number of children would serve as a means of insurance in old age. God's will was another reason, cited by 7% of Muslim women.

Finally, in an attempt to determine wanted family size in relation to actual family size, the women were asked if, in their opinion, large families were better than small ones. The responses are shown in Table 19.

Table 19: Large families vis-à-vis small families, Ramanagaram sample (1996)

Large families better than small	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
No	111	55.2	55	49.5	45	60.0	11	73.3
Yes	82	40.7	50	45.0	28	37.3	4	26.6
Yes but expensive	3	1.5	3	2.7	0	0.0	0	0.0
Same	1	0.5	0	0.0	1	1.3	0	0.0
Don't know	2	0.9	1	0.9	1	1.3	0	0.0
Did not answer	2	1.0	2	1.8	0	0.0	0	0.0
Total	201	100.0	111	100.0	75	100.0	15	100.0

Some 40% of women said that large families were better than small families, with the highest proportion among the Hindus and the lowest among the Christians. One Hindu woman, Saraswati, aged 38 years, who lived in a joint family in Ramanagaram town, remarked, ' I like large families - there is salvation in large crowds!' However, the fact that more than half the sample of women did not favour large families provides some support for the view that there may be substantial unwanted fertility in Ramanagaram.

To summarise, it appears that Ramanagaram women did have opinions on desired fertility, which were similar across religions, and that this figure was lower than actual family size. However, when specifically questioned if they would have wanted fewer children themselves, most women answered 'no'. Moreover, while half the sample preferred small families, the other half still preferred large families. In my view, the apparent contradiction between the women's small ideal family size and their stated desire not to have had fewer

children, was related to the *ex ante* general and *ex post* specific nature of the questions asked. When asked in general terms if they had an ideal or desired family size, the women were willing to express their opinions freely. Yet they also recognised that they could not have had less children because of certain constraints. The women, therefore, attempted to justify the existence of already born children with very similar reasons to those put forward in response to an earlier question if boys were to be preferred to girls (example: insurance vis-à-vis expense). It appears that the Ramanagaram women recognised the need for children, specifically in order to contribute to the household's activities or insurance in old age but also realised that additional children (particularly daughters) would be expensive to rear. Shivalingamma, a Hindu woman aged 32 from village C, gave explicit statement to the different cost-benefit calculations involved: 'If the family is large, everyone can pitch in to collect water, firewood etc., but it also costs more to support a large family. So, I do not know which is better. Perhaps we need to balance the two.' Thus, though the Ramanagaram women reported an ideal family size which was smaller than the actuality, they were also able to justify their actual large families on various counts. However, the contradictory nature of the same women's replies to different questions casts worrying light on the extremely shaky nature of the evidence on which most estimates of 'ideal' or 'unwanted' fertility appear to be based in the contraceptive choice literature. Depending on how the question is posed, the same woman will give different answers, depending on whether she is focusing primarily on costs or on benefits, whether she is asked for a general normative statement or a concrete positive one, whether she feels she is likely to be approved of by the questioner for certain answers, and many other unmeasurable factors.

IV. A logit model of contraceptive use

To identify determinants of contraceptive use in Ramanagaram, a logit model of contraceptive choice was estimated. A logit model was used because the dependent variable was dichotomous, namely, *ever-use of contraception by the woman*. If a woman had ever used any method of contraception, she was assigned a value of 1; if she had never used a contraceptive method, she was assigned the value 0.

For the reasons discussed in Section I of this chapter, the explanatory variables used were the education of the woman, her husband's education, various measures of the household's income, various measures of the woman's occupation, various measures of her husband's occupation, various measures of marital consanguinity, the woman's current age, the woman's reported ease of access to a contraceptive method, the number of female extended family members, various measures of religion, and caste (used in one model for Hindus only).

The preliminary logit models estimated used backward elimination based on the value of the likelihood ratio. The procedure involved two stages. First, 11 models which did not include interaction terms between the religion dummies and the other regressors were estimated, with the purpose of arriving at the best specification of certain regressors for which alternative measures were available. The 'best' specification of the model was selected on the basis of goodness of fit and specification tests for heteroscedasticity, model specification and collinearity. Then, at the second stage, the best of these models was selected, and each independent regressor was interacted with the two religion dummies. The initial starting-points of the first 11 models estimated are reported in Appendix A.5.1. The results of these preliminary models are reported in Appendix A.5.2.

In model 1, the variables used were woman's total years of education, husband's total years of education, total monthly expenditure, a dummy variable which took the value 1 if the woman performs a home-related occupation, a dummy variable which took the value 1 if the husband performs a skilled occupation, a dummy variable which took the value 1 if the marriage was consanguineous, the woman's age, the number of female extended family members, a dummy variable which took the value 1 if the woman says that contraceptive access is easy and two religion dummies, one which took the value 1 if the woman is Muslim and the other dummy variable which took the value 1 if the woman is Hindu (using the Christians as the base category).

Regressions 2 and 3 considered alternative measures of income. In model 2, total monthly expenditure was replaced by total monthly food expenditure. In model 3, this was replaced by a dummy variable which took the value 1 if the household owned a television. In models 4 and 5, two alternative measures of women's occupation were considered. These were a dummy variable which took the value 1 if the woman performed a skilled occupation (in model 4), and a dummy variable which took the value 1 if she performed a silk-related occupation (in model 5). In models 6 and 7, two alternative measures of husband's occupation were used. These were a dummy variable which took the value 1 if the husband performed a farming occupation (in model 6), and a dummy variable which took the value 1 if he was employed within domestic industry (in model 7). In model 8, the coefficient of inbreeding replaced the consanguineous marriage dummy.

In models 9 and 10, alternative measures of religion were tested. First, in model 9, a dummy variable which took the value of 1 if the woman was Muslim and 0 if she was Hindu is used. This model excluded the Christians. As with the models of marriage age presented in Chapter 4 and the models of fertility presented in Chapter 6, in model 10 of contraceptive adoption an index of piety was used to measure religious observance and practice for all women. In

model 11, the sample was restricted to ever-married Hindus (N = 103) and two dummy variables for high caste membership and scheduled caste membership were used (retaining the low castes as the base category).

Of all the preliminary regression models estimated, model 1 emerged as the best specification. In this model, woman's education, husband's education, the ease of access to a contraceptive method, the number of female extended family members resident, the woman's age, whether the woman was Muslim, and whether the woman was Hindu, emerged as the most significant determinants of the probability of contraceptive use.

According to this model, a greater degree of education for the woman and for her husband both increase the probability of contraceptive use. This suggests that knowledge of contraception is affected by values or skills learned in school, and that this is similar for both men and women. The model also predicts that if a woman is older, she is less likely to use contraception. If there is one more female family member resident, the woman is less likely to use contraception. If the woman said that contraceptive access was easy, she was more likely to use contraception. Finally, the model predicts that if a woman is either Muslim or Hindu, she is less likely to use contraception than if she is Christian. However, a Wald test of whether the Muslim coefficient equalled the Hindu coefficient was accepted, indicating that the effect of religious affiliation on the probability of contraceptive use did not differ significantly between the two groups. This conclusion is also supported by preliminary model 9 which was estimated for Muslims and Hindus only (N = 173), and in which the variable denoting religious affiliation, taking a value of 1 if the woman was Hindu and 0 if she was Muslim, did <u>not</u> emerge as a significant determinant of the probability of contraceptive use.

However, having established that Hindus and Muslims do not have significantly different intercepts, it is also important to examine whether religion affects the <u>slope</u> of the regression,

i.e. whether the socio-economic factors which affect contraceptive use act differently for the three religious groups. In order to investigate whether there were different slopes, different intercepts, or altogether different determinants for the three religious groups, interactive terms between the other explanatory variables and the Hindu and Muslim dummies were introduced into the model.

The initial starting-point variables of the interaction model were the woman's total years of education,[84] husband's total years of education, total monthly expenditure, a dummy variable which took the value 1 if the woman performed a home-related occupation, a dummy variable which took the value 1 if the husband performed a skilled occupation, a dummy variable which took the value 1 if the marriage was consanguineous, the woman's age, the number of female extended family members, a dummy variable which took the value 1 if the woman said that contraceptive access was easy, a dummy variable which took the value 1 if the woman was Muslim, a dummy variable which took the value 1 if the woman was Hindu, plus interactive terms between each of them and the Muslim and Hindu dummies, making a total of 27 explanatory variables. Although originally 29 variables were created, two of the interaction terms were not ultimately included in the starting model because they were perfectly correlated with one or more other regressors.

At every stage of the regression procedure, a restriction was imposed which hypothesised that the coefficients on a particular regressor and all its interaction terms were equal to zero. This hypothesis was tested by using a likelihood ratio test and the model was re-estimated on the basis of the outcome of this test. The likelihood ratio (LR) test was of the form:

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[84] It must be noted that for the maximum likelihood estimation of the logit models, women's and men's education was not broken down into primary, secondary and university education, mainly because of the multicollinearity between the measures of education themselves and the high correlation of the education-religion interaction terms both with the religion dummies and with the other education measures. Both for parsimony in the specification of the model, and because no significant amount of information about the effect of education on contraceptive choice was being lost, it was decided to use women and men's total number of years of education as explanatory variables in the interaction model.

$$LR = 2[L(H_1) - L(H_0)] \sim \Pi^2(r) \qquad (4)$$

where $L(H_1)$ = the maximised value of the log likelihood function under the unrestricted model; $L(H_0)$ = the maximised value of the log likelihood function under the restricted model; and r = the number of restrictions. The final model estimated using this procedure is reported in Table 20.

Table 20: Logit maximum likelihood estimation of the determinants of contraceptive use (Ramanagaram sample, all religions, 1996

Dependent variable is CTPRUSE : 1 = woman had ever-used a contraceptive method; 0 = woman had never used a contraceptive method

Sample: 187 ever-married Hindu, Muslim and Christian women

Base category: Christians

Regressor	Coefficient		T ratio [Prob.]	Marginal effect[a]
Constant (CONST)	-2.8762	**	-2.2666 [.025]	-
Woman's education				
Number of years of education (EDCN)	0.5697	***	2.6584 [.009]	0.1367
Number of years of education for Muslims (MEDCN)	-0.5281	**	-2.3006[.023]	0.0099
Number of years of education for Hindus (HEDCN)	-0.4500	**	-2.0259[.044]	0.0287
Husband's education				
Husband's years of education (EDCNSP)	0.3460		1.2408[.216]	0.0829
Muslim husband's years of education (MEDCNSP)	-0.0986		-0.3572[.721]	0.0594
Hindu husband's years of education (HEDCNSP)	-0.2358		-0.8465[.398]	0.0264
Ease of access to a contraceptive method				
Ease of access to contraception (EASYCON)	0.0102		0.0038[.997]	†
Ease of access to contraception for Muslims (MEASY)	4.0397		1.3233[.187]	†
Ease of access to contraception for Hindus (HEASY)	2.8578		1.0536[.294]	†
Female extended family				
Female extended family resident (FEXFAM)	-0.4435	**	-2.2640[.025]	-0.1064
Muslim female extended family resident (MFEXFAM)	0.2428		0.7461[.457]	-0.0481
Hindu female extended family resident (HFEXFAM)	-		-	-
Woman's age				
Woman's age (AGE)	-0.0085		-0.3751[.708]	-0.0021
Muslim woman's age (MAGE)	-0.0679	*	-1.8768[.062]	-0.0183
Hindu woman's age (HAGE)	-		-	-

Notes:
[a] Marginal effect = coefficient* scale factor. This is evaluated at the sample mean of the regressor.
† Not reported because the explanatory variable is a dummy variable.
- Note that two Hindu interaction terms (HWOMAN and HFEXFAM) were excluded from the model because of their perfect correlation with other regressors. As the model could not be estimated by retaining them, it was necessary to exclude them.
*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level.

Model statistics

Scale factor for the calculation of marginal effects	0.23990
Maximised value of the log likelihood function	-90.8589
Mean of CTPRUSE	0.54011
Mean of fitted CTPRUSE	0.49733
Goodness of fit	0.75401
Pesaran-Timmermann test statistic	-2.8630 [0.004]
Pseudo R-Squared	0.29576

The first variable which emerged as significant is the number of years of education for the woman. The model indicates that education has a significant and positive impact on contraceptive use for women of all three religions in Ramanagaram. Calculated at the sample means, a one-year increase in total education increases the probability of contraceptive use by 0.01 for Muslims, by 0.14 for Christians and by 0.03 for Hindus.[85] However, as the present study is particularly concerned with Hindu-Muslim differentials, the interesting question is whether the effect of total education on the probability of contraceptive use differs between Hindus and Muslims. A Wald test accepted the restriction that the coefficient on EDCN+HEDCN equals the coefficient on EDCN+MEDCN, implying that the effect of total education on the probability of contraceptive use did not differ significantly between Hindus and Muslims. Analogous tests, however, established that the effect of women's education on contraceptive use did differ significantly between Christians and Hindus, and between Christians and Muslims, with a much larger marginal impact of education on contraceptive choice for the Christians than for women of the other two religions. The major religious difference in relation to this variable was therefore between Christians and all other groups. One possible explanation for why education is much more important for Christians than for Hindus or Muslims may be that education has increasing returns in contraceptive use and Christian women have more education, on average, than Hindu or Muslim women.

Total education of the husband was the next variable to emerge as significant. Although the t-ratios on the husband's education variables were not individually significant, this set of variables had to be retained in the model as a group, on the basis of the likelihood ratio test. One possible reason for the insignificant t-ratios for the individual husband's-education terms is multicollinearity among them. Retaining them in the model was supported by Wald tests

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[85] It may be recollected that when reporting the value of the logit coefficient for Muslim and Hindu interaction terms, this is equal to the stated coefficient for a particular attribute plus the value of the coefficient on the base category of that attribute. Thus, the coefficient for total education for Muslims is equal to the coefficient on MEDCN plus that on EDCN; the coefficient for Hindus is that on HEDCN

which rejected the hypotheses that the coefficient on EDCNSP+HEDCNSP was not significantly different from zero, and that the coefficient on EDCNSP+MEDCNSP was not significantly different from zero. However, a Wald test accepted the restriction that the coefficient on EDCNSP was not significantly different from zero, indicating that husband's education did affect contraceptive use for Hindus and for Muslims, although not for Christians. Calculated at the sample means, a one-year increase in husband's total education increases the probability of contraceptive use by 0.06 for Muslims and by 0.03 for Hindus. A Wald test accepted the restriction that the coefficient on EDCNSP+HEDCNSP equalled the coefficient on EDCNSP+MEDCNSP, implying that husband's education does not have a different effect on contraceptive use for Muslims than for Hindus. Analogous tests established that the effect of years of husband's education on contraceptive use was not significantly different between Christians and Hindus, or between Christians and Muslims.

The next variable which emerged as significant was the presence of female extended family members resident in the household, which significantly decreased the probability of using contraception among Hindu and Christian women, but had no effect for Muslims. For Hindu and Christian women, calculated at the sample mean, one additional female family member reduced the probability of contraceptive use by 0.11. However, this difference between Hindus, Christians and Muslims was not statistically significant as a Wald test accepted the restriction that the coefficient on FEXFAM equals the coefficient on FEXFAM+MFEXFAM, indicating that the presence of female extended family acts similarly on contraceptive use by Hindu, Christian and Muslim women.

The ease of access to a contraceptive method did not emerge as significant for any of the three religious groups. This is consistent with the qualitative finding that family planning services are widely available in Ramanagaram, as in the state of Karnataka in general.

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plus EDCN and so forth. It is this value of the coefficient which is multiplied by the scale factor to get

However, it was retained in the model because of the rejection of a likelihood ratio test that the coefficients on the ease of access to contraception variable and the interaction terms derived from it were all equal to zero. The importance of this set of variables is also borne out by Wald tests which rejected the hypothesis that the coefficients on EASYCON+MEASY and EASYCON+HEASY were not significantly different from zero. However, a Wald test that the coefficient on EASYCON was not significantly different from zero was accepted. Therefore, this variable and the interaction terms associated with it were retained in the model. The individual coefficients are not significant, probably because of multicollinearity between all of these variables. A Wald test accepted the hypothesis that the coefficient on EASYCON+MEASY equals the coefficient on EASYCON+HEASY, indicating that the effect of ease of access to a contraceptive method did not differ significantly between Hindus and Muslims. Analogous tests established that the effect of ease of access to a contraceptive method on contraceptive use did not significantly differ between Christians and Hindus, and between Christians and Muslims.

Finally, a woman's age was found to affect contraceptive use significantly though with very different effects across religions. Calculated at the sample means of all other variables, if a woman was Muslim, her being one year older decreased the probability of her using contraception by 0.02. The fact that younger Muslim women are more likely to use contraception may be testimony to the influence of the family planning programme in changing norms in Ramanagaram. A Wald test showed that the coefficient on AGE+MAGE was not significantly different from the coefficient on AGE, indicating that the effect of a woman's age on contraceptive choice did not differ significantly among religious groups. The interaction term for Hindus (HAGE) is perfectly collinear with other interaction terms and hence is excluded from the estimation. The variable (AGE) which is included therefore compares Muslims with the Hindus and the Christians combined.

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the value of the marginal effect for interaction terms.

Finally, it must be noted that the religion dummies for Hindus and for Muslims were deleted from the model on the basis of a likelihood ratio test. This finding is very interesting from the point of view of the present study because it is in contrast with the preliminary models in which the Muslim and Hindu religion dummies were significant. In the preliminary models, the Muslim and Hindu dummies had a negative effect on contraceptive use, although the effect did not differ significantly between Hindus and Muslims. The findings from the interaction model suggests that although the Hindu and Muslim religion have an effect on contraceptive use in Ramanagaram, it is expressed primarily through differences in how socio-economic 'characteristics' of the individual members of different religions affect their contraceptive use. Moreover, as we saw in Chapter 1, there is debate about the influence of Islamic prescriptions on the acceptibility of using contraception by Muslim women and some ambiguity about the influence of Hinduism on contraception. However, in this model, Hinduism is not having an effect on contraceptive use which is significantly different from the effect of Islam. The findings from both the preliminary and the interaction models suggest that rather than theological doctrines, it may be the manner in which religion is being interpreted to women by the community which is influencing their contraceptive use, via the decisions they make about other aspects of their lives such as their education. This finding is also consistent with the qualitative evidence presented earlier in this chapter which suggested that community interpretations of religion may be more important than religious observance in explaining contraceptive use. This is also reflected in one of the preliminary models estimated, model 10, which replaced the Hindu and Muslim dummies by an index of piety, to measure the effect of religious observance and practice on the decision to use contraception. Model 10 showed that the index of piety did not affect the probability of contraceptive use. This finding is interesting because it indicates that it is not the strength of religious practice which influenced the decision to use contraception, but rather perhaps the manner in which religion is interpreted to women by their communities.

The logit coefficients and analysis of the marginal effects suggest that similar combinations of factors account for patterns of contraceptive use among the three religious groups. Among Hindus, the factors positively affecting the probability of using contraception are the education of the woman, her husband's education, and ease of access to a contraceptive method, while the factors affecting it negatively are the number of female family members resident. The woman's age is unimportant. For Muslims, the factors positively affecting the probability of using contraception are women's education, husband's education, and ease of access to a contraceptive method, while the factor negatively affecting the decision to use contraception is the woman's age. Female resident family members has no significant influence. Finally, for Christians, the factor affecting the probability of contraceptive use positively is the woman's education, while the factor affecting contraceptive use negatively is the number of female extended family members resident in the household. Those factors which had no impact were husband's education, the woman's age, and the ease of access to a contraceptive method.

If we consider comparisons across pairs of religions, the estimated regression lines for Hindus and for Christians differ in terms of intercept and in terms of slope mainly because of differences in the effect of women's education. Muslims and Christians also differ in terms of intercept and in terms of slope, again specifically in terms of the effect of woman's education. Hindus and Muslims did not differ in terms either of intercept or of slope, indicating that the factors which affect decisions about contraception in Ramanagaram do not vary significantly between Hindus and Muslims.

V. Conclusion

The extent of contraceptive adoption has concerned demographers and family planning policy in developing countries since the mid-1950s. As we saw in section I, the importance of family planning programmes in bringing about fertility declines has been the subject of much debate. As yet, there appears to be little consensus about either the impact of contraception on fertility, or the determinants of contraceptive use. This chapter has sought to address the latter question for one region of southern India.

The analysis began by examining the findings concerning contraceptive use and practice in Ramanagaram, women's fertility preferences and 'unwanted' fertility. The main conclusions derived from this part of the analysis was that just over half of the sample had ever used a method of contraception, and that of the women who had used contraception, almost two-thirds had opted for a tubectomy. Inter-spousal communication about family planning was low, but women did discuss these issues with other female extended family members and friends. As nurses regularly visited the localities studied, access to at least one method of contraception was reported to be comparatively easy. Finally, when questioned about the impact of religion on contraception, though some women were hesitant to reveal their views, Muslim women thought that their religion did disapprove of contraception, and as many as one-quarter of them disagreed with this position. This proportion was much larger than that found among Hindus and Christians. This suggests that the absence of theological prohibitions in Islam on contraception is irrelevant, since these Muslim women think that there are such prohibitions.

The information collected about Ramanagaram women's fertility preferences showed the importance of distinguishing revealed preferences from stated ones. On average, ideal family size in Ramanagaram was 2.5 for all three religious groups, and the difference between ideal

family size and actual family size, which demographers conventionally use as the measure of 'unwanted' fertility, averaged 1 child for all women. Though just over half of the sample said that they preferred small families to large ones, larger actual family size was rationalised and justified on several counts, particularly insurance reasons. These reasons were also manifested in a pronounced preference for sons.

The final part of this chapter estimated a logit model of the determinants of contraceptive choice, comprising 11 preliminary logit regression models and then going on to a more elaborate model of contraceptive choice which used 27 explanatory variables measuring socio-economic and other differentials among women in the sample, coupled with interaction terms between the explanatory variables and the Hindus and Muslim religion dummies.

Let us begin by considering the factors which were found not to affect the probability of contraceptive use. The first of these was the income of the household. Three different measures of income - total expenditure, total food expenditure, and television ownership - were explored but none was found to be a significant determinant of contraceptive choice. This suggests that income does not affect the demand for children, perhaps because its effect is cancelled out by various substitution effects. Another possible reason is that because access to contraception is very good in Ramanagaram, women's purchasing power, as measured by income, has no impact on contraceptive use. The lack of significance of the television ownership variable is also important because it suggests that the 'media brainwashing' explanation of contraceptive adoption is not entirely substantiated.

Second, husband's occupation, distinguished as farming-related and domestic-industry-related, was not a significant predictor of the probability of contraceptive use. However, in the preliminary model estimated on Hindus only, if the husband's occupation was skilled, the probability of contraceptive use by his wife was higher. This may be because men in skilled

occupations are better educated, and hence amenable to lower-fertility norms. Another possible explanation is that Hindu women who had husbands in skilled occupations may have been less secluded than others and have had greater autonomy over decision-making about contraception.

One of the most interesting findings of the present study is that marriage to a relation appears not to affect a woman's decisions about contraception, a finding which is consistent across all three religious groups. As discussed earlier, consanguineous marriage is regarded in the literature as affecting contraceptive use through increasing the influence of the natal family on the woman. Interestingly, the finding that consanguinity exercises no effect on contraception seems in contrast with the other econometric findings such as the significant effect of the female-extended-family variable reported earlier. In combination, the findings from these variables suggests that while extended family (as measured through members resident) can exert an impact on demographic outcomes, the same may not be true of the influence of extended family, as measured through the influence of inbreeding, in south India.

For the Hindus, caste had no effect on contraceptive use. Neither of the two dummy variables, for high castes and scheduled castes, was a significant determinant of contraceptive use. This may be because the family planning movement in Ramanagaram has now covered all major caste groups in the region, leading to greater homogeneity in contraceptive adoption than in the age at marriage (as discussed in Chapter 4 above).

Different measures of women's occupation (distinguished as home-related, skilled and silk-related), exerted no effect in the interaction model, although woman's occupation distinguished as silk-related, had exerted an impact in the preliminary regression models. These findings casts doubt on the argument that as women are employed, this raises the

opportunity cost of their time and encourages them to use contraception in order to limit fertility. It may be that because access to contraception is so widespread and its benefits are so well-known in the region, whether or not a woman used contraception was not determined by her employment status. Or it may be that so many of the Ramanagaram women were employed, that there is not enough variation in these variables to account for differences in contraceptive use. Finally, it may be that because women's occupation is so closely related to women's education, it does not appear individually significant.

It has been hypothesised that if the husband is better educated, he will encourage his wife to adopt a contraceptive method because he is aware of the importance of contraception in order to limit and space births, because he is concerned about his wife's health, or because he wishes to attain a low fertility goal. In the preliminary models, husbands' education was a very significant determinant of the probability of contraceptive use, and it exerted its impact in the expected positive direction. The variable did not display significant t-ratios in the interaction model, but Wald tests established that it was important for Hindus and for Muslims. This indicates that even after controlling for women's education, husband's education influences the decision to use contraception. This finding is vital from the perspective of family planning policy because it indicates that men should be targeted, whether through the education system, through the health system, or through the media, if it is desired to influence contraceptive adoption by their wives. This finding is also consistent with the qualitative information from Ramanagaram which suggested that couples should be encouraged to communicate more about family planning, and that for couples who say that they communicate already, care must be taken to ensure that communication is not partial and limited, but substantial.[86]

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[86] One way of doing this is to ascertain men's and women's views about contraception, as argued by Biddlecom, Casterline and Perez, 1996.

The ease of access to contraceptives significantly affected contraceptive use in the preliminary models, but did not display significant t-ratios in the interaction model. However, Wald tests established that this factor was important for Hindus and for Muslims, although there was no significant difference in the effect of this factor between religious groups. This suggests that even though most women in the Ramanagaram sample did say they had easy access to contraception, access was still a major issue for the remainder.

Let us now turn our attention to those factors which exercised a consistently significant effect on the decision to use contraception. The first such factor was women's education. It is hypothesised that as women become better educated, they are likely to be better informed of contraceptive techniques, use information about contraception better, and discuss contraception with others. Moreover, the higher opportunity cost of their time makes them demand fewer children and use contraceptives to achieve their lower fertility goals. Education may also change women's values in a direction consistent with less rejection of family planning. The effect of education on contraceptive use was not significantly different between Hindus and Muslims, but was significantly higher for Christians, compared to the other two religions. One possible reason for this finding may be that education exercises a greater impact on the decision to use contraception for a population with a high average level of education, and then only after a certain level of education has been reached. Because Christians had a much higher average level of education (9.2 years) than Hindus or Muslims (5.5 years), it is possible that they were more susceptible to this sort of educational impact on contraception. Another possible reason for this effect is that the variation in Christian women's education was small: out of the 13 married Christian women interviewed, 10 had had at least some schooling.

The next factor which was significant for Hindus and Christians in the final interaction model was the presence of female family members in the household. Conventionally, demographers

have argued that the role of the female extended family, and especially the mother-in-law, was to encourage high fertility and discourage contraceptive use among young brides. Another reason is that the mother's extended family may look after her children at low real and opportunity-cost, thereby cutting the cost of having more children, which in turn discourages the use of contraception. This appeared to be borne out by the econometric finding that for Hindus and Christians only, if a woman had one additional female family member resident this reduced her probability of contraceptive use. However, it emerges from the qualitative evidence collected during my fieldwork that female extended family and other female associates may be performing a role with respect to contraception which is quite different to that postulated in much of the older literature on the subject (and which contradicts directly the econometric findings of the present study). For example, Naseem Khatoon, a Muslim mother of 7 children, age 45, from Ramanagaram town, remarked, 'We need to improve ourselves, have fewer children. I wish people had spoken to us when we were young, now there is so much difficulty .. the family planning people keep telling us the population is growing. We should have more responsibility.' It was similar among Hindu women: for example, one Hindu woman, aged 51, from Ramanagaram town, stated quite clearly that she encouraged all her daughters and daughters-in-law to 'have their children and stop with an operation.' Such remarks suggest that attitudes favouring low fertility (and the associated contraceptive practices) have gained widespread acceptance within parts of south Indian society in the 1990s. This factor may be an important contributing factor to the fall in fertility in south India in recent years, although one which is hard to measure except by micro-level fieldwork of the sort carried out in the present study.

However, it is must be acknowledged that the role of female extended family on the decision to use contraception is an issue on which the qualitative and quantitative findings from Ramanagaram are at odds with one another. There are two possible explanations for this. The first is that quantitatively, female extended family may be exercising a negative effect on the

decision to use contraception not because there is a direct causal link between these two factors, but because there is an indirect connection, i.e. some other underlying factor may be affecting both variables. For example, it may be that those who live with extended family are also those who come from more traditional and conservative homes in which the use of contraception is discouraged. The other possibility is that female extended family members are actually discouraging the use of family planning, but that women are not willing to admit it openly in a questionnaire survey. In any case, the contradiction between the econometric and qualitative findings do suggest that this whole relationship requires further research.

The last variable which was a significant determinant of contraceptive use was the woman's age. Muslim women were found to have a higher probability of ever having used contraception if they were younger. There are several possible explanations. One is the 'ideational change' argument, i.e. that younger women are more exposed to family planning messages than older ones. The woman's age may also be proxying for changing norms over time.

Finally, we consider religion. In the preliminary models (the ones which did not use interaction terms), Hindu religion and Muslim religion did emerge as a negative influence on contraceptive use; however, in the interaction model this effect disappeared.[87] This suggests that Hindus and Muslims do not have significantly different intercepts. It was discovered that the estimated regression lines for Hindus and Muslims also did not differ in terms of slope. However in the interaction model, the estimated regression lines differed in terms of intercept and in terms of slope between Hindus and Christians and between Muslims and Christians. Thus, it is probably the differences between Christians and the other two religious groups

[87] Note that the religion dummy which took the value 1 if the woman was Hindu in preliminary model 9, and which was estimated on the sample of Hindus and Muslims only (N = 173), was found to be insignificant as well.

which accounts for the initial significance of the Hindu and Muslim religion dummies in the preliminary regression models.

The qualitative evidence presented in this chapter suggests that the decision to use contraception may be influenced by the manner in which Islam and Hinduism is being interpreted for women by the local community in Ramanagaram. This was clearly evident to me when I interviewed the local mullah of Ramanagaram. By a happy coincidence, the wife of the mullah was admitted to have a baby in a private clinic the day I went to interview the lady doctor at the clinic. Seizing the opportunity, I informally interviewed the mullah. He stated that he strongly objected to women working outside the home, which he said was against the Shariat. He said that he strongly disapproved of Najma Heptullah, a woman parliamentarian and speaker of the Lok Sabha (the lower house of parliament) at the time, as a role model for Muslim women. More particularly, he stated that he did not encourage birth control, but rather believed that children were 'gifts of God'.

We have already observed that Muslim women in Ramanagaram believed that contraception was not encouraged by their religion, and that in fact over one-quarter of Muslim women disagreed with this position. For example, a Muslim woman, Azmatunissa, age 52, from Ramanagaram, who was educated to the Masters level, remarked, 'I had two births and then got myself operated. My husband encouraged me. We have a responsibility to restrict our fertility... In twelve years the population has increased a lot. I feel sick looking at the numbers. I follow the Koran, what is correct, but ... I am trying to propagate small family norms. But you see, men are selfish. They do not allow girls to study. Husbands do not like wives in control of their lives or their fertility.'

Quantitative and qualitative evidence from the present study also suggests that individual beliefs held by men and women about whether their religion prescribes or proscribes

contraceptive use (whether or not their religion actually does so) may be fundamental to demographic decisions. The effect of religion may also be exercised through the local religious community, particularly through religious leaders[88]. However, this is expressed not in terms of a 'pure theological effect' on the decision to use contraception, but in terms of decisions taken about socio-economic matters, such as whether to continue an education, by individual members of different religions. In addition, socio-economic factors appear to affect the contraceptive decision-making of Christians in Ramanagaram differently to other religious groups.

These findings have important policy implications. First, it may be necessary for population policy to target religious and community leaders. Second, without systematically controlling for socio-economic status and other factors it is impossible to make generalisations about contraceptive adoption by religion, as is often heard from religious leaders speaking about members of their own community who are said to have committed a 'travesty of faith' by practising family planning; or from more right-wing Indian politicians who make blanket statements about contraceptive acceptance and adoption by members of other religions. Thirdly, policy initiatives directed at altering patterns of contraceptive adoption may need to target some of India's different religious groups in different ways, since in Ramanagaram the socio-economic factors determining people's existing contraceptive use vary between Christians and other religions, although not between Hindus and Muslims. The present study emphasises the importance of holding socio-economic factors constant when attempting to evaluate the impact of religious faith on demographic outcomes, and the importance of recognising the influence of the community in enforcing popular and preconceived notions about religious injunctions on birth control. In fact, it is the neglect of such a procedure which causes serious misrepresentations of demographic phenomena in developing countries

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[88] This is similar to the conclusion of Amin, Diamond and Steele, 1996.

such as India, and which is the more fundamental travesty which this chapter has attempted to overcome.

CHAPTER 6

The Determinants of Fertility in Ramanagaram

This chapter will analyse the socio-economic and demographic determinants of fertility among the 201 women of the Ramanagaram sample. The chapter begins with a review of the relevant literature on the determinants of fertility. It then undertakes an econometric analysis of the factors influencing variations in fertility among the women interviewed in the Ramanagaram survey. It concludes with a consideration of the implications of these findings for theoretical models of fertility in religiously differentiated societies.

The discussion that follows categorises the factors influencing fertility into what are conventionally termed the 'proximate determinants' and the 'nonproximate determinants' or 'nonproximate developmental factors' in fertility change.[1] In the two preceding chapters, we analysed the factors influencing two important proximate determinants of fertility in the Ramanagaram sample: nuptiality and contraceptive use. This chapter focuses on the influence of the nonproximate determinants.

I. Proximate determinants and nonproximate developmental influences

A. Proximate determinants

The proximate determinants of fertility are those intermediate variables through which change in fertility is effected.[2] Following Bongaarts and Srinivasan, the proximate determinants of fertility can be grouped into four main categories: natural fertility, nuptiality, contraceptive use, and abortion. The relationships between actual fertility, the chief

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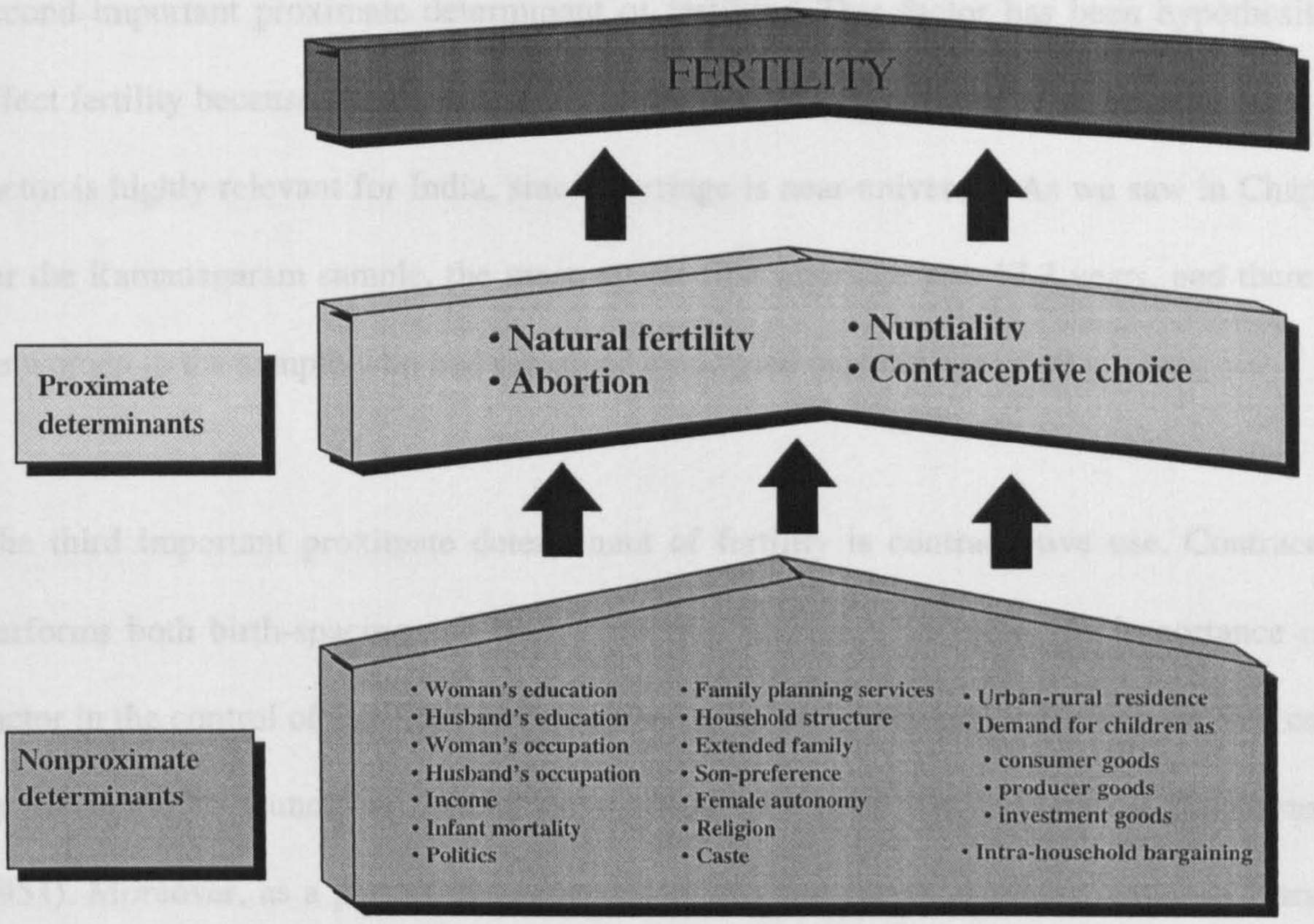
[1] The term 'nonproximate determinant' is used by Bongaarts, while, in the context of India, both terms are used interchangeably by Srinivasan. See Bongaarts, 1978: 105-132; Srinivasan, 1995: 577-586.

proximate determinants of fertility, and some of the main nonproximate determinants, are schematically represented in the diagram below.

Proximate and nonproximate determinants of fertility change



Natural fertility is defined as the total fertility of a couple which has not practised any method of deliberate control either to increase birth-spacing or to curtail total family size. Natural fertility has a number of components: sterility, menarche, intrauterine mortality, breastfeeding, postpartum abstinence, and so on. Historically in India, according to Srinivasan, natural fertility has been low, averaging 6 births per woman, mainly because it was kept in check by social, religious and cultural practices (such as the prohibition of widow remarriage and prolonged breast-feeding) and a high incidence of febrile diseases which diminished biological fecundity.[3] However, with improvements in health care and life

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[2] Bongaarts, 1978: 105-132; Srinivasan, 1995: 577-586.
[3] Srinivasan, 1995: 581.

expectancy in the 1960s and 1970s, natural fertility in India increased from 6 in the 1930s to 7 in the 1970s and 9 in the 1980s.[4]

Nuptiality, reflected in the proportions married and the female age at first marriage, is the second important proximate determinant of fertility.[5] This factor has been hypothesised to affect fertility because a later marriage age for women is associated with lower fertility. This factor is highly relevant for India, since marriage is near-universal. As we saw in Chapter 4, for the Ramanagaram sample, the mean age at first marriage was 17.3 years, and there were no women in the sample who had remained unmarried past the age of 49.

The third important proximate determinant of fertility is contraceptive use. Contraception performs both birth-spacing and birth-limitation functions. In India, the importance of this factor in the control of fertility was recognised at an early date and India was the first country in the world to launch an official government-sponsored family planning programme (in 1951). Moreover, as a part of this programme, the first family planning centre in Karnataka was set up in Ramanagaram in 1952.

Induced abortion, the willingness and ability of women to terminate unwanted births, is the final proximate determinant of fertility. It may be influenced by socio-economic factors such as income, by technological factors such as the availability of safe abortion methods, by religious and cultural factors such as attitudes toward the moral acceptability of abortion, and by practical and legal factors such as the laws regarding termination of pregnancies.

In previous chapters we have already looked at nuptiality and contraceptive use in detail. We have not considered natural fertility or induced abortion primarily because of paucity of data on these two factors, and because we are keen to compare the causes of fertility change in

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[4] Srinivasan and Jejeebhoy, 1981: 103.

Ramanagaram and in Karnataka for only those proximate determinants which have been used to account for changes in fertility by other studies conducted in previous decades in this region, such as the Mysore Population Study and the National Family Health Survey, which also mainly concentrated on nuptiality and contraceptive choice as the key demographic variables affecting fertility outcomes.

B. Nonproximate 'developmental' determinants

Nonproximate determinants affect fertility through their impact on the proximate variables.[6]

1. Infant and child mortality

A first important nonproximate developmental factor is infant and child mortality. According to the theory of 'demographic transition' the pace and timing of mortality decline (particularly for infants) determines the timing of fertility decline, even in the absence of modern contraception. There are two main hypotheses concerning the effects on fertility of higher infant mortality. First is the 'child survival hypothesis' which argues that if parents live in an area of high child mortality, they will have more children because they expect to lose a high percentage of offspring to death.[7] Second is the 'child replacement hypothesis', which assumes that if a child dies, parents are anxious to replace it as soon as possible.[8] Lower mortality both reduces the number of births necessary to achieve desired reproductive

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[5] Wrigley and Schofield, 1981; Goldstone, 1986: 5-33.

[6] An illustration of the way in which the nonproximate determinants affect fertility via the proximate determinants can be found in studies of historical demography. Wrigley and Schofield argue that fertility trends in England from 1541-1816 followed real wage trends with a lag of forty years, so that the increase in fertility in England after 1750 occurred when nuptiality responded with a lag to the rise in real wages in the early eighteenth century. Goldstone argues that in England before 1700 changes in real wages determined fertility by affecting the proportions marrying, though in later cohorts, fertility was determined by a sustained fall in the age at marriage. For more on this debate, see Wrigley and Schofield,1981; Goldstone, 1986: 5-33.

[7] Birdsall and Griffin, 1988: 29-55. For evidence from other countries, see Olsen, 1987; Ketkar, 1979: 479-488; Duraisamy 1988: 293-316.

[8] Scrimshaw, 1978: 383-403.

outcomes, and reduces the costs to parents of investing in children, by reducing the risk that such investments will be lost through child deaths. This is an especially important consideration in the context of the 'quantity-quality' model of fertility of Becker and Lewis, and Schultz.[9] This variable is not included in the econometric models presented later in this chapter because it did not vary significantly among the women covered in the Ramanagaram sample, and because in any case it would be impossible to assign an infant mortality rate to each woman in the sample.

2. Education

Education is another important nonproximate influence on fertility. A wide array of empirical studies have shown that greater education, especially secondary education for women, contributes significantly to declines in fertility, even after controlling for other variables.[10] There are a number of avenues through which female education is hypothesised to influence fertility. First, attending school or university may itself delay marriage. Second, it may mean women have better knowledge of contraception and greater efficiency in using it. Third, educated women are hypothesised to have healthier babies and lower child mortality, which in turn lowers their fertility.[11] Fourth, educated women are hypothesised to be more likely to work in jobs in the modern sector which are incompatible with looking after children, thereby increasing the time costs of having children.[12] Fifth, as Mason argues, education is also likely

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[9] Becker and Lewis, 1973b: S279-288; Schultz, 1990: 599-634.

[10] See Cochrane, 1979; Cochrane, 1983: 992- 1026; Dasgupta, 1995a: 1879-1902; see also Caldwell, 1980: 225-255; Caldwell, Reddy and Caldwell, 1985: 29-51; Nag and Kak, 1984: 661-678; Appleton, 1996: 139-166; Duraisamy, 1988: 293-316; Shapiro, 1996: 89-103; Ajayi and Kekovole, 1998: 113 - 156. Birdsall and Griffin postulate that women with very few years of primary schooling have slightly higher fertility than those with no education, but that as the number of years of education increases beyond primary levels, the number of children declines. See Birdsall and Griffin, 1988: 29-55.

[11] According to Singh, Casterline and Cleland, educated women achieve desired family size better as they are more successful in preventing excess births by using contraception. The World Fertility Survey also found that while desired family size may not vary by educational level, actual family size does. See Singh, Casterline and Cleland, 1985: 113-135.

[12] Female employment itself does not necessarily reduce fertility. Only those women who perform jobs which are incompatible with child rearing are likely to show reduced fertility. See Standing, 1983: 517-546.

to have a favourable effect on a woman's status in the household and her influence on all household decisions, including additional childbearing; insofar as wives desire fewer children than husbands, this may tend to reduce fertility. Sixth, education also influences the ability of mothers to produce higher 'quality' children, who are more expensive to raise, which increases the unit costs of higher child 'quantity' (or higher fertility).[13]

The interaction between child quality and child quantity can be expressed using the analysis put forward by Becker.[14] The model assumes that the shadow price of child quantity depends on child quality and the shadow price of child quality depends on child quantity. Thus, an increase in child quality not only raises the amount spent on each child but also raises the cost of each child. Similarly, an increase in child quantity raises the cost of adding to child quality because a greater number of children are now affected. An exogenous increase in the number of children raises the shadow price of child quality and reduces the demand for quality. The reduction in quality in turn lowers that shadow price of child-quantity (which depends on child quality), and this continues until an equilibrium is reached. Commodities such as children which do not have close substitutes have modest price elasticities and the demand for them does not, in general, change by large amounts as prices change. Declines in fertility can then be explained by the quantity-quality model as this implies that the demand for children will be highly responsive to price and income, even where children have no close substitutes. In order to arrive at the demand for children, if a fixed cost of each child which includes all expenditures on children independent of child quality is now taken into account, the ratio of the shadow prices of quantity and quality depends on the ratio of quality to quantity, on the ratio of fixed to variable costs, and on the ratio of marginal to average variable costs of quality. The interaction between quantity and quality is such that an increase

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[13] For example, the Mysore Population Study noted that ever-married women in Bangalore city, aged more than 45 years with high school or university education, gave birth, on average, to 4.0 children, compared with 5.3 children for women with no education, and 5.5 children for women with primary education. See the Mysore Population Study, 1961:122.

[14] Becker, 1981: 93-113.

in quality and a decrease in quantity encourages greater substitution away from child quantity and towards child quality. The decrease in quantity and the increase in quality would be great even if the increase in the fixed cost of quantity was small and the elasticity of substitution between quantity and quality not large. Education of the woman then leads to falling fertility because higher mother's education causes initial increases in the relative price of quantity (lowering the price of child quality) due to the high marginal rates of return on education. This in turn increases the demand for child quality by more than for other goods, even if both quality and other goods are equally good substitutes for quantity. As educated women now have lower demand for child quantity, the interaction with child quality implies that they invest more in education and other training of their children.

Female education was included in the econometric models of fertility below, in two alternative measures: first, in terms of the total number of years of education; and second, the number of years of primary, secondary and university education separately.

The education of the woman's husband has also been postulated as an important determinant of fertility. An increased level of husband's education increases the opportunity cost of women's time. It may also contribute to the desire for fewer, but better 'quality' children because higher education for the man raises the relative price of child quantity (and lowers the price of a unit of child quality) which increases the demand for child quality relative to the demand for other goods. A higher level of education for the husband may also lead him to prefer a wife who is more highly educated or has a skilled job, factors which themselves may contribute to lower fertility. In this study, husband's education was measured in two ways: in terms of husband's total number of years of education, and in terms of the number of years of husband's primary education, of secondary education and of husband's university education.

3. Employment

Female labour force participation is another important nonproximate influence on fertility and is closely related to education. Women who work have fewer children because the opportunity cost of children for them is higher.[15] Higher women's wages have the same effect on the time cost of children whether or not women work. However, female employment is neither a necessary nor a sufficient condition for fertility reduction. This is because women's employment depresses fertility only if women work in jobs which are incompatible with child-rearing (for example in cities, or in the modern sector).[16] In rural areas, female employment does not necessarily depress fertility because it is often compatible with child-rearing.[17] In such a context, working mothers may have more children than non-working ones, because higher incomes enable women to provide for more children. This issue is particularly relevant to Ramanagaram, where so many women were employed in the silk industry, essentially still a cottage industry.

Other important findings pertaining to female employment and fertility are that if the woman has a skilled occupation, she is likely to have lower fertility because of the higher opportunity costs of childbearing and child-rearing; that labour market discrimination against women raises fertility; and that women from poor households, who tend both to work and to suffer from malnutrition, are more likely to experience secondary sterility, which will contribute to a negative relationship between fertility and women's work.[18] It is also argued that in order

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[15] Birdsall and Griffin, 1988: 29-55.
[16] Standing, 1983: 517-546.
[17] In a very early article on female employment in cottage industry and fertility, Jaffe and Azumi argued that female employment in cottage industries may have actually increased fertility in Puerto Rico and Japan in the 1950s. They argued that women employed in agriculture had the highest fertility, while those employed in non-agricultural industry which was carried on very near the woman's home, enabling women to combine work and childrearing, resulted in considerably higher fertility than if the woman worked away from the home. See Jaffe and Azumi, 1960: 52-63.
[18] Standing, 1983: 517-546.

to depress fertility, it is necessary to raise both the productivity of women inside the home and their earnings in the market outside.[19] This is important because it improves women's bargaining position within the household by widening their exit options, whether or not women actually take up work outside the home.[20]

In this study, employment for women was measured in three different ways. The first was through a dummy variable which took the value of 1 if the woman said she had a primary occupation and 0 otherwise. The second was through a dummy variable which took the value 1 if the woman was employed in a silk-related occupation, and 0 otherwise. The latter was tested for two reasons: first, because in Ramanagaram taluk the silk industry is the main source of livelihood for a large part of the population; and second, because some stages in the silk process are dominated by women workers and child labour. There is a large literature on proto-industry (market-oriented rural domestic industry) which postulates that it creates incentives for higher fertility.[21] Therefore, it seemed important to analyse if employment in this industry was related to fertility behaviour in the taluk. Finally, a third dummy variable was defined which took a value of 1 if the woman was employed in a skilled occupation (such as a teacher) and 0 otherwise.

The occupation of the woman's husband is also postulated as an important predictor of women's fertility, though the manner in which it is supposed to affect fertility is complex. It is theorised that if the husband is employed in a skilled occupation, his wife is likely to have fewer children. This is because a man will tend to prefer a wife who is also employed in a skilled occupation, who is better-educated, or who is older at the time of marriage. Alternatively, it has been postulated that at higher wage rates men can afford to marry earlier

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[19] Duraisamy's analysis supports this conclusion. He argues that in his sample of 525 rural households in Tamil Nadu, an increase in wages would draw women into the labour force. See Duraisamy, 1988: 293-316.
[20] Dasgupta, 1995a: 1879-1902.
[21] Kriedte, Medick and Schlumbohm, 1981: 58-9.

and raise more children, hence increasing their fertility. It has also been postulated that if the husband's primary occupation is farming, there may be greater need for children to work on the family farm, increasing the demand for children. There may also be a higher demand for children if men are employed in domestic industry, for the same reasons as adduced for the employment of women in domestic industry.

In order to test these competing theories, three variables relating to husband's primary occupation were created. First, a dummy variable was created which took the value 1 if the husband had a farming occupation and 0 otherwise; the expected sign of the coefficient on this variable is positive. Second, a dummy variable was created which took the value 1 if the husband had a skilled occupation and 0 otherwise; the expected sign of the coefficient on this variable is negative. Thirdly, a variable was created which took the value 1 if the husband was employed in domestic industry and 0 otherwise; the expected sign of the coefficient on this variable, is positive.

4. Income

Income is a further nonproximate influence on fertility. The pure 'income effect' raises the demand for all normal goods, including children. This is thought to be the reason for the observation that at very low levels of income as incomes rise, fertility rises. As income keeps rising, fertility is subsequently observed to fall because at higher incomes various substitution effects come into play, reducing the demand for children by increasing the price of children relative to other goods, and thus parents substitute away from them. These substitution effects operate in a number of ways: by increases in the opportunity cost of parent's time, by the 'quantity-quality' trade-off, and by increased access to substitutes for various 'child services' such as insurance and welfare. Thus, the effect of income on fertility is first to

increase fertility due to the operation of a pure income effect, and then to depress fertility due to substitution effects.

Consequently, in empirical analyses of income and fertility, one seldom observes the pure income effect, mainly because the substitution effects soon cancel it out.[22] Consistent with the theoretical and empirical literature discussed in Chapter 3, five different measures of income were calculated for the Ramanagaram sample: total monthly expenditure, per capita monthly expenditure, total monthly foodgrains expenditure, per capita monthly foodgrains expenditure, and an index which measured the ownership of items of consumer equipment. The regression models estimated in this chapter use total monthly expenditure, total monthly food expenditure and the index of consumer equipment ownership as measures of income. Per capita expenditure and per capita foodgrains expenditure are not used because they are calculated by taking total family size into account and are therefore endogenous in a model of fertility. However, in order to control for the fact that some households' total expenditure (or total food expenditure) may be higher than that of other households not because they are richer, but because there are more members living in the household, we also use (as discussed below) the total number of female extended family members (or total number of extended family), both of which are highly correlated with total household size, as an additional explanatory variable in the models, in order to control for family size.[23]

5. Women's status and female autonomy

Another important nonproximate influence on fertility is women's status and female autonomy. Dyson and Moore define female autonomy as 'the capacity to manipulate one's personal environment'.[24] Various studies have postulated that an increase in women's

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[22] Schultz, 1982: 137-150; Duraisamy, 1988: 293-316.
[23] The correlation coefficient is 0.87.
[24] Dyson and Moore, 1983: 45.

autonomy, independence, or control of resources leads to a fall in fertility.[25] Women's status is believed to influence fertility in two ways. First, it can increase child survival due to a mother's increased ability to provide better nutrition and medical care, and it will tend to increase the value of daughters in a society, which may consequently increase nutritional and health investments in them. Mason argues that women are more motivated than men to ensure that their children survive and will therefore attempt to achieve better child survival rates when they have greater autonomy and the resources to do so. Others have also argued that mortality and women's status are linked.[26]

The second, and more direct set of ways in which women's status is thought to affect fertility is that it tends to increase the age at first marriage, to strike at the roots of a patriarchal family structure, to reduce son-preference, to push families toward being more 'conjugally-oriented'[27], to encourage women's access to contraception, and to diminish the extent to which women have to resort to high fertility in order to gain power and prestige within the family or the wider community.[28] Mason claims that there is more evidence in support of the view that greater female autonomy lowers fertility by lowering mortality rather than in the direct ways just mentioned.[29] Finally, Dyson and Moore argue that across India, it is possible to observe a broad north-south dichotomy with areas of low female autonomy (and high birth and death rates) prevalent in north India, and comparatively high female autonomy (and low birth and death rates) prevalent in south India.[30] There is also evidence which Kennedy and

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[25] Mason, 1993: 19-42; Dharmalingam and Philip Morgan, 1996: 187-201; Drèze and Sen, 1995); Malhotra, Vanneman and Kishor, 1995: 281-305; Steele, Amin and Naved, 1998.
[26] Standing, 1983: 517-546; Dyson and Moore, 1983: 35-60.
[27] 'Conjugally-oriented' families are those families in which husbands and wives are thought to have greater communication with each other, and jointly exercise household decision-making, in particular, reproductive decision-making. These families contrast with those in which the extended family, in-laws and other relatives exercise a greater role in making household decisions, with husband-wife communication playing a smaller role.
[28] Standing, 1983: 517- 546; Cochrane, 1983; Cain, 1984; Dyson and Moore, 1983: 35-60; Mason and Taj, 1987: 611-638.
[29] Mason, 1993: 19-42; Cain, Khanam and Nahar, 1979: 432; Srinivas, 1989: 129; Oppong, 1983: 556-557; Dasgupta, 1995a: 1888; Rosenzweig and Schultz, 1982: 803-815; Cain, 1984.
[30] This is similar to Sopher's hypothesis of differences in culture between north and south India. See Sopher, 1980: 289-327. Dyson and Moore's contrasting demographic regimes mirror the alleged

Haddad provide from a study of Ghana and Kenya conducted in 1994, and which Kennedy and Peters provide from a study of Kenya and Malawi conducted in 1992, that extra income or expenditure improves child nutrition more if it goes to women rather than to men.[31] This variable was not included separately in the econometric models for two reasons: first, because it is highly correlated with women's education, occupation and other explanatory variables, and could also well be the result of education; and second, because it did not vary sufficiently across Hindus and Muslims in the Ramanagaram sample.

6. Children as consumer, producer and investment goods

It is hypothesised that poor households have high fertility because children simultaneously function as consumer goods, producer goods and investment goods. Children are desired for the utility they provide to parents; for their contributions of labour income and time spent performing household tasks (especially fuel and water collection); and for the insurance they provide in societies where risk is high and established systems of social security are lacking.

There is considerable evidence in support of the producer goods motive for high fertility. Dasgupta argues that in poor households, even when parents are young, children are required to take care of younger siblings and of animals on the family farm, and to collect water and firewood.[32] Cain finds that in Char Gopalpur in Bangladesh, children of all classes enter the labour force at an early age. Male children are net producers as early as age 12; and they compensate for their cumulative consumption by age 15.[33] Duraisamy contends that in poor households in Tamil Nadu, the wage contributions of children encouraged parents to have

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cultural differences between the northern, mainly 'Aryan' culture and the southern, predominantly 'Dravidian' culture. For more on some of these factors and the contrasts between north India and south India, see Agarwal, 1994; Malhotra, Vanneman and Kishor, 1995: 281-305; Murthi, Guio and Drèze, 1995: 745-782; Jeffery and Jeffery, 1997.

[31] Kenendy and Haddad, 1994; Kennedy and Peters, 1992.

[32] Dasgupta, 1993a: 358-361; Dasgupta, 1995a: 1879-1902.

[33] Cain, 1977: 201-227.

more children and discouraged investment in their schooling.[34] Mamdani argued forcefully that children in Manupur in Punjab were making productive contributions to the household at early ages, and that this was most evident in the poorest households.[35] However, some studies disagree.[36] Based on a sample village in Maharashtra, Vlassoff reported that the average work day for boys was 2.6 hours, with younger boys working only 1.7 hours. At age 18, contributions in the busiest season were only 4 hours. Unlike Mamdani, Vlassoff found that the poorest households had more idle labour as well.[37]

There is also some empirical evidence for the old-age security motive for high fertility. May and Heer estimated that in the 1960s an Indian couple needed to have 6.3 children in order to be 95% certain that they would have a surviving son when the father reached the age of 65.[38] At the time, this figure was very close to India's average total fertility rate. However, for the insurance motive, the evidence is also mixed. Vlassoff and Vlassoff concluded from a sample village in Maharashtra that most men worked until death, and tended to link security in old age with adequate economic resources such as land rather than with children (even specifically sons).[39] Nag and Kak concluded the same from a re-survey of Mamdani's village of Manupur in the early 1980s.[40] Thus, though the three motives for childbearing seem convincing explanations of high fertility in poor societies, the empirical evidence appears to be mixed, and to depend greatly on the context and the specific population being analysed, the country in question, and the time period in which the analysis was conducted.

Related to the producer good motive, it has been postulated that the lack of water and fuel infrastructure in poor countries may create a cycle of overpopulation, poverty and

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[34] Duraisamy, 1988: 293-316.
[35] Mamdani, 1972.
[36] For a reappraisal of the evidence from Punjab, see Das Gupta, 1994: 101-133.
[37] Vlassoff, 1979: 415-428.
[38] May and Heer, 1968: 199-210.
[39] Vlassoff and Vlassoff, 1980: 487-499. However, there is little support for this hypothesis among the women of Ramanagaram because they did express their concern about sources of support in old age.

environmental degradation.[41] In poor countries, lack of infrastructure means households must undertake water and fuel collection tasks by hand.[42] This results in high fertility because children typically carry out these tasks. This can eventually give rise to a 'tragedy of the commons', where common resources are continually depleted due to the externalities that collectively arise from high fertility and increasing population density, which in turn, deplete common resources further.[43] In sum, when the social costs of the externalities to child rearing outweigh the private benefits of children, this may result in a situation where poverty and depletion of environmental resources is a natural consequence. Because this hypothesis has not yet been explored in detail empirically on the micro-level, the present study has sought to do so, by investigating in detail how water and fuel were obtained by Ramanagaram households, which household members collected it, and finally (in the econometric analysis of the determinants of fertility) whether these infrastructure variables influenced fertility significantly.

a. Water infrastructure

There were five main sources of water supply in Ramanagaram: daily filling-up of pots of water from the river or from hand-pumps provided by the municipality; borewells; motor pumps; taps/pipes in the home supplied by the municipality; and ordinary wells. The women's responses to the question 'What is your main source of water supply?' are shown in Table 1.

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[40] Nag and Kak, 1984: 661-678.
[41] Dasgupta, 1993a: 358-361.
[42] Dasgupta, 1993a: 359.
[43] Lee and Miller, 1991: 275-297. Dasgupta argues that the breakdown of agreements on common property resources may set off this spiral in poor countries. See Dasgupta, 1995b; Dasgupta, 1993b: 207-243.

Table 1: Sources of water supply, Ramanagaram sample (1996)

Source of water	All women		Hindu		Muslim		Christian	
	No.	%	No.	%	No.	%	No.	%
Pots of water collected	166	82.3	90	81.1	63	84.0	13	86.7
Tap	13	6.5	6	5.4	6	8.0	1	6.7
Pipe	8	4.0	5	4.5	2	2.7	1	6.7
Borewell	5	2.5	5	4.5	0	0.0	0	0
Ordinary well	3	1.5	1	0.9	2	2.7	0	0
Motor pump	1	0.5	1	0.9	0	0.0	0	0
Missing/don't know	5	2.5	3	2.7	2	2.7	0	0
Total	201	100	111	100	75	100	15	100

In the sample as a whole, 82% said that they collected pots of water by hand as their primary source of water supply, and this percentage was quite similar across religious groups.

The women were then asked 'How many pots of water are required per day to meet the family's water requirements?'. The average number of pots of water required per day in Ramanagaram was 26.3: the Muslims required 27.7, the Christians 26.9 and the Hindus 25.2. It may be recollected that the mean household size in the sample was 5.7 for Hindus, 6.6 for Muslims and 4.3 for Christians. Thus, the Muslims, who had the largest households, also had the highest water requirements. The mean per capita water requirements by religion were almost identical between Hindus and Muslims (4.5 - 4.6 pots per person) but 6.2 among the Christians. One reason why the Christians had the highest per capita water requirements may be that they were the most likely of all three religious communities to have water taps in their homes or employ others to collect water for them (as discussed below).

Table 2 shows the responses to the question 'Who collects water?'.

Table 2: Water collection in the household, Ramanagaram sample (1996)

Water collection performed by	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Woman	134	66.7	84	75.7	43	57.3	7	46.7
Husband	22	11.0	9	8.1	11	14.7	2	13.3
Daughter(s)†	40	19.9	20	18.0	18	24.0	2	13.3
Son(s)†	11	5.5	7	6.3	3	4.0	0	0.0
Children*	35	17.4	22	11.0	11	14.7	2	13.3
Daughter(s)-in-law†	9	4.5	6	5.4	3	4.0	0	0.0
Others**	25	12.4	13	11.7	9	12.0	3	20.0
Total number of women***	201		111		75		15	

† Very often, more than one daughter, son or daughter-in-law assisted with water collection, though the detailed breakdown is not reported here.
*In their responses, some women did not distinguish between sons and daughters and preferred to indicate that 'children' in the household helped with water-collection.
**This includes siblings, brothers-in-law, hired coolies and servants, parents-in-law, joint family members (where the woman did not provide a detailed breakdown), sisters-in-law, co-sisters, girl neighbour, mother, sons-in-law, and in three cases an unnamed person.
***The women mentioned more than one person who collected water, and hence the column totals do not add up to 100%.

Women and children (especially daughters) are the main water-carriers in Ramanagaram taluk: 67% of all women collected water on a daily basis for their own homes, and 47% of all households used one or more children to collect water. In only 10% of households were men alone performing water-carrying duties, though a few men did come under the 'others' category.

Looking at the religious breakdown, 76% of Hindu women, 57% of Muslim women and 47% of Christian women collected water for their own homes. Moreover, 50% of Hindu households and 47% of Muslim households used children for water collection, compared with only 26% of Christian households. This is relevant to a discussion of fertility because it appears that those religious communities (mainly Hindus and Muslims) which had greater fertility, were also those in which children were more widely used for water-collection, although naturally we cannot know whether these are causally related. For those children who went to school, water collection was done either in the early morning, before school hours, or in the late afternoon or evenings after school. This made the problem of irregular water supply (which was discussed in Chapter 2) even worse because it meant that in order to

catch the water supply when it was on, there was an incentive to keep at least one child home from school.

Even so, women told me during my fieldwork that as the daughters of the household were increasingly being sent to school, the water-collection tasks often fell on their mothers. One woman, Devamma from village C, remarked that while she realised the importance of educating her daughters, yet she was suffering greater tiredness and ill-health, mainly because she did not have enough help with the water- and fuel-collection tasks. Another problem, she complained, was that the younger generation (especially sons) wished to bathe every day, as opposed to once in three days like their parents. However, they refused to collect the extra water required, putting an extra burden on their mothers and sisters. Although more girls were being sent to school, this process would perhaps have proceeded further and faster by this time if it was not for the water burden that it implied.

Women were also asked, 'How many hours per person per day are required for water collection?'. In the sample as a whole, the mean was 2.2 hours per person per day, 2.3 for the Hindus, 2.2 for the Muslims, and 1.5 for the Christians. The differences between the three religious groups was found not to be statistically significant at the 95% confidence level. The closeness of the figures for all three religious groups suggests that the women's answers were accurate and that they were acutely aware of the time spent per day collecting water to meet the household's needs. Hence it is certainly possible that labour needed for water collection entered into their fertility calculations.

b. Fuel infrastructure

The Ramanagaram women were also asked about their sources of fuel, and their answers are shown in Table 3.

Table 3: Source of fuel, Ramanagaram sample (1996)

Source of fuel	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Firewood	149	74.1	90	81.1	49	65.3	10	66.7
Coconut husks and sawdust	78	38.8	47	42.3	30	40.0	1	6.7
Kerosene	37	18.4	14	12.6	18	24.0	5	33.3
Gas	32	15.9	16	14.4	12	16.0	4	26.7
Total number of households	201*		111		75		15	

* Column totals do not add up to 100% because women often gave more than one response to this question.

Of the women in the sample, the majority (74%) used firewood. Even schoolteachers and government office clerks (considered to be more 'prestigious' and monetarily more rewarding occupations for women), used firewood, although these groups often bought it rather than collected it. The large difference in the proportions dependent on firewood between the Hindus on the one hand and the Muslims and Christians on the other is probably explained by the relative prosperity of some Muslim and Christian households. In fact, for the sample as a whole, the correlation coefficient between per capita expenditure and firewood usage was negative (-0.31), suggesting that as incomes rose, less firewood was used, being replaced by alternative fuel sources such as kerosene oil or gas.

The firewood requirements of the family were expressed by the women interviewed in terms of manas. One mana cost approximately Rs.8 to Rs.9. Sometimes, when firewood was bought, it was also expressed in terms of gadis or carts. For those who owned silk trees, or a saw-mill, there was no question of payment for firewood collection. For others, the firewood was collected by hand from common land in surrounding areas or on the outskirts of the town and no monetary payment was made for it. For still others, it was purchased from the saw-mills. I observed in my fieldwork that most families purchased a fixed amount of firewood per week, and supplemented it with additional wood, if required, which was either purchased again, or cut by hand. The wood was piled up in front of the house and used slowly during the week. The women could not provide precise estimates of the percentage physically

chopped as opposed to the amount purchased. At best, they could provide the figures for the amount of manas they consumed per week. The average Ramanagaram family which used wood for fuel needed 6.7 manas every week, 6.3 among the Hindus, 7.0 among the Muslims, and 7.8 among the Christians.

Women were asked who performed firewood collection for the household. In Table 4 their answers are alphabetically grouped by family members and group totals for some of the family members who were mainly responsible for fuel collection, in order to facilitate comparisons. This table is presented in detail, both to highlight the range of responses, and to illustrate how firewood collection in Ramanagaram taluk, as perhaps in most parts of India, is a fundamental aspect of daily living and may involve various combinations of all members of the family and household.

Table 4: Combinations of household members who perform firewood collection tasks, Ramanagaram sample (1996)

Household member(s)	All women	Hindus	Muslims	Christians
Brothers-in-law (2)*	1	0	1	0
Brothers (1 or 2)	3	0	2	1
Daughter	4	3	0	0
Daughter + daughter-in-law	1	1	0	0
Total daughters	**5**	**4**	**0**	**1**
Daughter-in-law (2)	2	0	2	0
Father {tractor}*	5	4	0	0
Father-in-law + brother-in-law	1	1	0	0
Girl neighbour	1	1	0	0
Husband	42	21	19	5
Husband+ daughters (3)	1	0	1	0
Husband +sons (2)	1	0	1	0
Total husbands	**44**	**21**	**21**	**5**
Children (2)	3	2	1	0
Children (3)	1	1	0	0
Children (4)	2	1	0	0
Children (5)	3	0	3	0
Children (6) + daughters-in-law (2)	1	0	1	0
Children (7)	1	0	1	0
Total children	**11**	**4**	**5**	**0**
Male joint family members	1	0	1	0
Parents in-law	1	0	1	0
Mother	1	1	0	0
Nephews (2)	1	0	1	0
Son	1	1	0	0
Son {auto}	1	1	0	0
Son	9	1	8	0
Son {cycle}	1	0	0	1
Son (2)	8	2	5	1
Son (3)	2	0	2	0
Total sons	**22**	**5**	**15**	**2**
Servant	1	1	0	0
Suppliers	6	6	0	0
Woman	43	33	8	2
Woman + daughters (unspecified)	2	2	0	0
Woman + daughters (3)	1	1	0	0
Woman + daughter-in-law	1	1	0	0
Woman + husband	11	10	0	1
Woman + husband + son	1	1	0	0
Woman + children	1	1	0	0
Woman + co-sister	1	1	0	0
Woman + son (3)	1	1	0	0
Woman {auto}	1	1	0	0
Total women	**63**	**52**	**8**	**3**

*The presence of two or more particular household members is represented in the round brackets [example:(2)]. Where there is no round bracket, this implies a single person only. Sometimes, the women would also describe how the firewood, once collected, was eventually transported back home. If mentioned, this is represented in curly brackets [example:{cycle}].

The women themselves, their husbands and their sons were those mainly responsible for firewood collection. But this differed across religions. For Hindus, the women themselves

and their husbands were primarily responsible, while in Muslim families, it was mainly the husbands and sons. This is probably due to the strict code of the purdah practised by the Muslim women and girls of Ramanagaram. In the Christian families, husbands, sons and women themselves collected firewood.

An interesting feature of the Ramanagaram sample is that among the children, there is a broad split down gender lines in the allocation of water-collection and fuel-collection tasks, with daughters routinely collecting water and sons mainly collecting fuel. As one Muslim woman explained, daughters were not normally sent out very far on their own to collect firewood, both for security reasons and because it was a very heavy load to carry. The reluctance to send daughters out for firewood was evident across all three religious groups.

In Ramanagaram taluk, it was intrinsically less laborious to obtain water, as compared with firewood, due to easy access to the river Arkavati and due to water taps provided by the municipality. If we accept the hypothesis that increased fertility arises because children may be desired as producer goods to help with fuel and water collection, this argument could perhaps explain observed son-preference among all religious groups, since sons would help with the more labour-intensive fuel collection. This desire for sons may be reinforced if communities observe a strict code of purdah which restricts the mobility of girls and women.

Women were asked how many hours the family spent collecting fuel each day. The responses were remarkably similar across religious groups, at 1.6 hours for Hindus, 1.8 for Muslims, and 1.8 for Christians. The closeness of these figures, as with those for water-collection, suggests quite accurate responses and knowledge by the respondents about the time involved for firewood collection.

The econometric analysis of fertility will examine whether the family's fuel and water requirements influenced the total number of children ever born. This is done by creating two dummy variables, the first measured whether the household collected water in pots by hand, the second whether it collected firewood by hand.

7. Son-preference

A further nonproximate influence on fertility is son-preference and possible discrimination against daughters. Demographers postulate that the strength of parents' preferences for sons may increase fertility because a larger total number of children must be born in order to obtain the desired quantity of sons.[44] Chen, Huq and D'Souza, Cain, Mason, Dyson and Moore, and Dasgupta, have all shown that evidence exists that some women may not be as interested in the survival of some of their children as in that of the others, as is evident in gender discrimination against daughters relative to sons in the access to food and medical care in some parts of north India.[45] To explain this theoretically, Cain has hypothesised a 'security-fertility' theory which is the 'lexicographic safety-first' (LSF) model. According to lexicographic decision rules, agents maximise net returns, but do so subject to the condition that these net returns do not fall below some specified 'disaster level'. For reproductive decisions, this means that parents wish to maximise 'utility' subject to the constraint that the probability of inadequate support in old age is less than or equal to some target. In certain societies, minimum requirements for old age security can be expressed in terms of a certain

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[44] Irudaya Rajan, Mishra and Vimala, 1996: 1980-1986. In this article, using Census data for India between 1980 and 1991, they argue that the acceptance of a permanent method of contraception among Indian couples is strongly associated with the sex composition of the family, in particular the number of sons.

[45] Chen, Huq and D'Souza, 1981: 55-70; Cain, 1984; Mason, 1993: 19-42; Dyson and Moore, 1983: 35-60; Dasgupta, 1993a: 343-370.

number of surviving children, say, 'one healthy, loyal, and surviving son'. The fertility level then depends on the probability of child survival and child default.[46]

Given the enormous literature devoted to son-preference in poor countries and the old-age security motive for fertility, from the Ramanagaram data a variable was calculated in order to see whether the delay in succeeding in giving birth to a son had any impact on fertility. This was done by calculating an index which measured the location of sons in the birth-order. This variable in a sense captures a pure demographic accident. Of course, this calculation could easily have been done with reference to the location of daughters in the birth-order; however, the location of sons was of more interest because the literature on the old-age security motive suggests that fertility will be higher as parents try to have at least one surviving son who will look after them in old-age.

This variable was calculated as follows. A number was assigned to each family, which took the value of the birth order of the first-born son. For example, if a woman gave birth to a son followed by a daughter followed by another son, the variable took the value '1'. If she gave birth to a daughter, followed by another daughter, then a son, and then another daughter, it took the value '3'. If the woman had only daughters and no sons, the variable took the value 0. In the multivariate models presented later, it was attempted to examine whether this demographic accident affected total fertility.

To cast some qualitative light on the old-age security motive for fertility, women were also asked with whom they would live after the age of 60. Over half of all women preferred to live with their sons in old age, a percentage which was very similar across all religious groups: 57% of Hindus, 55% of Muslims and 53% of Christians. Only 5% of the women in the

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[46] For example, Cain found that in a comparative study of villages in Bangladesh, Maharashtra and Andhra Pradesh, the security motive was mainly responsible for explaining fertility differentials and son-preference. See Cain, 1981: 467.

sample said they would choose to live alone. However, women did indicate that living with a son was contingent on obtaining a daughter-in-law they could tolerate. One uneducated woman, Gangamma, age 36 of Ramanagaram town, replied: 'If Indira Gandhi herself did not stay with her son because she could not get on with her daughter-in-law, how do I know, when my son marries, if I will obtain a daughter-in-law that I will get on with; and therefore, how can I possibly say who I will stay with in my old age? It is a very stupid question.'

8. Extended family

It is also postulated that the presence of extended family to share the costs of child rearing is an important nonproximate determinant of fertility. Hajnal argued that in north-west Europe in the past, the costs of raising children were solely borne by parents; by contrast, the 'Asiatic' pattern involved joint households, where the costs of child rearing were borne by many, and hence parents had less disincentive to have high fertility.[47] Oppong has argued that the wide dispersal of the costs of having children among the kinship network contributes to high fertility in Africa as well.[48]

On the other hand, the presence of extended family members may act to reduce fertility, both because there is a lack of privacy and because traditional taboos on sexual intercourse at particular times are more likely to be observed by women in extended households, under the scrutiny of in-laws, than among those living in nuclear family households.

Most households in Ramanagaram had extra persons beyond the nuclear family living in the household. These included family members, such as elderly parents or parents-in-law, distant relatives, and servants living permanently in the household. Table 5 shows the average household composition for different religious groups in Ramanagaram.

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[47] Hajnal, 1982: 449-494.

Table 5: Household composition table, (Ramanagaram sample, 1996)

Mean number of:	All women	Hindu	Muslim	Christian
Women (wife/female head)	1.0	1.0	1.0	1.0
Husbands (male head)	0.8	0.8	0.8	0.9
Offspring	2.9	2.5	3.5	2.3
Other relatives	1.5	1.6	1.6	0.3
Servants	0.01	0.01	0.01	0.0
Mean household size	5.9	5.7	6.6	4.3

The mean household size for this sample is very similar to the mean household size calculated for Ramanagaram by other studies.[49] The lower household size among the Christians compared to Hindus and Muslims seems to be caused primarily by the lower number of other relatives in their households. This may be because members from the better-educated Christian community are able to migrate easily to other places elsewhere in India; and therefore the possible universe of 'extra kin' resident locally who could be recruited as members of Christian households is lower than for the other two religious groups. There may also be a tendency towards more nuclear families within the Christian community because of its tendency to be the most educated of all the religious groups in Ramanagaram.

Women were also asked 'Who looks after the children when you are not at home?'. Their answers are shown in Table 6.

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[48] Oppong, 1983: 547-589.

[49] For example, a study of urban infrastructure undertaken in 1995 has calculated that mean household size in Ramanagaram was 5.6. See the Karnataka Urban Infrastructure Development Report, 1995.

Table 6: Role of the extended family in assisting with child-care, Ramanagaram sample (1996)

Extended family member assisting with child-care	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mother	34	16.9	15	13.5	14	18.7	5	33.3
Mother-in-law	45	22.4	25	22.5	17	22.7	3	20.0
Father	3	1.5	2	1.8	1	1.3	0	0.0
Father-in-law	8	4.0	6	5.4	2	2.6	0	0.0
Friend	6	3.0	5	4.5	1	1.3	0	0.0
Husband's brother's wife	6	3.0	4	3.6	2	2.6	0	0.0
Sister	5	2.5	2	1.8	2	2.6	1	6.7
Sister-in-law	6	3.0	3	2.7	3	4.0	0	0.0
Elder offspring	11	5.5	6	5.4	4	5.3	1	6.7
Others	28	13.9	12	10.8	13	17.3	3	20.0
Extended family not used	35	18.7	23	22.3	11	15.7	1	7.1
Total	187	100	103	100	70	100	14	100

Table 7: Breakdown of 'others' assisting with child-care, Ramanagaram sample (1996)

Breakdown of 'others'	All women	Hindus	Muslims	Christians
Aunt	1	0	1	0
Brother	1	0	1	0
Daughter	1	0	1	0
Daughter-in-law	4	3	1	0
Husband	6	2	2	2
Joint family	4	0	4	0
Kids work	1	1	0	0
Maid	1	1	0	0
Midwife	1	0	1	0
School	4	3	1	0
Servant	2	1	0	1
Work at home	2	1	1	0

Nearly 77% of the women interviewed had extended family helping with the child care, though not all these relations were actually coresident in the women's families. The most popular responses for the whole sample taken together were the woman's mother, her mother-in-law, elder offspring, and 'others' (broken down in Table 7). The percentage relying on their own mothers varied a great deal among religious groups: lowest for Hindus (13.5%), higher for Muslims (18.7%) and very much higher for Christians (33.3%). By contrast, 22% of women interviewed listed their mothers-in-law as helpers with child care,

and this percentage was approximately the same for all religions. Clearly, members of the extended family, widely defined, helped substantially with child care. This variable is therefore included in the econometric models of fertility estimated below. It is measured as the number of female extended family members resident in the household.

9. Religion

As discussed in Chapter 1, the impact of religion on fertility can be direct, in the form of religious injunctions to refrain from contraception or to have certain numbers of children in order to continue the lineage, or indirect, in the form of religious norms about such matters as women's status (which may in turn affect fertility).

The Ramanagaram questionnaire contained five questions which focused on the religious characteristics of the women and their families. First, the women were asked how faithfully they practised their religion. They were asked to respond on a scale of 1 to 5, where 1 was 'not at all', 2 was 'not very much', 3 was 'medium', 4 was 'quite a bit', and 5 was 'very much'. Their responses are shown in Table 8.

Table 8: Faithfulness in practising religion, Ramanagaram sample (1996)

Rank	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	3.8		3.2		4.6		4.1	
1	7	3.5	6	5.4	1	1.3	0	0.0
2	23	11.4	21	18.9	1	1.3	1	6.7
3	40	19.9	32	28.8	5	6.7	3	20.0
4	70	34.8	49	44.1	16	21.3	5	33.3
5	61	30.3	3	2.7	52	69.3	6	40.0
Total	201	100	111	100	75	100	15	100

Christians and Muslims rated themselves as being more 'faithful' to their religion than the Hindus. The difference between the Muslims and Christians was not found to be significant,

at the 95% level, but the difference between the Hindus and Muslims and that between the Hindus and Christians was found to be highly significant. One might speculate that this is a spinoff of 'minority group status' whereby members of a small religion are more assiduous in their faith to it.

The women were then asked about the role of their local priest in their lives. First, they were asked 'How much does it matter to you what the local priests think of you?'. Again they were asked to use a scale of 1 to 5, where 1 stood for 'not at all' and 5 stood for 'very much'. The responses are shown in Table 9.

Table 9: Importance of the priest's opinion, Ramanagaram sample (1996)

Rank	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	3.0		2.1		4.2		3.6	
1	40	19.9	33	29.7	4	5.3	3	20.0
2	52	25.9	44	39.6	7	9.3	1	6.7
3	26	12.9	20	18.0	5	6.7	1	6.7
4	28	13.9	14	12.6	10	13.3	4	26.7
5	55	27.4	0	0.0	49	65.3	6	40.0
Total	201	100	111	100	75	100	15	100

It appears that the Muslims and Christians were also more concerned with the opinions of their priests than the Hindus. The difference between Muslims and Christians was not found to be statistically significant, but the differences between Hindus and Muslims and between Hindus and Christians were found to be highly significant.

The women were then asked if they would ask advice from the local priests about aspects of their lives. The responses to this question are shown in Table 10.

Table 10: Would you ask advice from your priest about aspects of your life? Ramanagaram sample (1996)

Rank	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	3.1		2.2		4.2		3.6	
1	40	19.9	32	28.8	5	6.6	3	20.0
2	50	24.8	43	38.7	6	8.0	1	6.7
3	27	13.4	21	18.9	5	6.6	1	6.7
4	28	13.9	15	13.5	9	12.0	4	26.6
5	56	27.8	0	0.0	50	66.6	6	40.0
Total	201	100	111	100	75	100	15	100

The difference in means was statistically insignificant at the 95% confidence level for the difference between Muslims and Christians, but it was significant for the differences between Hindus and Christians and between Hindus and Muslims. Thus, it appears that the Muslim and Christian priests exercised more influence over their communities than the Hindu priests, both in terms of the importance the women placed on their priests' opinions of them and in terms of whether they would ask advice from the priest about aspects of their daily lives.

The Ramanagaram women were then asked how frequently they visited places of worship. Their responses are shown in Table 11.

Table 11: Frequency of visits to places of worship, Ramanagaram sample (1996)

Rank	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	2.8		3.2		2.1		3.9	
1	54	26.8	6	5.4	48	64.0	0	0.0
2	28	13.9	25	22.5	1	1.3	2	13.3
3	32	15.9	26	23.4	3	4.0	3	20.0
4	75	37.3	51	45.9	19	25.3	5	33.3
5	12	5.9	3	2.7	4	5.3	5	33.3
Total	201	100	111	100	75	100	15	100

Christian women visited places of worship most frequently, followed by Hindu women and then, a long way behind, by Muslim women. The difference in means between all three groups was significant at the 95% confidence level. There were 37% of women in the sample

who said that they visited places of worship quite a bit, but also 27% who said that they did not visit places of worship at all. This was mainly because a large proportion of Muslim women (64%) were not allowed to go to the mosque in Ramanagaram because of purdah restrictions.[50] Thus, all communities seemed to believe in visiting places of worship, though a large percentage of the Muslim women were prevented from doing so by other norms. Even then, Muslim women who were not allowed to visit the mosque prayed simultaneously at home during prayer-time. Thus, the Muslim women's lower level of attendance at places of worship cannot be interpreted as indicating a lesser importance of religion in their lives.

Finally, the women were asked if they interacted with neighbours who did not belong to their religion. The responses are shown in Table 12.

Table 12: Frequency of interaction with other religions, Ramanagaram sample (1996)

Rank	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Mean	2.1		2.0		2.2		2.3	
1	78	38.8	51	45.9	32	42.6	5	33.3
2	48	23.3	30	27.0	14	18.6	4	26.6
3	29	14.4	14	12.6	13	17.3	2	13.3
4	29	14.4	11	9.9	14	18.6	4	26.6
5	16	7.9	5	4.5	1	1.3	0	0.0
Don't know	1	0.5	0	0.0	1	1.3	0	0.0
Total	201	100	111	100	75	100	15	100

Although there were some exceptions, the religious groups did not mix very much socially in Ramanagaram. The lower proportions for the Muslims (62%) and Christians (60%) than for the Hindus (73%) is understandable, since the former were minorities in a predominantly Hindu region. But in the analysis, the differences between all three groups, Hindus and Muslims, Muslims and Christians and Hindus and Christians were not found to be significant

[50] There were 27 Muslim women who rated their frequency of visits to places of worship as 'medium' to 'very much', even though none of them were actually allowed to go to the mosque (and, in fact, did not go there) for prayers. This question was often misinterpreted by Muslim women as referring to how

at the 95% level. What is striking is how little even the two 'minority' religions interacted outside their own religious community.

In summary, women in Ramanagaram appear to be religious, the Muslims and Christians more so than the Hindus. The opinions of the priests are important, but more so to Muslims and Christians, who would ask for advice pertaining to their lives, than for Hindus, who would not. All communities worshipped either at home or at places designated for worship, and interactions between those of different religions appears to be limited, though there were pockets where there were exceptions.[51]

In order to test empirically the effect of the religion on fertility in the econometric analysis, the following measures of religion were used. Firstly, a dummy variable was defined that took a value of 1 if the respondent was Muslim and 0 if otherwise. Secondly, a dummy variable was defined which took the value 1 if the respondent was Hindu and 0 otherwise. The Christians were the base category. Thirdly, a dummy variable was defined which looked only at Hindu and Muslim respondents, leaving out the Christians, and took a value of 1 if the respondent was Muslim and 0 if the respondent was Hindu; because the Christians were excluded, the sample size was reduced to 173 ever-married women. Fourthly, a qualitative 'index of piety' was created, which was calculated as each women's mean response to the five questions in the questionnaire relating to her personal evaluation of her religiosity (discussed above).

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frequently they prayed. Moreover, some Muslim women did visit the burial sites of saints or seers (dargha) nearby which they considered as places of worship.

[51] The women were also asked two questions about the religiosity of their offspring, although their responses are not reported here. These questions were 'Are your children religious too and do they go to the temple/mosque/church/worship at home?' and 'Do they practise religion to your satisfaction?'

10. Marital consanguinity

Marital consanguinity is also postulated as affecting fertility. However, we need to recognise two effects of consanguinity on fertility which work in opposite directions. First, there is the possibility of greater autonomy for the woman by marrying into the natal family, and thereby residing matrilocally; this would tend to reduce fertility. Second, there is the larger number of years of childbearing potential within marriage which may occur due to the woman's low age at marriage if she marries a relation who is much older than herself, such as a maternal uncle; this would tend to increase fertility.

Consanguineous marriage is incorporated into the regression models estimated below in two ways. Firstly, we define a dummy variable for whether or not a woman had married a relation. Secondly, we use Bittles, Coble and Appaji Rao's statistical measure of the 'coefficient of inbreeding'.[52]

11. Caste

Among Hindus, caste is also postulated to affect fertility. In theory, the higher castes may be expected to have lower fertility, while the scheduled castes may be expected to have higher fertility.[53] The mechanism behind this is postulated to be the 'culture' of various castes, which favour a high-fertility or low-fertility norm. Caste is incorporated into the regression models estimated for Hindus only in the form of two dummy variables: one which took the value of 1 if a woman belonged to a high caste and 0 otherwise; and one which took the value 1 if the individual belonged to a scheduled caste and 0 otherwise. The category 'low caste' was defined as the base category.

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[52] Bittles, Cobles and Appaji Rao, 1993: 111-116.

[53] Although studies such as the Mysore Population Study found that high castes in Karnataka had higher fertility than others. See Mysore Population Study, 1961: 120-121.

12. Politics

Politics, whether at the regional, state or national level, or more significantly, at the level of the village community, may be an important nonproximate influence on fertility.[54] This is particularly important if there are direct political or economic benefits to be obtained at the national level if a group has numerical strength. At the village level, as Srinivas argues, one of the main features of the 'dominant caste' in village India is that in order to be 'dominant' a caste has to be ritually high[55], economically rich, and strong in numerical terms. This enables the caste to corner the gains from development, particularly in those local self-government institutions which are based on adult franchise. This was evident during my fieldwork in Ramanagaram, where one woman (a teacher in a local Urdu-medium school) mentioned that in the local elections, the main contest was invariably between candidates sponsored by the Gowdas (an upper-caste Hindu group) and the Muslims, both of which were economically rich and numerically preponderant groups in Ramanagaram taluk. Moreover, as is well-known, control over these political panchayati-raj institutions can immediately translate into economic gain for the concerned group.[56] This is especially true for the leaders of the groups at the top, because apart from the economic gain which is derived by all households, the political gain for the leaders who control the local government institutions can be enormous. Thus, politics both at the national level and at the immediately visible level of the village community may also provide a powerful incentive for higher fertility. These mechanisms may lie behind any observed effect of religion or caste on fertility. No political variables are included in the regressions because religious membership does, in part, proxy membership of a group with political aspirations; the main political rivalry in Ramanagaram was between

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[54] For more on this distinction see Srinivas, 1994.

[55] This refers to the position of the caste in the caste hierarchy. Srinivas argues that empirically, the dominant caste is one which is observed to be higher up the caste order. See Srinivas, 1994.

[56] However, as Srinivas correctly argues, 'Numbers are also important at the other end of the spectrum i.e. to resist being "steam-rollered" by the dominant castes'. See Srinivas, 1989: 141.

Muslims and Gowdas. Moreover, the structure of political institutions in Ramanagaram taluk, and the way in which these institutions were organised, did not vary significantly between Hindus and Muslims or across individuals - certainly not enough to warrant including political variables separately in the econometric models.

II. The alternative: do we need an 'ideational' theory of fertility?

Ideational theories of fertility challenge the basic economic assumption of the 'new household economics', that the changing balance between the costs and benefits of childbearing reduces the demand for children and is the key to the fertility transition. Cleland and Wilson, who have been the most important proponents of the ideational view, argue that even Easterlin's model which combined economic decision-making with social constraints is, in essence, a demand-side explanation because, 'the idea that economic considerations of costs and benefits are of primary importance remains central'.[57] Cleland and Wilson argue that Caldwell's 'intergenerational wealth-flows' theory, by contrast, which postulates that the fertility transition is caused by a reversal of the net flow of goods and services from children to older generations, is a theory of ideational change because the central idea behind it is the 'cultural transmission of the idea that the child-centred nuclear family, replaces the extended family system with its vested interest in high fertility'.[58]

Cleland and Wilson argue that findings showing a relationship between education for women and declining fertility is due to changing perceptions, ideas and aspirations rather than to changes in women's economic circumstances.[59] They suggest also that changes in social norms and attitudes towards birth control may be the key factor which determine the timing

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[57] Cleland and Wilson, 1987: 8; See also Cleland, 1993: 345-352.
[58] Cleland and Wilson, 1987: 8.
[59] Cleland and Wilson, 1987: 25.

of the fertility transition, although they admit that 'in the absence of direct evidence to support it, such a view is largely speculative.'[60]

Cleland and Wilson argue that evidence for the importance of ideational theories is to be found in the case of historical European populations. In the case of 700 provinces in historical Europe, fertility began to decline in a short period of time, in 59% of the provinces between 1890 and 1920, and in 71% of the provinces between 1880 and 1930. Moreover, they argue that contraceptive use existed in pre-transition historical societies, especially in France, where from the 1780s family limitation was widespread. This view is also reflected in the findings of Knodel and van de Walle, who argue that economic development in European countries showed no association with the date at which significant fertility declines began, that the practice of family limitation was largely absent, and that cultural settings influenced the onset and spread of fertility declines independently of socio-economic conditions.[61] Lesthaeghe and Wilson argue that the inhabitants of 'secularised' regions in Europe were the first to adopt fertility control, and that in Catholic regions, secularisation played a particularly important role in the fertility transition.[62] As Cleland and Wilson put it,

> in historical Europe, just as in the developing world today, the culture of sub-populations, loosely defined by religion, language or region, appears to exert a major influence on the timing of reproductive change, independently of levels of development, education or provision of family planning services.[63]

It is necessary to examine this theory carefully, both because of its importance to the explanation of fertility decline, and because it epitomises the most divisive issue in demography between economics and other disciplines, namely, the way in which 'culture'

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[60] Cleland and Wilson, 1987: 25.
[61] Knodel and van de Walle, 1986.
[62] Lesthaeghe and Wilson, 1986. Secularisation refers to a decreasing belief in traditional religious constructs that deal with salvation, the soul, life after death etc. Secularisation is also associated with declining adherence to organised or institutional religion.
[63] Cleland and Wilson, 1987: 24.

affects demographic outcomes.[64] Cleland and Wilson's argument that ideas and aspirations are vital in the fertility transition cannot be dismissed out of hand, but measuring these ideational changes, and distinguishing them from changes in behaviour for other reasons, appears to be extremely difficult. Moreover, the evidence from Europe has also been interpreted in a more socio-economic light by others, and the debate about the causes of the fertility transition in Europe is still unresolved.[65] Finally, Thomas has refuted the argument that Caldwell's theory of wealth-flows is an ideational theory. Rather, he argues that reproductive behaviour in the Caldwell model is motivated directly by the expected gains from children, and indirectly by underlying social change.[66] However, these arguments must not be taken to imply that the present study is opposed to the ideational view of fertility. Rather, it is the view of the present study that the most important aspect of Cleland and Wilson's ideational theory, which has relevance for Karnataka and other parts of south India such as Tamil Nadu, is the hypothesis that ideational change about attitudes towards birth control may be important to the timing of the fertility transition.[67]

For example, it is hypothesised that one reason why contraceptive use is higher and fertility is lower in other south Indian states such as Tamil Nadu (which has achieved near-replacement levels of fertility) is because there is greater exposure to the mass media, a much higher proportion of mothers in these states receive antenatal care with much better use of maternal and child-health services than in north India, and the percentage of girls aged 6-14 attending school is high.[68] However, the most interesting outlier among the south Indian

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[64] Lesthaeghe and Surkyn, 1988: 1.
[65] Galloway, Hammel and Lee, 1994: 135-158.
[66] Thomas, 1993: 353-359.
[67] This is also suggested by Knodel and van de Walle, 1986; and also by Cotts Watkins, 1990: 241-272.
[68] Retherford and Ramesh, 1996: 2. However, there are also socio-economic characteristics which distinguish Tamil Nadu from north Indian states such as Uttar Pradesh. First, the percentage of females aged 6-14 attending school in Tamil Nadu is 79% compared with 48% in U.P.; the percentage of females aged 6 who are illiterate is 44% in Tamil Nadu compared with 69% for U.P.; the percentage of ever-married women who work outside their homes is much higher (47% in Tamil Nadu compared with 13% in U.P.); more households have electricity (64% in Tamil Nadu compared with 32% in U.P.); and many more ever-married women are regularly exposed to the electronic mass media in Tamil Nadu (78% in Tamil Nadu compared with 35% in Uttar Pradesh).

states is Andhra Pradesh. This state has a very high proportion of females age 6 and over who are illiterate (62%) with only 55% of females aged 6-14 attending school. However, Andhra Pradesh has managed to achieve a total fertility rate of 2.2 mainly because 62% of its households receive electricity and 75% of ever-married women are exposed to the mass media.[69] This example is particularly important because it is an exception to the argument that high levels of education are a necessary precondition for achieving replacement-level fertility and may provide some empirical support for the influence of 'ideational change' on fertility.[70]

Bongaarts and Watkins argue that theoretically there is an important link between 'social interactions' and contemporary fertility transitions.[71] According to them, the influence of social interactions is not limited to 'the spread of birth control techniques, or even to the spread of ideas about these techniques', but extends also 'to ideational change more generally.'[72] They emphasise that the effects of social interactions on fertility are most evident in the personal networks of small communities. Finally, they argue that there are three aspects of social interactions which are relevant for fertility: first, that it involves the exchange of information and ideas; second, that it encapsulates the joint evaluation of their meaning in a context; and third, that it involves social influence constraining or encouraging action.[73] Perhaps the 'ideal' model of fertility is then one which does not depend wholly, on the one hand, on diffusion of ideas and changes in aspirations or, on the other hand, on pure economic determinants, but on some combination of socio-economic influences and changes in attitudes towards birth control influenced by social interactions. In essence, what the present study argues is that a more realistic model of fertility is one encapsulating ideational

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[69] Retherford and Ramesh, 1996.
[70] See also evidence from Bangladesh in Koenig *et al*, 1992: 352-364.
[71] Bongaarts and Watkins, 1996: 639-682.
[72] Bongaarts and Watkins, 1996: 657.
[73] Bongaarts and Watkins, 1996: 657.

change which is partly contingent on structural economic change and partially autonomous.[74] The most important feature of this model is that, as opposed to a dichotomy between socio-economic theories and ideational theories, such a model sees no conflict between both operating simultaneously, but sees an important orchestrating role for social interactions, as observed in the experience of the transition to replacement levels of fertility in parts of south India.

One of the major problems with ideational change is that it is hard to observe and measure. In the econometric analysis conducted later in this chapter, the age of the woman was used as a control variable in order to take into account the fact that some women who had been interviewed had not, as yet, completed their fertility. However, once all other socio-economic factors are controlled for, if fertility is observed to rise with a woman's age, this may also be a reflection of 'ideational change' in aspirations or norms concerning fertility over time.

III. Children ever born in Ramanagaram

In Chapter 1, trends in fertility and religious differences in fertility between Hindus, Muslims and Christians, were explored for India, Karnataka state and Bangalore rural district. To what extent does the Ramanagaram sample also reveal demographic differences between religious groups? Table 13 presents data on the number of children ever born for each religious group. This is the dependent variable used in the regression models presented in the next section of this chapter.

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[74] This is the view of Lesthaeghe and Surkyn, which the present study concurs with. Their model of ideational change has two features: first, it is cohort and education driven; second, a period-cohort interaction is recognised which is used to capture ideational change. For more on this see, Lesthaeghe and Surkyn, 1988: 1-45.

Table 13: Number of children ever born, Ramanagaram sample (1996)

Children ever born	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
0	13	7.0	8	7.8	4	5.7	1	7.1
1	27	14.4	15	14.6	10	14.3	2	14.3
2	45	24.1	29	28.2	9	12.8	7	50.0
3	38	20.3	27	26.2	10	14.3	1	7.1
4	25	13.4	12	11.7	11	15.7	2	14.3
5	18	9.6	6	5.8	11	15.7	1	7.1
6	6	3.2	1	1.0	5	7.1	0	0.0
7	11	5.9	5	4.9	6	8.6	0	0.0
8	2	1.1	0	0.0	2	2.9	0	0.0
9	2	1.1	0	0.0	2	2.9	0	0.0
10	0	0.0	0	0.0	0	0.0	0	0.0
More than 10	0	0.0	0	0.0	0	0.0	0	0.0
Total	187	100.0	103	100.0	70	100.0	14	100.0
Mean	3.04		2.66		3.73		2.29	
Median	3.00		2.50		4.00		2.00	
Mode	2.00		2.00		4.00		2.00	
Maximum	9.00		7.00		9.00		5.00	
Minimum	0.00		0.00		0.00		0.00	

A majority of the women in the sample had either 2 or 3 children, although there were 15 who had between 7 and 9 children. The modal value for the Muslims, at 4, was much higher than that for the Hindus and the Christians, at 2. The means also appeared to differ greatly, with Muslim women having 1.07 children more on average than the Hindus and 1.41 more on average than the Christians. While the difference between Hindus and Christians was not found to be significant at the 95% level, the differences in means between Hindus and Muslims and between Muslims and Christians were statistically significant. In the Ramanagaram sample, the Muslims have higher fertility than the Hindus and the Christians and this difference is nearly one child on average. As discussed in Chapter 1, this is consistent with the finding reported for Karnataka as a whole by the National Family Health Survey.[75]

[75] National Family Health Survey 1992-93: Karnataka, 1995: 60-62.

These findings on number of children ever born essentially raise the following questions. First, what is the impact of religion on differences in the number of children ever born, once other factors are controlled for? Is a certain number of children desired for their own sake, for religious reasons, or for other considerations such as family obligations or economic benefits accruing from children? Finally, how do other factors, such as the age of the woman, which may reflect the diffusion of ideas and changes in aspirations, affect the number of children ever born?

IV. Regression models of the nonproximate determinants of fertility in Ramanagaram

Of all the factors discussed in the introductory section, those which emerged as appropriate for inclusion in a model of the nonproximate determinants of fertility for the women in the Ramanagaram sample were the following: the education of the woman; the education of her husband; various measures of income; the occupation of the woman; that of her husband; marital consanguinity; the presence of extended family in the household; the desire for a son; provisions of water and fuel infrastructure; differences in religion and caste; and the age of the woman. These factors were chosen on a number of grounds. First, information on them all could be obtained by means of intensive questioning of the women of Ramanagaram. Secondly, they are all factors which are not endogenously determined with fertility itself. Many studies of fertility incorrectly include factors which are endogenous to fertility as independent variables.[76] It is for this reason that the proximate determinants of fertility are not included here as explanatory variables. In all models estimated, the dependent variable was female fertility, measured as the total number of children ever born (CEB) to the woman.

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[76] It is recognised that one can resolve the endogeneity of the proximate determinants issue by using simultaneous equation models to estimate fertility. However, given the range of nonproximate factors on which data was obtained, and the small size of the sample, OLS methods using the nonproximate determinants was regarded as preferable.

The analysis was conducted as follows. First, fourteen preliminary models were estimated which experimented with different measures of certain variables, in order to determine the 'best' specification of the model. Then, using this 'best' specification, an F-test was performed in order to find out whether the effect of the socio-economic and other determinants of fertility differed significantly for the sub-samples of the Hindus and the Muslims compared with the 'pooled' model of Hindus and Muslims together. Finally, interaction terms between the explanatory variables and the Hindu and Muslim religion dummies were introduced into the general model in order to estimate a final model of fertility, incorporating slope effects as well as shift effects.

The initial starting points of the fourteen preliminary multiple regression models estimated to explore alternative variable specifications are shown in Appendix A.6.1 to this dissertation, and the results of these models are reported in Appendix A.6.2.

Regression 1 estimated a general model of fertility which incorporated the following thirteen explanatory variables: the total number of years of education of the woman, the total number of years of education of the husband, total expenditure, a dummy variable which took the value 1 if the woman had married a relation, a measure which took the number of the position of the first-born son in the birth-order, a religion dummy which took the value 1 if the woman was Muslim, another religion dummy which took the value 1 if the woman was Hindu (the Christians were kept as the base category), a dummy variable which took the value 1 if the woman had a primary occupation, a dummy variable which took the value 1 if the woman's husband was a farmer, a dummy variable which took the value 1 if the household used piped water from a tap in the home (as opposed to collecting water by hand), a dummy variable which took the value 1 if the household used gas or kerosene oil as the primary source of fuel (as opposed to collecting firewood), the total number of female extended family members resident in the household, and the age of the woman.

Regression 2 replaced the total number of years of education of the woman with her total number of years of primary education, her total number of years of secondary education and her total number of years of university education, and kept all other variables the same as in Regression 1. This was in order to see if primary education, secondary education, and university education exerted separate effects on fertility. In regression 3, the total number of years of husband's education was replaced with husband's years of primary education, years of secondary education and years of university education, in order to assess if they exerted separate effects on fertility.

Regressions 4 and 5 explored the impact of alternative measures of income: model 4 used total food expenditure and model 5 used an index for the total number of items of consumer equipment owned by the household.

In model 6, the consanguinity dummy variable was replaced by the coefficient of inbreeding, a statistical measure of consanguinity.

Regressions 7 and 8 explored the impact of alternative measures of religion. In regression 7, an index of piety was used, which was calculated as the average of the woman's rating of her own religiosity on a scale of 1 to 5 in answer to five questions on religion in the questionnaire (as described in Section II.A.1 in this chapter). In regression 8, a dummy variable which took a value 1 if the woman was Muslim and 0 if she was Hindu was used. This model excluded the Christians, reducing the sample size to N = 173.

Regressions 9 and 10 explored the impact of different measures of women's occupation. Regression 9 used a dummy variable which took the value 1 if the woman was employed in a

skilled occupation, and regression 10 used a dummy variable which took the value 1 if she was employed in a silk-related occupation.

Regressions 11 and 12 evaluated alternative measures of husband's occupation. Regression 11 used a dummy variable which took the value 1 if the husband was employed in a skilled occupation, while regression 12 used a dummy variable which took the value 1 if the husband was employed in domestic industry.

Regression 13 replaced the number of female extended family members with the total number of extended family members of both sexes, to explore the hypothesis that male family members might also help with child care or influence fertility in other ways.

Finally, regression 14 explored the impact of alternative measures of caste. In this case, the sample size was restricted to ever-married Hindus only (N = 103). Regression 14 used two dummy variables, one which took the value 1 if the woman belonged to a 'high' caste, and the other which took the value 1 if the woman belonged to a 'scheduled' caste. The 'low' castes were retained as the base category.

Of all the preliminary models estimated, models 12 and 13 emerged as the 'best' models in terms of the proportion of the variation in fertility which they can explain. In models 12 and 13, the factors which affected fertility were female university education, husband's primary and secondary education, position of first-born sons in the birth-order, the Muslim dummy variable, the Hindu dummy variable, whether or not the woman's husband was employed in domestic industry, the woman's age, and the number of extended family members resident in the household, measured either as the total of both sexes (in model 13) or as the number of females only (in model 12).

Model 12 had several interesting features. First, though husband's primary and secondary education were significant, the signs on the two coefficients were opposite. An additional year of primary education for the husband increased fertility by 0.15 children, while an additional year of secondary education decreased fertility by 0.23 children. Both the Hindu and Muslim dummies were significant and positive, indicating that both Hindus and Muslims had, on average, more children than the Christians, who form the base category. If a woman was Muslim she had 1.31 children more, on average, than if she were Christian. If a woman was Hindu, she had 0.95 children more, on average, than if she were Christian. The position of sons in the birth-order was also highly significant: controlling for other factors, if a woman had a son who was one position later in the birth-order she had 0.47 more children on average. If the husband was employed in domestic industry, he had 0.86 fewer children than if he was employed in other occupations. This model also highlighted a possible influence of 'Marshallian atmospheric externalities' or 'ideational change' in that even after controlling for the influence of other socio-economic factors, a woman's age had a significant positive influence on her fertility (although this may simply result from her having had a larger fertile lifespan in which to have children). The model explained 57% of the variation in children ever born.

In most of these preliminary models, the Muslim and the Hindu dummy variables were both significant and positive, with large coefficients, indicating that if the woman was Muslim (or Hindu), she was likely, on average, to have just over one child (or just about one child) more than if she were Christian. There were however two exceptions: in model 7 the impact of religion was tested using an index of piety rather than religious affiliation. In model 8, a dummy variable was used which distinguished between Hindus and Muslims only, excluding the Christians from the sample. The interesting feature of models 7 and 8 is that neither alternative measure of the religion variable was significant, when other socio-economic

characteristics were controlled for. This may be because the piety index in model 7 is acting as a proxy for Muslims and Christians (who on average rated themselves as more pious) versus the Hindus (who rated themselves as comparatively less pious). However, piety does not affect fertility, apparently, even if the religion in which you are pious (or not) does so. Moreover, the insignificance of the Hindu/Muslim religion dummy in model 8 indicates that there was no significant difference in the fertility level between Hindus and Muslims, after controlling for other socio-economic factors.[77]

Finally, preliminary model 14 explored the impact of alternative measures of caste, restricting the sample size to 103 as this was relevant only to Hindus. In the resulting model, the factors which accounted for changes in children ever born among Hindus were the position of sons in the birth-order, the age of the woman, and whether or not the woman belonged to a high caste. The last variable indicated that if a woman belonged to a high caste, on average, she had 0.3 fewer children than if she belonged to a low or a scheduled caste. This suggests that there may be a 'caste' culture which influences fertility even after the socio-economic characteristics of caste members are controlled for, and that high castes in this region are adopting a lower-family-size norm. The model explained 51% of the variation in children ever born among Hindu women in the sample.

The next step in the analysis was to estimate the 'best' specification (model 12) on sub-samples of Hindus and Muslims, and to compare these regressions with a 'pooled' model estimated for Hindus and Muslims combined. This was done by using an F-test. The sub-sample regressions on Hindus and Muslims are reported in Tables 14 and 15, and the pooled model for Hindus and Muslims in Table 16.

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[77] It must be emphasised that the Hindus <u>are different</u> to the Muslims in terms of the effect of religion on fertility, but this is shown later to be due to a slope effect rather than an 'intercept' effect. What model 8 shows is that there is no difference between Hindus and Muslims in terms of an 'intercept' or 'pure religion' effect alone.

Table 14: OLS estimates of the determinants of children ever born, Hindus only (Ramanagaram, 1996)

Dependent variable is CEB: the total number of children ever born to the woman

Sample: 103 ever-married Hindu women

Regressor	Coefficient		Standard error	T Ratio [Prob.]
Constant (CONST)	-0.473		0.514	- 0.920 [.360]
Woman's education				
Secondary education of woman (SEDU)	-0.107		0.068	-1.570 [.120]
University education of woman (UEDU)	-0.085		0.131	-0.648 [.519]
Husband's education				
Primary education of husband (PEDUSP)	0.076		0.084	0.905 [.368]
Secondary education of husband (SEDUSP)	-0.086		0.086	-1.007 [.317]
Husband's occupation				
Husband employed in domestic industry (DOMINDU)	-0.726	***	0.269	-2.697 [.008]
Son preference				
Position of first-born son in the birth-order (SONPRF)	0.484	***	0.132	3.656 [.000]
Female extended family				
Number of female extended family (FEXFAM)	-0.002		0.079	-0.022 [.982]
Woman's age				
Woman's age (AGE)	0.090	***	0.013	7.008 [.000]
Fuel infrastructure				
Household uses gas/kerosene for fuel (GASKERO)	-0.044		0.355	-0.123 [.902]
R-Bar-Squared	0.594			
Residual sum of squares	110.930			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level

Table 15: OLS estimates of the determinants of children ever born, Muslims only (Ramanagaram, 1996)

Dependent variable is CEB: the total number of children ever born to the woman

Sample: 70 ever-married Muslim women

Regressor	Coefficient		Standard error	T-Ratio [Prob]
Constant (CONST)	-0.206		0.747	-0.275 [.784]
Woman's education				
Secondary education of woman (SEDU)	-0.042		0.090	-0.462 [.645]
University education of woman (UEDU)	-0.421	**	0.182	-2.313 [.024]
Husband's education				
Primary education of husband (PEDUSP)	0.315	***	0.097	3.247 [.002]
Secondary education of husband (SEDUSP)	-0.259	***	0.095	-2.725 [.008]
Husband's occupation				
Husband employed in domestic industry (DOMINDU)	-1.208	**	0.479	-2.525 [.014]
Son preference				
Position of first-born son in the birth-order (SONPRF)	0.275	*	0.151	1.826 [.073]
Female extended family				
Number of female extended family (FEXFAM)	-0.721	***	0.160	-4.495 [.000]
Woman's age				
Woman's age (AGE)	0.098	***	0.016	-4.495 [.000]
Fuel infrastructure				
Household uses gas/kerosene for fuel (GASKERO)	-0.789	*	0.445	-1.772 [.081]
R-Bar-Squared	0.656			
Residual sum of squares	125.754			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level

Table 16: OLS estimates of the determinants of children ever born, pooled model of Hindus and Muslims (Ramanagaram, 1996)

Dependent variable is CEB: the total number of children ever born to the woman

Sample: 173 ever-married Hindu and Muslim women

Regressor	Coefficient		Standard error	T Ratio [Prob.]
Intercepts				
Hindu religion dummy (HINDU)	-0.197		0.380	-0.519 [.604]
Muslim religion dummy (MUSLIM)	0.094		0.439	0.215 [.830]
Woman's education				
Secondary education of woman (SEDU)	-0.048		0.056	-0.866 [.388]
University education of woman (UEDU)	-0.228	**	0.114	-2.008 [.046]
Husband's education				
Primary education of husband (PEDUSP)	0.171	***	0.063	2.704 [.008]
Secondary education of husband (SEDUSP)	-0.195	***	0.064	-3.050 [.003]
Husband's occupation				
Husband is employed in domestic industry (DOMINDU)	-1.037	***	0.250	-4.146 [.000]
Son preference				
Position of first-born son in the birth-order (SONPRF)	0.394	***	0.010	3.956 [.000]
Female extended family				
Number of female extended family (FEXFAM)	-0.220	***	0.077	-2.857 [.005]
Woman's age				
Woman's age (AGE)	0.090	***	0.010	9.467 [.000]
Fuel infrastructure				
Household uses gas/kerosene for fuel (GASKERO)	-0.351		0.287	-1.222 [.224]
R-Bar-Squared	0.592			
Residual sum of squares	279.971			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level

The null hypothesis was that the coefficients on all the explanatory variables for Hindus were equal to the coefficients on all the explanatory variables for Muslims. As in Chapter 4, the F-test is defined as:

$$F(k, n\text{-}2k) = \frac{RSS^{Restricted} - RSS^{Unrestricted} / k}{RSS^{Unrestricted} / n\text{-}2k}$$

where:

$RSS^{Unrestricted} = RSS^{Muslim} + RSS^{Hindu} = 110.9295 + 125.7540 = 236.6835$

$RSS^{Restricted} = RSS^{Pooled\ model} = 279.9714$

n = number of observations = 173

k = number of regressors in the restricted model = 12

$2k$ = number of regressors in the unrestricted model = 10 +10 = 20

Hence:

$$F = \frac{279.9714 - 236.6835/12}{236.6835/173\text{-}20} = 2.332$$

As the critical value of F(12, 153) is 1.83, and the calculated F = 2.332 > 1.83, the F-test rejects the null hypothesis that the coefficients on the explanatory variables are equal for Hindus and Muslims. This established that at least one socio-economic factor affects the number of children ever born differently for Hindus than it does for Muslims. It therefore seemed justified to go on to examine in detail the manner in which the various socio-economic factors exercise their influence on the fertility of Muslims, Hindus and Christians in Ramanagaram.

This next stage of the analysis was conducted by introducing interaction factors (multiplicative dummy variables) into the fertility model. All the explanatory variables were interacted with the Hindu and Muslims religion dummies. The interactive variables were

created using those variable specifications in the 'best' fertility model (model 12) and interacting each explanatory variable with the Hindu and Muslim religion dummies, creating an initial starting model containing 47 explanatory variables. The model which resulted from the estimation of this starting-model is reported in Table 17.

Table 17: OLS estimates of the determinants of children ever born, all religions (Ramanagaram, 1996)

Dependent variable is CEB: the total number of children ever born to the woman
Sample: 187 ever-married Hindu, Muslim and Christian women
Base category: Christians

Regressor	Coefficient		Standard error	T Ratio[Prob.]
Intercepts				
Constant (CONST)	0.999		1.023	0.975 [.331]
Muslim religion dummy (MUSLIM)	-0.798		1.128	-0.707 [.481]
Hindu religion dummy (HINDU)	-1.762		1.122	-1.570 [.118]
Woman's education				
University education of woman (UEDU)	-0.002		0.039	-0.047 [.962]
University education of Muslim woman (MUEDU)	-0.402	***	0.084	-4.763 [.000]
University education of Hindu woman (HUEDU)	-0.109		0.104	-1.049 [.296]
Husband's education				
Husband's primary education (PEDUSP)	-0.161		0.168	-0.957 [.340]
Primary education of Muslim husbands (MPEDUSP)	0.488	**	0.198	2.467 [.015]
Primary education of Hindu husbands (HPEDUSP)	0.264		0.185	1.429 [.155]
Husband's secondary education (SEDUSP)	-0.003		0.084	-0.034 [.973]
Secondary education of Muslim husbands (MSEDUSP)	-0.285	***	0.108	-2.638 [.009]
Secondary education of Hindu husbands (HSEDUSP)	-0.150		0.104	-1.439 [.152]
Husband employed in domestic industry				
Husband in domestic industry (DOMIND)	-0.781		0.479	-1.631 [.105]
Muslim husband in domestic industry (MDOMIND)	-0.310		0.693	-0.447 [.655]
Hindu husband in domestic industry (HDOMIND)	0.121		0.559	0.217 [.828]
Son-preference				
Position of first-born son in the birth order (SONPRF)	1.130	***	0.156	7.254 [.000]
Position of first-born son for Muslims (MSONPRF)	-0.809	***	0.213	-3.795 [.000]
Position of first-born son for Hindus (HSONPRF)	-0.590	***	0.204	-2.892 [.004]
Fuel infrastructure				
Household uses gas/kerosene (GASKERO)	0.086		0.326	0.264 [.792]
Muslim household uses gas/kerosene (MGASKERO)	-0.746	*	0.422	-1.767 [.079]
Hindu household uses gas/kerosene (HGASKERO)	-0.307		0.443	-0.694 [.489]
Female extended family				
Female extended family resident (FEXFAM)	-0.014		0.087	-0.165 [.869]
Muslim female extended family resident (MFEXFAM)	-0.677	***	0.149	-4.560 [.000]
Hindu female extended family resident (HFEXFAM)	-		-	-
Woman's age				
Woman's age (AGE)	0.013		0.025	0.521 [.603]
Muslim woman's age (MAGE)	0.085	***	0.029	2.949 [.004]
Hindus woman's age (HAGE)	0.082	***	0.029	2.840 [.005]
R-Bar-Squared	0.606			

*** = Significant at the 0.01 level; ** = Significant at the 0.05 level; * = Significant at the 0.10 level

The first significant variable was women's university education. Higher education is postulated as influencing fertility for several reasons: it may increase the opportunity costs of women's time; it may bring into operation the 'quantity-quality' trade-off; university education encourages women to study later into their fertile lifespan which may directly delay marriage and childbearing; it may make women more effective users of family planning methods; and it may inculcate values incompatible with high fertility. University education was significant at the 0.01 level for Muslims, but not at all significant for Hindus and Christians. Neither secondary nor primary education was significant for any religious group. According to the model, a one-year increase in university education decreased Muslim women's fertility by 0.40 children. Three hypotheses were tested in relation to university education. First, a Wald test rejected the restriction that the coefficient on HUEDU equalled the coefficient on MUEDU, implying that the effect of university education on fertility was significantly different for Muslims than for Hindus. Second, a Wald test accepted the restriction that the coefficient on UEDU equalled the coefficient on UEDU+HUEDU, implying that the effect of university education on fertility for Christians was similar to that for Hindus. Third, a Wald test rejected the restriction that the coefficient on UEDU equalled that on UEDU+MUEDU, implying that the effect of university education on fertility differed between Christians and Muslims.

The next significant variable was husband's primary education. If a Muslim man had an additional year of primary education this increased his wife's fertility by 0.33 children. Husband's primary education was not significant for Hindus and Christians. Three hypotheses were tested for this set of variables. First, a Wald test accepted the restriction that the coefficient on HPEDUSP equals the coefficient on MPEDUSP, indicating that there is no significant difference in the effect of husband's education on the fertility of Muslims and Hindus. Second, a Wald test accepted the restriction that the coefficient on PEDUSP equals the coefficient on PEDUSP+HPEDUSP, implying that the effect of husband's primary

education on children ever born for Christians is similar to its effect for Hindus. Third, a Wald test rejected the restriction that the coefficient on PEDUSP equals the coefficient on PEDUSP+MPEDUSP, implying that the effect of husband's primary education on fertility differed between Christians and Muslims.

Husband's secondary education decreased fertility significantly for Muslims, but had no effect for Hindus and Christians. This may be because Muslim men who have attended secondary school prefer wives who are more educated, or they too prefer better 'quality' children to a higher 'quantity'. Three hypotheses were tested in relation to this variable. First, a Wald test accepted the restriction that the coefficient on HSEDUSP equalled the coefficient on MSEDUSP, implying that the effect of husband's secondary education on Hindu fertility was not significantly different from its effect on Muslim fertility. Second, a Wald test accepted the restriction that the coefficient on SEDUSP equals the coefficient on SEDUSP+HSEDUSP, implying that the effect of husband's secondary education on Christian fertility is not significantly different from its effect on Hindu fertility. Third, a Wald test rejected the restriction that the coefficient on SEDUSP equals the coefficient on SEDUSP+MSEDUSP, implying that the effect of husband's secondary education on fertility significantly differed between Christians and Muslims.

The next significant variable was whether the husband was employed in domestic industry. This variable was not significant for Hindus, Muslims or Christians. However, an F-test testing the joint restriction that the coefficient on all three variables was not significantly different from zero was rejected, implying that these variables had to be retained in the model. Hypothesis-testing with these three variables also showed that their effects on fertility were not significantly different from each other. This result is probably because of a high degree of multicollinearity between these regressors, which makes them individually insignificant, but very significant overall.

The next significant variable measured son-preference through the position of the first-born son in the birth-order. This variable was significant for Hindus, Muslims and Christians at the 0.01 level, implying that son-preference may be captured in a 'pure demographic accident' variable affecting fertility. If a Hindu woman had a son who was one place later in the birth-order, this raised her fertility by 0.32 children; if a Muslim woman had a son who was one place later in the birth-order this raised her fertility by 0.54 children; and if she was Christian this raised her fertility by 1.13 children. Three hypotheses were tested in relation to this variable. First, a Wald test accepted the restriction that the coefficient on HSONPRF was not significantly different from the coefficient on MSONPRF, implying that son-preference had similar effects on Hindus and Muslim fertility. Analogous tests established that the position of the first-born son affected fertility among Christians significantly differently from its effect among Hindus and Muslims.

The next variable to affect fertility was women's age, which was significant for both Hindus and Muslims at the 0.01 level, but not significant for the Christians. Three hypotheses were tested in relation to this variable. First, a Wald test accepted the restriction that the coefficient on HAGE was not significantly different from the coefficient on MAGE, implying that the effect of woman's age on children ever born was not significantly different for Hindus than for Muslims. Analogous tests established that the effect of woman's age on fertility was significantly different for Christians from its effect for either Hindus or Muslims.

The next variable to affect fertility was the presence in the household of resident female extended family. As argued earlier, one reason why this variable was used was that it is

highly correlated with total household size and was used as a proxy for it.[78] This variable had no significant influence on the fertility of Hindus and Christians, but if a Muslim woman had one additional female family member, this decreased her fertility by 0.69 children, an effect significant at the 0.01 level. Though this finding may appear counter-intuitive, given that female extended family members are postulated as reducing the time-costs to parents of having children by taking over some of the child care responsibilities, this suggests perhaps the influence of other women encouraging family planning (as we saw in the qualitative evidence in Chapter 5). Alternatively, it may reflect greater monitoring of couples' observance of abstinence norms in households containing extended family members. Moreover, extended family members may substitute for children either spatially or as productive members of the family labour force. A Wald test rejected the restriction that the coefficient on FEXFAM was equal to the coefficient on MFEXFAM, implying that the effect of female extended family on the fertility of Muslim households was significantly different from their effect on the fertility of Hindu and Christian households.[79]

The next variable influencing fertility was the availability of fuel infrastructure. This variable was not significant for Hindus and Christians, but a Muslim household had 0.66 fewer children if it used gas or kerosene rather than firewood as a primary source for fuel. Three hypotheses were tested in relation to this variable. First, a Wald test accepted the restriction that the coefficient on HGASKERO equals the coefficient on MGASKERO, implying that the effect of using gas or kerosene for fuel on fertility was not significantly different for Hindus and Muslims. Analogous tests established that the effect of using gas or kerosene as a

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[78] It may be recollected that this was done in order to facilitate interpretation of the coefficient on the total-expenditure variable i.e. it was necessary to control for the fact that some families had higher expenditure not because they were richer but because they had more members living in the household. As total household size could not be used in the model because it is endogenously determined with total fertility, the female-extended-family variable was used instead, because it was highly correlated with total household size.

[79] It may be recollected that HFEXFAM could not be included in this model due to perfect collinearity with the other regressors. Hence, it is not possible to test the equality of MFEXFAM = HFEXFAM separately.

primary source of fuel does not have significantly different effects on fertility between Christians and Hindus, and between Christians and Muslims.

Finally, we must consider the intercept terms. None of the intercept terms were significant. Three hypotheses were tested: first, whether the coefficient on CONST equals the coefficient on CONST+MUSLIM; second, whether the coefficient on CONST equals the coefficient on CONST+HINDU; and third, whether the coefficient on MUSLIM equals the coefficient on HINDU. All three hypotheses were accepted, implying that religious affiliation alone does not exert a separate effect on the fertility of the three religious groups.

The findings from the interaction model support the conclusion that differences in fertility among religious groups are not due to religion alone. Rather, they are caused by differences in socio-economic and other characteristics of individual members of different religions, and by differences in the way members of different religions respond demographically to certain socio-economic and other influences. Thus, the conclusion from both the preliminary models and the interaction model is that the causes of religious differentials in fertility are more to be found in the background socio-economic characteristics of members of different religious groups, and in their patterns of response to changes in these characteristics, than in religion by itself.

V. Conclusion

For many decades now, in both theoretical models and empirical studies, economists, demographers and anthropologists have been concerned with explaining fertility trends in India. For the most part, these empirical analyses of fertility have taken the form either of large sample surveys or of microdemographic investigations in localised areas. This chapter has adopted the second approach. It has attempted to assess the influence of the

nonproximate developmental factors that affect fertility, using a sample of 201 households from Ramanagaram taluk in Karnataka in south India from which information was collected on a very wide variety of variables. What light do the findings from the Ramanagaram sample shed on the various economic, social and religious factors which have been hypothesised to influence fertility theoretically, and which were discussed earlier in this chapter?

Let us turn our attention first to the factors which did not turn out to be significant predictors of fertility. The first factor considered is the occupation of the woman. Although this was significant in some of the preliminary models, it was insignificant in the final interaction model. In this study, woman's occupation was measured in three ways. The first measure was whether or not the woman had a primary occupation. Theoretically, we expect that if a woman is not a housewife, but has an occupation, her fertility is lower. This variable was not significant for Hindus, Muslims or Christians.

The second way in which women's occupation was measured was whether or not the woman had a skilled occupation. In particular, if a woman is employed in a skilled occupation, she may have lower fertility because of the higher opportunity costs of bearing and rearing children due to the availability of better economic opportunities outside the home. This variable, however, was not significant for Hindus, Muslims or Christians.

The third way in which this variable was measured was whether or not the woman had a silk-related occupation. If a woman performs a silk-related occupation, her fertility may be higher because many of the silk-related processes (such as silk-rearing, cocoon-boiling, silk-reeling and filature work) required a continuous supply of child labour. Thus, if a woman was in a silk-related occupation, she may have had higher fertility because of the increased demand

for child labour. However, even this measure of women's occupation was not significant either for Hindus, Muslims or Christians in the interaction model.

There may be several reasons why none of the measures of women's occupation were significant predictors of fertility. Firstly, this variable may have been highly correlated with income, education or other indicators of women's status. Secondly, as argued in section I.B.3, it is hypothesised that women's occupation affects fertility only if women are working in the urban sector, in the modern labour force. As argued in Chapter 2, although Ramanagaram was classified as a 'town', the environment in which women lived and worked was still very 'rural'. Moreover, the silk industry, in which so many of the Ramanagaram women worked is still entirely a cottage-based industry. These may be the reasons we do not observe women's occupation (measured in any way) to have a significant effect on fertility: the available work for women in Ramanagaram is still too compatible with childrearing, and in this respect varies too little across women, to exert any effect on their fertility decisions.

Income is a second factor often hypothesised to affect fertility. The argument usually goes that as income rises, initially it increases fertility and then later reduces it. This latter effect is because as incomes rise, the price of children increases relative to the price of other goods, due to the operation of various substitution effects, which increase the opportunity costs of parent's time, with the operation of the 'quantity-quality' trade-off, and with better access to substitutes for 'child services' such as insurance and welfare. In the present study, income was measured in three different ways: as total expenditure, as total foodgrains expenditure, and through an index of the ownership of items of consumer equipment. In no model was any of the income measures a significant determinant of fertility. This suggests either that income does not exercise an impact on fertility, or that a pure 'income effect' on fertility is completely outweighed by various other 'substitution effects' in our models. This finding is

surprising in the light of other fertility studies, and given the wide range of variation in income in the Ramanagaram sample.

The next factor that was found to exert no influence on fertility was marital consanguinity. Theoretically, it has been postulated that fertility should be higher in consanguineous marriages than in marriages where partners are unrelated, mainly because of the initial low age at marriage for women and large age differences between spouses in consanguineous unions. Women in consanguineous unions are also postulated to have more children in order to have more sons to keep property within the family. On the other hand, consanguineous marriages may lead to lower fertility because of greater female autonomy arising from the fact that wives stay near their families of origin. In the present study, consanguinity was measured using a dummy variable and the coefficient of inbreeding. The theoretical expectation of higher fertility in consanguineous unions was not confirmed in the 'best' preliminary fertility model (model 12) nor in the interaction model.

The next factor which was not significant was some measures of husband's occupation. Some occupations for men are supposed to increase a couple's fertility (farming, domestic industry), others to decrease it (skilled occupations). Theoretically, we expect fertility to be higher if the husband is employed in farming or domestic industry because of greater demand for child labour, and we expect fertility to be lower if the husband is employed in a skilled occupation because a man who is employed in a skilled occupation may prefer a wife who is also employed in a skilled occupation, is better educated, or is older. In the models presented here, neither skilled nor farming occupations for husbands significantly affected fertility. The fact that the farming-occupation variable was insignificant implies that fertility was not affected specifically by an increased demand for child labour in agriculture, probably because many occupations in cottage or small-scale industry in Ramanagaram also used child labour. Secondly, the insignificance of the skilled-occupation variable may be because this variable

is highly correlated with men's secondary education, which (as we shall see below) exerted a negative effect on fertility. Domestic industry did have to be retained in the interaction model because an F-test which performed a joint test of zero restrictions on the coefficients of the domestic industry variables was rejected at the 0.05 level. However, this variable did not have a significant t-ratio for any religious group. Hypothesis-testing also showed that the effect of domestic industry on fertility was not significantly different between Hindus, Muslims and Christians. In combination, this implies that husband's employment in domestic industry does affect fertility overall, and in a negative direction, but that it is difficult econometrically to isolate its effect on fertility for individual religious groups.

Let us now turn our attention to those factors which emerged as significant nonproximate determinants of fertility. The first factor is the education of the woman. Theoretically, this variable is hypothesised to lower fertility because it may delay marriage, because women acquire better knowledge of contraception, and because women with education have healthier babies with lower child mortality. Women with education are also more likely to be employed, which may be incompatible with child rearing because it increases the opportunity costs of women's time. Education is also very important from the perspective of population policy because recent studies have argued that in other developing countries, such as in Kenya, the apparent success of the country's population policy has been largely attributable to the success of its education policy in increasing primary and secondary school enrolment, particularly for girls. In that country, the total fertility rate fell from 8.1 in 1978 to 5.4 in 1993, mainly because total primary school enrolment has remained above 90% since the mid-1970s.[80] However, it is important to note, as Jeffery and Jeffery argue, that girls' schooling can only lead to lower fertility when class, community and gender politics are changed in order to make female empowerment possible. They argue that education alone may not lead

[80] Ajayi and Kekovole, 1998: 113-156.

to decreased fertility, unless the structural contexts in which women find themselves are also taken into account.[81]

The relationship between more education and lower fertility is particularly supposed to hold for secondary and university education. Women's education was measured in the Ramanagaram sample as the total number of years of education, and then broken down into the total number of years of primary education, secondary education and university education. In the models presented here, female university education emerged as one of the most important variables influencing fertility, at least for Muslim women.

The importance of university education, particularly in the interaction model, suggests that in Ramanagaram education affects women's abilities to make decisions about fertility only at higher educational levels. It may be that higher education significantly influences women's status in the household, relative to other family members, by enabling women to make independent decisions, such as decisions about contraception. Higher education may also be increasing the opportunity costs of women's time, and by motivating and enabling mothers to produce fewer but better 'quality' children, because each child is now more costly to raise. Or it may be the case that the aspirations and values which education can convey, which are incompatible with high fertility, are only transmitted in high school and university.

While university education decreased the fertility of Muslims, it had no significant effect on the fertility of the Hindus and the Christians. Moreover, there was a difference in the effect of husband's university education on Muslim fertility compared to Hindu fertility; and also between Muslim fertility and Christian fertility. One reason why Muslims in Ramanagaram may be so much more susceptible to university education than the Hindus and the Christians may be that Muslim women were the least likely of all the three religious groups to go on to

[81] Jeffery and Jeffery, 1997: 255-256.

university. Hence, at the margin, an additional year of university education may affect them more. Another reason may be that there was only one Arts College in the town which women of all religions attended. However at the level of school, while Muslim girls mainly attended the Urdu schools, Christian and Hindu girls attended the Anganwadi and other primary state schools, where information about family planning, at least at the secondary school level, was regularly imparted. Hence, perhaps Muslim girls were more affected by an additional year of university education because the interaction with women of all religions at university had a larger impact on their own views about fertility and small family norms. It should also be remarked that no measure of women's education appears to affect the fertility of Hindus and Christians, which is a very surprising finding, especially given the importance of this variable in so many studies of fertility in other societies. One possible reason for this is given that women's education and husband's education are highly correlated, for Hindus and Christians husband's secondary education is picking up the effect of education on fertility (as discussed below).

Husband's education is also postulated to influence fertility, either in a negative or in a positive direction, depending upon the level of the income of the husband, and the relative difference between husband's income and wife's income. If the husband has greater education, this is hypothesised to increase the opportunity cost of women's time, resulting in the desire for fewer, but better-'quality' children. On the other hand, if a husband who is highly-educated prefers a wife who is also highly educated or has a skilled job, then this would reduce fertility. An alternative view is that husband's education increases fertility if the husband is educated and employed and believes that he can afford to support a wife and family earlier. This may then give rise to higher fertility by lowering both women and men's age at marriage.

In the models estimated for Ramanagaram, husband's primary education exercised a significant positive influence on fertility only for Muslims. This variable was not significant for Hindus and Christians. However, Wald tests established that the effect of husband's primary education was not significantly different for Muslims compared with Hindus, even though it was significantly different from its effect for the Christians. The fact that for Muslims, husband's primary education exercises a positive role on fertility implies that at least for this religious community, a few years of education alone do not reduce men's demand for children, nor does it necessarily mean that Muslim men marry 'likes' in the marriage market. Nor, perhaps, does education influence Muslim men's ideas about using contraception. A few years of education do not also make Muslim men want to favour child-quality over child-quantity. However, if a Muslim man is educated beyond this level (as explored below), his education does exercise the expected negative effect on fertility, as it does for Hindu and Christian men likewise.

For all three religions, husband's secondary education exercised a significant and negative influence on fertility. This suggests that an increase in husband's secondary education may be increasing the opportunity costs of both parents' time, resulting in fewer, but better-quality children, or that educated husbands marry 'likes' and that therefore, both husband and wife hold low-fertility norms. Further, Wald tests established that the effect of husband's secondary education was significantly different between Christians and Muslims, though not between Hindus and Muslims nor between Hindus and Christians. Thus, while husband's secondary education does affect fertility, it affects it significantly more for Muslims than for Christians. Perhaps one reason for this finding is that Christian women in Ramanagaram had greater autonomy than Muslim women. Hence, the influence of Christian men on couples' decisions is not as great as in Muslim households, where the men's decisons about fertility may be very important and even override those of the women. This difference in autonomy

may well be what is being expressed in the greater significance of the husband's-secondary-education variable for Muslim households.

The next factor we consider is the position of the first-born son in the birth order. This variable in essence measured whether a pure demographic 'accident' - how long it took to get a son - could have an impact on total fertility. This factor was very significant and positive in all of the preliminary models. It was also positive and significant, at the 0.01 level, for all three religious groups in the interaction model. We can conclude, therefore, that how soon the couple succeeds in having a son strongly influences total children ever born in Ramanagaram, after controlling for the influence of other possible determinants. This is consistent with other evidence, both from the Ramanagaram questionnaire and for India more generally, that parents expect to derive considerable benefits from sons in the form of old age care, and possibly also in the form of contributions to family income earlier in life. Even though the position of the son in the birth-order was significant for all three religious groups, Wald tests established that this effect was different between Hindus and Christians and between Muslims and Christians, though not between Hindus and Muslims. The difference was expressed mainly in the value of the coefficient on the son-preference variable, which was much higher for Christians than for Muslims and Hindus. Though it is not possible to make generalisations because the sample size of Christians is small, greater son-preference among the Christians may be because the Christian community in Ramanagaram are originally migrants from Tamil Nadu, and their minority status in Karnataka relative to both Hindus and Muslims (since they make up only 2% of the population in the taluk) may make them depend more on sons for insurance cover.

The next significant variable was the presence of extended family members in the household. This variable was used for two reasons. First, it was used as a proxy for total household size with which it is highly correlated. This was done so as to control for those households which

had higher total expenditure not because they are richer, but because they have more members. Second, it is often hypothesised that the presence of extended family significantly reduces the costs of childrearing for parents, increasing fertility because parents only bear a portion of the costs of childbearing. Alternatively, extended family may reduce fertility if there is a lack of privacy, and if traditional taboos on sexual intercourse are observed at certain times due to strict monitoring by the extended family.

What was particularly interesting about this variable in the interaction model was that (counter to theory) it had a negative coefficient, at least for Muslims. That is, if a Muslim household had one extra female family member, this reduced the number of children ever born by 0.69. This runs totally counter to existing theories about the effects of the extended family system increasing fertility. Instead, among Ramanagaram Muslims resident family seems to reduce fertility. There are several possible reasons for this. First, the presence of extended family may lead to residential crowding, reducing living space for new offspring. Second, the direction of causation may in fact be the opposite: exogenous reproductive problems may have resulted in reduced fertility, creating more living space and labour demand, thereby encouraging coresident extended family. Third, the presence of the extended family may result in surveillance of the couple's sex lives, particularly in the case of post-partum taboos leading to reduced fertility. Fourth, exogenous availability of extended family may have increased household labour supply, substituting for children and contributing to lower fertility. Fifth, it may be that because the concept of a child-centred nuclear family is replacing the notion of the extended family, this results in lower fertility. Finally, female extended family may be directly encouraging lower fertility through the mechanism discussed in Chapter 5 where qualitative information from the Ramanagaram interviews showed that women consulted with female extended family members on issues which related to contraception, and mothers-in-law positively encouraged daughters-in-law to have sterilisation operations after a certain number of children had been born. Examining

differences by religion, the effect of female extended family for Muslim households was significantly different from the effects on Hindu and Christian households, for whom this variable was not significant. Perhaps one reason why female extended family resident was more important for Muslim households was because of purdah restrictions, which limited Muslim women's mobility, resulting in their greater dependence on female extended family and consequently, greater monitoring of Muslim women's fertility behaviour.

The age of the woman was included in the model for two reasons. The first was that it acted as a control variable, because many younger women may not have completed their fertility at the time of survey. Secondly, it acted as a measure of 'ideational change' over time, based on the hypothesis that the social equilibrium with regard to fertility depends on 'strategic complementarities' in decision-making by individuals, and the history of the social system. The effect of woman's age on fertility was very significant and positive both in the preliminary models and in the interaction model. Although this was probably because the older women in the sample had had more time to have more children, it may also be reflecting the same set of influences we observed with the negative relationship between woman's age and her age at marriage, i.e. of changes over time in norms and ideas about fertility. Examining differences by religion, this variable was significant for Hindus and Muslims, but not for Christians; the size of the effect did not differ significantly between Hindus and Muslims. Perhaps one reason why this variable did not affect the Christians as much as it Hindus and Muslims may be because older Christian women in Ramanagaram have greater autonomy and have experienced a change in norms about lower fertility within their community earlier than women of the other two religious groups, whether through the influence of radio and television or through the influence of the meetings on women's issues which took place at their local church on Sundays.

The next factor we consider is water and fuel infrastructure. It has been hypothesised that a major reason for rural households to have many children is to help with collecting water and fuel. In the preliminary models, no infrastructure variable exerted any significant influence on actual fertility. However, in the interaction model, if the household used gas or kerosene for fuel, this had a significant and negative effect on fertility, although only for Muslim households. One reason for this finding may be that Muslim households did not use daughters at all for collecting fuel because of purdah restrictions, but did use sons. This may have increased the demand for sons, and hence fertility, for those Muslim households which were dependent on firewood for fuel, and consequently decreased fertility for those Muslim households which used alternative sources of fuel such as gas or kerosene. This is consistent with the results of the detailed analysis of water and fuel provision in the Ramanagaram sample of households, which found that children were indeed among the primary collectors of water and fuel, and that these tasks were immensely time-consuming. However, the fact that this variable was significant for one religious group only, and that Wald tests showed this result not to be significantly different between religions, cast some doubt on its importance. One explanation may be that parents are simultaneously making decisions about a number of matters, such as the number of children to have and/or whether to use firewood or kerosene for fuel, and in these models we only observe the outcome. Another possible explanation is that access to piped water or gas may be highly correlated with other regressors such as educational status, occupations of both men and women, and income, and these regressors may be picking up the effect of some of the infrastructure variables.

The last variable which significantly affected fertility was caste among Hindus. Theoretically, we expect that some caste groups may have higher fertility than others due to the operation of the effects of a particular 'caste culture' or the desire of some castes to be numerically 'dominant'; this reasoning has been applied specifically to the scheduled castes. However, as discussed earlier in this chapter, the Mysore Population Study of 1961 found the

contrary, namely that the fertility of the non-backward castes was higher than that of the scheduled and backward castes. This could not be tested in the interaction model because the caste variable applied only to Hindus. However, in model 14 the high-caste variable was a significant determinant of fertility, suggesting that even after we take into account socio-economic differences between members of various castes, the influence of caste membership is important in explaining differences in fertility among Hindus. However, in contrast to the 1961 findings, those women who belonged to a higher caste in Ramanagaram have 0.3 fewer children than those who belonged to low or scheduled castes. The findings from Ramanagaram suggest that higher castes have progressed further through a transition from higher fertility to lower fertility than have backward and scheduled castes in the region. The influence of caste may also illustrate the operation of atmospheric externalities which influence fertility irrespective of socio-economic context, as it holds even when variables such as education and income are controlled for.

Finally, we consider whether the religion of the respondent affects fertility independently of any differences in socio-economic characteristics across religious groups. Theoretically, adherence to some set of religious beliefs is hypothesised to affect fertility either directly (in terms of its normative precepts) or indirectly (in terms of other characteristics associated with it). In Chapter 1, we explored the theories postulating an impact of religion on fertility in considerable detail. In the analysis of fertility in Ramanagaram, religion was measured in terms of Hindu and Muslim dummy variables and an index of piety. In all but two of the preliminary models, the religion measures were significant. The two models in which the religion measures were not significant were model 7 which used the index of piety; and model 8 which excluded the Christians. By way of illustration, in model 12, a woman was likely to have 1.31 children more if she were Muslim than if she were Christian, and 0.95 children more if she were Hindu than if she were Christian, after controlling for other possible determinants. However, there was no significant difference in fertility level between

Hindus and Muslims. Moreover, in the interaction model we saw that the effect of religion on fertility is not significantly different between Hindus, Muslims and Christians, as evidenced in the acceptance of the hypotheses that the intercept terms for the three religious groups were not significantly different from each other. The demographic differences between religious groups in Ramanagaram are expressed more in terms of significant differences in the effects of various socio-economic factors which influence fertility in this society, not in religious affiliation by itself.

In summary, what can we say about Hindu-Muslim fertility in Ramanagaram? The preliminary regression models presented in this chapter concluded that both Hindus and Muslims have high fertility when compared with the Christians. The difference of one child in the mean level of fertility between Hindus and Muslims, which we observed in Chapter 3, disappears once we have controlled for the influence of other socio-economic factors. The results from the interaction model suggest that rather than religion, demographic divergences were actually related to other socio-economic characteristics such as education, age, infrastructure, son-preference, female extended family and (among Hindus) caste, and differences in how members of different religions respond demographically to these socio-economic influences. This finding is consistent with the more general theoretical observation made in Chapter 1 that there is little theological difference between Hinduism and Islam with regard to matters relating to demographic behaviour, except in their positions on birth control. These findings are also consistent with those from the analyses of age at marriage and contraceptive use, which also found that religion does not exert a pure 'theological' impact after controlling for other socio-economic factors.

However, this conclusion may have to be qualified by taking into account that the Muslim community in Ramanagaram taluk is economically richer and more urbanised than Muslim communities elsewhere in India. This might explain the closeness of Hindu and Muslim

demographic characteristics in this region. It may also explain the non-significance of the expenditure variable because Muslim/Hindu membership may, in part, be proxying for it. However, this caveat does lend strong support to the more general issue raised by the present study, namely that as socio-economic factors are targeted more strongly, fertility among religious groups in India will tend to converge.

This has obvious implications for population policy at the state and taluk level. In post-Independence India, Karnataka is one of the four states in the south which are collectively considered to have performed well on demographic indicators compared with national trends and in comparison with other states in north India. However, what this analysis has shown is that even if state averages are considered good, there are still likely to be significant demographic differences between groups within states. Such differences require further research and may be important in formulating government policy.

What would the individual women of Ramanagaram have to say about attempts to reduce their fertility? We conclude this chapter by returning to their views. At the end of the questionnaire, the 201 women were asked to reflect on what they felt about the growth of population in the towns and villages of Ramanagaram taluk. The responses to this question, presented in Table 18, revealed that these women did in fact think about population issues and had definite views on the subject.

Table 18: What do you feel about the growth of population in your town/village? Ramanagaram sample (1996)

Response	All women		Hindus		Muslims		Christians	
	No.	%	No.	%	No.	%	No.	%
Growing too fast	172	85.5	90	81.1	67	89.3	15	100.0
Growth is about right	11	5.5	9	8.1	2	2.6	0	0.0
Don't know	18	8.9	12	10.8	6	8.3	0	0.0
Total	201	100.0	111	100.0	75	100.0	15	100.0

The Ramanagaram women appeared overwhelmingly to believe that the population in their town and villages was growing too fast. Of the women in the sample, 86% believed that population growth was too fast, and the percentage was high among all religions, at 81% of Hindus, 89% of Muslims, and 100% of Christians. This may suggest that attempts to formulate government policy to reduce fertility will have active support at the grass-roots level. However, the other findings of the study show that individual fertility is still quite high, and that this is because of socio-economic factors which will need to change before the collective demographic aspirations of these south Indian women can be realised. For lowering fertility, these socio-economic factors include targeting women's education, husband's education, ideas about (and the economic pressures underlying) son-preference, the provision of fuel infrastructure, influence of female extended family and changes in social norms. The policy measures which would specifically affect Hindu and Christian fertility are those which relate to changing perceptions about the importance of sons as a means of insurance cover, and using the media to further influence changes in social norms about fertility. For Muslims, possible policy measures include increased state support for education for both Muslim women and their husbands; encouraging the influence of female extended family who appear to have a positive effect on Muslim women's fertility; and finally, public provision of gas or kerosene oil as alternatives to firewood collection. It is only by recognising that socio-economic factors influence different religious groups differently that we may be able to devise policy measures which can address the patterns of demographic response found in Ramanagaram and elsewhere in India.

CHAPTER 7

Conclusion

You are a small girl, not yet five and I wonder in what kind of India you will grow up and in what kind of India you will serve. ... You were hardly two years when you had a little sister. I was immensely pleased that it was also a girl. I know girls are not wanted - especially in our custom-ridden and conservative country, but I feel that it is only women who can make the world a happy place. ... Once you decide to fortify yourself with knowledge and offer your services to help humanity, nothing can come in your path. I know you may marry, but remember this, that once you decide to marry, you must not forget your country... and our suffering fellow-beings.[1]

Shakuntala's vision for her daughters in 1946 seems as relevant to Indian women today as it was over half a century ago. In keeping with that vision, the present study was motivated by the desire to serve the concerns of a small community of Hindu, Muslim and Christian women in the taluk of Ramanagaram in the south Indian state of Karnataka via a micro-demographic exploration of the socio-economic and religious determinants of their age at marriage, their contraceptive choices and their fertility.

The history of India in the post-colonial era, and more particularly in the 1980s and 1990s, has seen the pervasive expansion of 'communalism'. This phenomenon uses religion for political gains or economic rent-seeking. Within this spirituality-with-competition nexus, confrontations between religious groups, particularly between Hindus and Muslims, have involved both large-scale communal rioting with great destruction of life and property, and less violent, but equally volatile, debates about the numerical preponderance of one group relative to another, with specific focus on the impact of religion on fertility behaviour. In this debate, more often than not exacerbated by prejudice, the distinction between the sacred and the secular becomes blurred. The present study hopes to contribute to this debate with an academic examination of the theoretical and empirical links between religion and reproduction in India today.

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[1] Extracts from a letter, written in English, from Shakuntala Rao (age 26) to her daughter Srilata (age 4), Madras, south India, 23 December 1946.

This study originally set out to answer four questions. First, can the observed higher fertility of some religious communities relative to others in India be attributed to socio-economic characteristics or to theological beliefs?[2] Does the intensity of religious observance influence fertility? How does women's status vary across religions and is this significant for fertility? Finally, might 'convergence' in the demographic behaviour of different religious groups (as in the case of Catholic and non-Catholic fertility in the 1970s in the USA) occur in any society?

There are three hypotheses about how religion can affect demographic outcomes.[3] The first is the 'pure religion effect': that the theological content of a religion exercises an independent effect on decision-making about fertility. The present study examined the theological content of Islam and Hinduism concerning marriage, children, birth control, and the position of women. It concluded that the theological content of Hinduism and Islam concerning demographic decisions is very similar. From a purely theological perspective, both religions would tend to encourage high fertility, with little difference between the two.

The second hypothesis is that religious differentials in fertility are due not so much to theology, but to differences in the socio-economic characteristics of individual members of different religions. These include not only economic characteristics such as education, income or occupation; but societal characteristics such as minority group status; household characteristics such as resident female extended family or access to infrastructure; and community characteristics such as caste.

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[2] For example, in an early analysis of fertility differentials by religion in India, Mandelbaum argued that differences in fertility by religion are more to do with differences in income and education than with differences in religion. See Mandelbaum, 1974: 46.
[3] Chamie, 1977: 365-382.

A third effect of religion on fertility is an interaction, possibly with religion as the cause, between religious affiliation and the level of different socio-economic characteristics.

This study investigated in detail only the first two hypotheses since explaining differences in all socio-economic characteristics that might affect fertility was far beyond the purview of this (or any other feasible) fieldwork. It was then examined, using both quantitative and qualitative evidence, if either of these hypotheses explained religious differentials in fertility within a sample of 201 rural women in the taluk of Ramanagaram in the south Indian state of Karnataka.

It is important to emphasise that any conclusion derived from the Ramanagaram sample cannot be representative of India as a whole, nor even of all of Karnataka. First, compared with other parts of India, levels of living in Karnataka are relatively good. The rural women from whom the Ramanagaram sample were selected are relatively prosperous compared to their counterparts in north India. Secondly, the small size of the sample means that the conclusions drawn, particularly for sub-groups of the population, must not be taken to be representative of all of India's Hindus, Muslims and Christians. There may well be demographic differences by religion in other parts of India which are different from those in Ramanagaram, and have different determinants. Notwithstanding these caveats, the present study regards it as valuable to investigate if there are demographic differentials by religion in a population which is broadly homogenous, faces a similar set of factor prices, and has uniform access to family planning.

From just looking at the monovariate descriptive statistics before taking into account differences in any other characteristic, in the Ramanagaram sample Muslim marriage age is higher than Hindu marriage age; contraceptive use among Muslims is less than among Hindus and Christians; and Muslims had one child more than Hindus. This last finding is

similar to that made in other studies of Karnataka. Almost all statements about religious differentials in demographic behaviour in India tend to stop with such monovariate descriptive statistics. The present study sought to investigate whether these religious differentials were upheld even after taking into account differences in other socio-economic attributes.

The age at which a woman marries is hypothesised to be an important proximate determinant of fertility. Over the last century or so, the age at marriage has been steadily rising in Karnataka. This has been attributed to many causes, including, among others, increasing education for girls, ideational change wrought by changing perceptions about the 'proper' time to marry and the decline in the incidence of child marriage. The present study examined trends in marriage age in Ramanagaram, both quantitatively and qualitatively. Mean marriage age among Hindus was lower than among Muslims and Christians, at least before controlling for the influence of other factors. The study also found that for the Ramanagaram women, the age at marriage had been rising over time, more so after 1978 with the imposition of the Child Marriage Restraint Act; as was the gap between the age at menarche and the age at marriage. There was also qualitative evidence supporting the hypothesis of a 'marriage squeeze' and a 'rising price of husbands' because dowry payments were ordering a market characterised by hypergamy.

An econometric investigation of the age at marriage in Ramanagaram showed that the factors tending to increase age at marriage for the women covered in the sample were more years of education, particularly secondary education, a later age at menarche, higher income, whether the woman's husband performed a skilled occupation and a later year of marriage. Of all of these socio-economic factors, the role of education in increasing marriage age must be emphasised. Whether through government schools or through the Anganwadi movement, encouraging girls to be sent to school, at least up to the SSLC level, seems to be particularly

crucial in order to increase their marriage age. Another very interesting finding of the econometric analysis was the significant and positive 'year of marriage' variable, which may indicate 'ideational change' over time in the norms surrounding age at marriage in Karnataka. Perhaps the most telling confirmation of this emerges from qualitative evidence: when the Ramanagaram women were asked at what age they wished their unmarried daughters to be married in the future, the average of their responses was 18.9 years, which was higher than the mean of their own marriage age (17.3 years).

This study also focused on whether religion exercised a significantly different effect on marriage age for Hindus, Muslims and Christians covered in the sample. The study found that the effect of religion on marriage age was not significantly different between Hindus and Muslims, but was significantly different between Hindus and Christians, and between Muslims and Christians. The interaction model also showed that the effect of different socio-economic factors on the age at marriage of Hindus and Muslims was not significantly different between them either. However, the Christians were different from the Hindus and from the Muslims, and this difference was expressed in terms of the effect of some socio-economic factors such as women's secondary education, total expenditure and the year of marriage. Thus, a combination of socio-economic factors such as education and some change in social norms about marriage appear to account for the patterns of rising marriage age in Ramanagaram.

A second major proximate influence on fertility is the use of contraception. Access to family planning in Karnataka is very widespread. This was reflected in the qualitative questioning of the Ramanagaram women, most of whom had easy access to contraception, either through the system of doorstep delivery of contraceptives, or through the public-sector provision of tubectomies. Most women had access to at least one method of contraception, though Muslim women appeared to use the system of doorstep delivery of contraceptives less than Hindus or

Christians. In the Ramanagaram sample, just under half the women had used a method of contraception. Of these methods, sterilisation operations were by far the most popular. Given the easy availability of contraception in Ramanagaram, the main determinants of contraceptive use there were factors influencing contraceptive acceptability. Moreover, a close look at 'unwanted' fertility and fertility preferences in Ramanagaram suggests that while these measures are very useful as an indication of desires about fertility, all too often women's stated preferences and revealed preferences differ; questionnaire surveys have to be carefully formulated in order to obtain accurate estimates of 'unwanted' fertility. This is because women's responses are influenced by whether they are asked for a general positive statement or a concrete normative one, by their existing number of children, and by other qualitative factors.

According to the perceptions of the women in the Ramanagaram sample, religion did influence the acceptability of contraception. The most interesting qualitative finding was that most Muslim women thought their religion did disapprove of contraception and over one-quarter of them disagreed with this perceived position of their religion on contraception. Even though a number of scholars have argued that Islam does not oppose contraception, the Muslim women of Ramanagaram think that such prohibitions do exist.

Turning to whether religion actually did influence contraceptive choice, the study found that the factors affecting the probability of contraceptive use in Ramanagaram were woman's education, husband's education, ease of access to contraception, female extended family resident and the woman's age. Religion did not have an impact on contraceptive use either for the Hindus or for the Muslims, after controlling for the effect of other socio-economic factors. Moreover, there was also little difference between Hindus and Muslims in the socio-economic characteristics which affected their contraceptive practice, although there were differences between both of them and the Christians. Interestingly, for a constant level of any

one characteristic, it exerts different effects for different religious groups. For example, if we take a single socio-economic characteristic such as women's education, the effect of this on the probability of contraceptive use for all women is positive. However, the impact of women's education on the decision to use contraception for Christians is greater than for either Hindus or Muslims. Consequently, education policy towards the Christians, who were already better educated, may need to be different from that towards Hindus and Muslims. For Hindus and Muslims, education may need to be targeted more strongly. The immediate policy implication of this analysis is that population policy in developing countries may have to *target different religious groups in different ways*, in order to increase contraceptive use.

Having considered the determinants of two important proximate fertility determinants, age at marriage and contraceptive choice, the nonproximate determinants of fertility in Ramanagaram were explored. The econometric analysis found that the factors affecting children ever born in Ramanagaram were women's university education, husband's primary education, husband's secondary education, position of first-born sons in the birth-order, female extended family members resident, woman's age, and whether the household used gas/kerosene in lieu of firewood for fuel.

Looking at differences across religions prior to controlling for other variables, the mean number of children ever born for Muslims was one child higher than for Hindus. However, after taking into account the effect of other factors, there was no statistically significant difference in the intercept terms for Hindus and Muslims, suggesting that religion is not exercising a direct effect on fertility levels. Interestingly, though, there were differences in the slopes of the regression lines for the three religious groups, indicating that the set of socio-economic factors affecting fertility differ across religions, and that some socio-economic attributes affect the fertility of different religions in different ways. Thus, Hindu fertility is influenced mainly by the woman's age and the position of first-born sons in the

birth-order, while Muslim fertility is affected by those two variables plus woman's university education, husband's primary and secondary education, whether the household used gas or kerosene as a source of fuel, and the number of female extended family resident. This implies that any fertility policy undertaken in Ramanagaram - and possibly other religiously diverse societies - needs to target different religious groups differently. For Muslims, policies focusing on education and infrastructure would be strongly indicated. For Hindus, by contrast, policies focusing on 'ideational' change would seem to be more important, insofar as woman's age reflects changing norms, and insofar as son-preference arises from norms rather than from considerations of insurance. For both groups, however, insofar as son-preference arises from insurance considerations, the Ramanagaram findings provide support for policies directed at providing old age pensions or access to credit by women (as has been successful in Bangladesh[4]) in order to reduce women's dependence on surviving sons.

The findings from Ramanagaram show clearly, however, that it is not religious affiliation or religious observance which affects fertility, but rather the manner in which religion is interpreted to individuals. This was evidenced in the fact that the index of piety created as a measure of religious observance was not significant in any of the regression models.

The implications of these findings on the effect of religion on fertility for Indian politics and policy-makers are simple but important. First, they provide no empirical support for views which ascribe demographic differentials to differences in theology, or which indulge in stereotyping the behaviour of one religious group relative to another. Rather, they suggest that it is necessary to focus on how the content of a religion is interpreted to individual members of that religion and the corresponding impact on their lives. Therefore, community and religious leaders may need to be targeted because of the influence they may wield. For example, one of the key qualitative findings from Ramanagaram was that Muslim women

[4] Steele, Amin and Naved, 1998.

think that their religion prohibits contraception, even though theologically (as we saw in Chapter 1) this point is highly debated. In this case, the actual theological content of Islam is irrelevant to decision-making about fertility by Muslim women in Ramanagaram.

Second, socio-economic factors, especially women's and men's education, need more emphasis. Numerous studies of the relationship between education and fertility have found this relationship to be vital to fertility declines and the findings from Ramanagaram substantiate this.[5] The mean number of years of education for married women in the Ramanagaram sample was only 5.5 years. This is very low and is definitely one area which government policy needs to target. More importantly, even if schooling is provided, more research needs to be done on the quality of schooling provided,[6] on how to make mothers send their daughters to school, and on why they might prefer alternatives such as Anganwadi schools, as observed in Ramanagaram. More research should also be devoted to what it is in education (for both men and women), be it the acquisition of skills or the learning of values, that reduces their fertility.

Third, the findings for Ramanagaram show that different religious groups may need to be targeted in different ways if it is thought desirable to try to influence people's fertility behaviour. For example, in Ramanagaram, Muslims husbands' education needs more targeting in order to affect women's fertility; while for Hindus, women's own education and changing attitudes toward son-preference may be the key to lower fertility.

Other policy measures which could have a direct impact on reducing fertility in India more widely are further education about family planning, instituting systems of social security to reduce the dependence on children for insurance reasons, further attention to laws which

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[5] Kishor argues that female enrolment in literacy classes and in primary school is the one of the major factors behind small families in Tamil Nadu. See Kishor, 1994: 65-100.
[6] For an example of such research see Lloyd, Mensch and Clark, 1998.

would deal with gender relations, and further action on enforcing property rights, particularly those of women, so as to enable them both to own more land, and exercise more effective control over land even when they own it.[7]

This study has also generated findings which indicate the need for further research in a number of areas. There are variables which affect demographic outcomes in south India, such as the role of female extended family in influencing demographic decision-making, which need to be explored more deeply. Although the econometric results of this study presented confirm the traditional role of extended family acting negatively on contraceptive use and fertility, qualitative evidence from Ramanagaram indicated that this role may be changing, with female extended family (especially mothers and mothers-in-law) becoming increasingly proactive in encouraging younger women family members to undertake family planning. The importance of these female social networks in influencing fertility change needs more thorough empirical investigation.

Second, and related to the above discussion, the role of marital consanguinity on age at marriage and contraceptive choice, in south India more generally and Karnataka in particular, needs more research. Marital consanguinity is a distinctive feature of social organisation and marriage practice in Karnataka, and has been widely postulated as increasing fertility. However, even though measures of consanguinity were included in models of marriage age, contraceptive choice and fertility for Ramanagaram, this variable was not shown to exercise a significant effect. It was argued earlier that consanguinity may be popular in Karnataka because of the need to reduce dowry payments in marriage, and as a means of diversifying risk. Consanguinity also has positive consequences for female autonomy in that it is argued that if women are closer to their natal homes, they have greater mobility and autonomy. Although this relationship was not explored fully, this is another area requiring further

[7] Egerö, 1994: 26-27.

research, especially given the emphasis placed upon it in the demographic and anthropological literature.

The age at menarche as a determinant of the age at marriage is another variable which would reward further explanation. Although this variable has been quite thoroughly researched in the field of medicine, the present study has shown that it also belongs in the field of economic demography. It was postulated here that the positive relationship observed between the age at menarche and age at marriage arose because of underlying nutritional and health-related variables which led both to early menarche and to advantages in a competitive marriage market. This hypothesis would benefit from deeper theoretical and empirical explanation. For developing countries, its importance is further emphasised because of its relation to changes in women's nutritional status, and investments in their health capital.

In the Indian context, another relationship which this study suggests needs further exploration is that between caste and demographic behaviour. There were several indications that among the Ramanagaram Hindus, caste was an important determinant of demographic patterns. Though there was not enough information in the Ramanagaram data set to test the empirical relationships between caste and fertility more fully, it would be possible to conduct a similar type of analysis to that which has been conducted for religion in this study, by focusing on caste instead.[8] Given Indian political concerns to improve the position of the more disadvantaged castes, exploring the sources of caste differences in fertility is an important undertaking.

Another relationship deserving further empirical research is the link between infrastructure provision and fertility. The Ramanagaram study found that all members of the household, but

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[8] The importance of combining quantitative and anthropological methods in order to investigate the effects on fertility of inter- and intra-jati relations has also been argued by Lipton, 1992: 1543-1544.

particularly women and children, were responsible for water and fuel collection tasks. This may have been one reason for higher fertility. Certainly, in the case of Muslim families, those families which used gas and kerosene and did not rely primarily on firewood had lower fertility than others, even after controlling for socio-economic variables. This is one area which government policy can easily target. For power, the government can implement the proposals advocated for Ramanagaram by the 1995 infrastructure consultants: these included installing a sub-station, increasing power supply to 40 mw, phasing out power cuts and stabilising voltage fluctuations. For water, the infrastructure report recommended the digging of additional borewells, the establishment of reservoirs for water storage, the implementation of the Cauvery water supply scheme (a Karnataka Government Scheme for sharing the waters of the Cauvery equally between Tamil Nadu and Karnataka), efficient recovery of water taxes imposed by the state government, and streamlining of the administrative set-up that deals with water supply and distribution issues. Until such proposals are implemented effectively, as observed both from the analysis of water and fuel provision in Ramanagaram in Chapter 2 and the comments of the women themselves, irregular water supply and collecting firewood imply that as many hands as possible are required in order to collect the household's daily water and fuel requirements. Moreover, water and fuel collection will go on constituting a disincentive to send children (particularly daughters) to school.

This study found that while there was no differences between Hindus and Muslims in terms of the determinants of their age at marriage and in terms of the determinants of their contraceptive use, there were differences between them in the socio-economic determinants of their fertility. Given the 'proximate determinants' framework which was adopted to study fertility behaviour in Ramanagaram, these findings suggest that the nonproximate influences on fertility are acting on Hindus and Muslims differently - not via differences in their age at marriage nor via differences in their adoption of contraception, but through some other proximate determinant, such as natural fertility, length of breastfeeding, duration of couple

separation during the fertile period (as affected by divorce or migration), or differences in their practice of abortion. For example, as argued elsewhere in this study, early studies of fertility in the Mysore region did argue that Hindu religious prescriptions on the length of couple separation just after childbirth and prohibiting sexual intercourse during certain religious festivals were responsible for lower Hindu than Muslim fertility in the early part of this century. While the Ramanagaram data set was limited in that it did not collect detailed information on all of these other proximate determinants, these findings do suggest that more research would be desirable, particularly on the determinants of abortion practices and couple separation.

It must be recognised that this study of Ramanagaram is essentially one which revolves around socio-economic determinants of fertility. Although this kind of analysis is very useful, an even more broadly-based study, which tried to measure 'ideational change' in a more detailed way, would be valuable. Although some attempt was made to measure ideational change in the models of marriage age, contraceptive choice and fertility, using the 'year of marriage' and 'woman's age' variables, it must be recognised that the lack of data which measured ideational change in detail limited an in-depth exploration of the influence of social norms on fertility.

Although this study has concentrated particularly on religion and fertility, it has also been more generally a study of women and their status in a south Indian society. As discussed above, one of the key issues with which this study was concerned was how women's status varies across religions and whether this is significant for fertility. Women's status is broadly perceived to be better in south India than in north India. Indeed, this has been attributed to the nature of social organisation and marriage practices in south India, better autonomy and mobility, female education, and largely proactive regional governments who have taken a keen interest in promoting a small family ideal and literacy, and who have recognised these

two avenues as a key potential for growth. However, while the quantitative and qualitative findings from Ramanagaram substantiate all of these hypotheses, the data collected do indicate that there is room for even more improvement and change in the status of women in south India, particularly with regard to the relationship between men and women. This conviction emerges not merely from the quantitative findings, but more vitally, from the opinions of the Ramanagaram women themselves.

At the end of the questionnaire, the women were asked to reflect on five questions, as a way of assessing their perceptions about the changes around them in Ramanagaram town or their village over the previous five-year period. They were asked to rate on a scale of 'better, same or worse' their own economic position, the relations between religious groups, violence between men, violence between men and women, and the position of women, five years previously, compared to the point at which they were interviewed.

Of the women in the sample, 44% said that their economic position had improved over five years: 50% of Hindus, 33% of Muslims and 47% of Christians. There were 37% of women who said that their economic position had become worse: 18% of Hindus, 36% of Muslims and 7% of Christians. Very clearly, of all the three groups, the Muslim women believed most that their economic position had worsened over time.

The women were also asked if they thought that communal relations between religious groups had become better, stayed the same or become worse over five years. There were major communal riots in Ramanagaram in 1989-90, and as an observer in the area, my impression was that the relations between religious groups were somewhat tense. The women of Ramanagaram confirmed this impression in their responses to this question. Of the women in the sample, 54% said that relations between religious groups had become worse compared to five years before, 31% said that relations had stayed the same, and only 15% that they had improved. This was fairly uniform across religious groups, with 53% of Hindus, 53% of

Muslims and 60% of Christians saying that relations between religious groups had become worse over the five-year period.

The women were asked if the degree of violence among men and between men and women in the town or village had increased, decreased or remained at the same level. In the whole sample, 61% of women said that violence among men had become worse, 35% that it had stayed the same and only 4% that it had decreased. There were 61% of Hindus, 63% of Muslims and 53% of Christians who said that violence among men had become worse. Interestingly, the percentages are higher among Hindus and Muslims, relative to the Christians, possibly because the main conflict between religious groups in Ramanagaram taluk in recent years has been between Hindus and Muslims. An even larger proportion of women believed that domestic violence between men and women had increased (63%), while only 4% thought it had decreased. There were 61% of Hindus, 65% of Muslims and 60% of Christians who thought domestic violence had become worse over five years. One possible explanation for this, to which many of the Ramanagaram women alluded, either directly or indirectly, was the increasing incidence of alcohol-related abuse by their husbands.

Finally, the women of Ramanagaram did not think that their position in their town or village was improving. The query on any change in their position over the past five years drew rather pessimistic comments from them. Of the women in the sample, 65% believed that their position had remained the same, and 21% that it had got worse; only 14% thought that it had improved. There were 63% of Hindus, 64% of Muslims and 87% of Christians who thought that their position had stayed the same. However, while only 7% of Christians thought that their position was worse than before, there were as many as 20% of Hindus and 27% of Muslims who thought that their position was worse than before.

Thus, the majority of women in the sample interviewed in Ramanagaram taluk believed that their family's economic position had somewhat bettered, that the relations between religious groups, the level of violence between men and the level of violence between men and women had become worse, while their own position as women in the taluk had remained at about the same level as five years before. Muslim and Hindu women believed more that they were worse off, particularly with regard to their economic position and with regard to their own position as women resident in the town or village, compared with the Christians. Such qualitative evidence indicates that even in south India, there is still room for improvement in women's status.

In examining if women's status varies across religions, the most significant finding was that on most indicators, be it education, income, or occupation, Christian women emerged as much better off than their Hindu and Muslim counterparts. Though the main focus of this study was not Christian fertility in Ramanagaram, comparisons with the Christians made for useful insights. The higher status of women among the Christian community as reflected in their access to education and greater independence in decision-making abilities, was noteworthy. Moreover, whether or not it had anything to do with the Church of South India, the example of the Christians illustrates the influence of female education on demographic outcomes. Given the recent emergence of some communal violence against Indian Christians, these findings have somewhat disturbing implications.

Finally, the last question on which it is important to reflect is whether convergence in Hindu, Muslim and Christian fertility in India is possible. I believe that it is, if government policy were to target different religious groups in different ways that affect their fertility, but in a sensitive manner which works in tandem with religious leaders. Having established that community influences on fertility were more significant than individual religious observance, the present study suggests the importance of a multi-pronged approach to studying religious

differentials in fertility within a country. However, the most important conclusion of the present study is that religious differentials in fertility are the observed outcome of a complex set of factors derived from differences across religious groups in both socio-economic characteristics and the effect of these characteristics on demographic decision-making. This has far-reaching implications for both policy and politics in a religiously pluralistic society such as India. Until public policy moves in such directions, attaining Shakuntala's vision for Indian women, and Indian people in general, seems some distance away.

APPENDIX

A.1. Questionnaire

Part I

I.1. Census information
I.2. Structure of and decision-making within the family

Part II

II.1. Economic value of children
II.2. Reproduction, contraception and health care
II.3. Religion and women's status

Date and time of interview:

Language the interview was conducted in: ☐ Kannada ☐ Hindi ☐ Tamil ☐ Telugu ☐ English

Respondent number:

Part I

I.1. Census information

1.1. Name:

1.2. Town/village: ☐ Village A ☐ Village B ☐ Village C ☐ Village D ☐ Village E ☐ Ramanagaram town

1.3. Caste and jati:

1.4. Age:

1.5. Religion: ☐ Hindu ☐ Muslim ☐ Christian ☐ Other

1.6. What is your primary language of communication?
☐ Kannada ☐ Hindi ☐ Urdu ☐ Tamil
☐ Telugu ☐ English ☐ Other

1.7. Can you read and/or write your primary language of communication?
☐ Yes ☐ No

1.8. Can you read and /or write any other language(s)?
☐ Yes ☐ No

1.9. If yes, which language(s): ☐ Kannada ☐ Hindi☐ Urdu ☐ Tamil ☐ Telugu ☐ English ☐ Other

1.10. Years of education:

Primary education	Secondary education	University education

1.11. Occupation:

Primary occupation	Secondary occupation	Any other occupation

1.12. Marital status:

❒ Single ❒ Widowed ❒ Divorced ❒ Deserted (Married, spouse absent)
❒ Married ❒ Remarried

1.13. How old were you at menarche?

1.14. How old were you when you first married?

1.15. How old were you when you married the man you are currently married to?

1.16. How old were you when you started living with your first husband?

1.17. How old were you when you started living with your current husband?

1.18. Details of husband:

1.18.1. Age:

1.18.2. Years of education:

Primary education	Secondary education	University education

1.18.3. Occupation:

Primary occupation	Secondary occupation	Any other occupation

1.19. Before you got married, was your husband related to you in any way?

❒ Yes ❒ No

1.20. If yes, what type of relationship was it?

❒ First cousin on father's side ❒ First cousin on mother's side
❒ Second cousin on mother's side ❒ Second cousin on fathers' side
❒ Maternal uncle ❒ Brother-in-law
❒ Other blood relation ❒ Other non-blood relation

1.21. How many children do you have?

1.22. How old were you at the birth of your first child?

1.23.1. Details of children:

Category	1	2	3	4	5	6	7	8	9	10
Name										
Sex ❒ Male ❒ Female										
Age										
In school ❒ Yes ❒ No										
Years of education										
Resident ❒ Yes ❒ No										
If no, where does child reside?										

1.23.2 Details of other resident members of the household:

Category	1	2	3	4	5	6	7	8	9	10
Name										
Sex ❒ Male ❒ Female										
Age										
Relationship to household head										
Years of education										
Occupation										

1.24. Sources of income:

1.24.1. How much land does your family/husband have?

1.24.2. Is it self-owned or leased-in? ❒ self-owned ❒ leased-in ❒ other

1.25. Consumer expenditure and consumer equipment:

1.25.1. Average monthly consumer expenditure:

Category	Amount	Cost (rupees)
Rent (or do you own your own house?)		
Foodgrains (kgs.)		
Rice		
Wheat		
Ragi		
Pulses		
Other food (kgs.)		
Fruit/vegetables		
Meat/fish		
Milk (litres)		
Leisure		
Alcoholic beverages		
Tobacco/betel		
Cinema/other entertainment		
Children		
Food for children		
Clothing for children		
Education for children		
Miscellaneous*		
Washing soap		
Bathing soap		
Talcum powder		
Coconut oil		
Face cream		
Flowers		
Kumkum powder, kohl and any other cosmetics		
Saris/other clothes for women		

* This is mainly women's expenditure on themselves.

1.25.2. Do you own any of the following?

❒ Transistor/radio ❒ Bicycle ❒ Fan ❒ Cot
❒ Moped/scooter ❒ Watch ❒ Television ❒ Chair/bench

I.2 Structure of and decision-making within the family

2.1. Influence and decision-making within the household:

2.1.1. Name five people with whom you have the closest contact.

1. 2. 3. 4. 5.

2.1.2. Who decides who goes to school?

❒ Woman alone ❒ Husband ❒ Father-in-law ❒ Parents
❒ Parents-in-law ❒ Male relative ❒ Female relative ❒ Joint family
❒ Husband and wife together ❒ Woman and other relatives ❒ Other

2.1.3 Who decides who performs housework?

❒ Woman alone ❒ Husband ❒ Father-in-law ❒ Parents
❒ Parents-in-law ❒ Male relative ❒ Female relative ❒ Joint family
❒ Husband and wife together ❒ Woman and other relatives ❒ Other

2.1.4 Who decides who performs income-earning work?

❒ Woman alone ❒ Husband ❒ Father-in-law ❒ Parents
❒ Parents-in-law ❒ Male relative ❒ Female relative ❒ Joint family
❒ Husband and wife together ❒ Woman and other relatives ❒ Other

2.1.5 Who decides how to spend money?

❒ Woman alone ❒ Husband ❒ Father-in-law ❒ Parents
❒ Parents-in-law ❒ Male relative ❒ Female relative ❒ Joint family
❒ Husband and wife together ❒ Woman and other relatives ❒ Other

2.2. To what extent does 'custom' decide these matters?

❒ Custom is important ❒ Custom is unimportant ❒ Do not know

2.3. Value of daughters:

2.3.1. Does your daughter share in the cooking? ❒ Yes ❒ No

2.3.2. What age did your daughters get married?

Married daughter	1	2	3	4	5	6	7
Age at first marriage							

2.3.3. What age will your unmarried daughters be married?

Unmarried daughter	1	2	3	4	5	6	7
Proposed age at first marriage							

2.3.4. Would you/did you allow your daughters to continue schooling after puberty?

❒ Yes ❒ No

Part II

II.1 Economic value of children - benefits and costs

1.1. Children's contributions to current and future income:

1.1.1. How many hours a day (approximately) do children spend doing tasks such as:
- ☐ grazing;
- ☐ helping mother;
- ☐ working in other employment (e.g. silk-reeling units)?

1.2. What is your main source of water?
☐ Collected by hand in water pots either from the river or public tap
☐ Pipe ☐ Tap ☐ Other

1.3. If collected by hand, which family member(s) collects water?

☐ Woman	☐ Husband	☐ Son	☐ Daughters
☐ Sisters-in-law	☐ Father-in-law	☐ Mother-in-law	☐ Brothers-in-law
☐ Daughters-in-law	☐ Sons-in-law	☐ Servants	☐ Others

1.4. How many hours a day do you or any family member spend collecting water?

1.5. What is your main source of fuel?
☐ Firewood ☐ Gas ☐ Kerosene ☐ Firewood delivered home ☐ Other

1.6. If firewood, which family member(s) collect the wood?

☐ Woman	☐ Husband	☐ Son	☐ Daughters
☐ Sisters-in-law	☐ Father-in-law	☐ Mother-in-law	☐ Brothers-in-law
☐ Daughters-in-law	☐ Sons-in-law	☐ Servants	☐ Others

1.7. How many hours a day do you or any family member spend collecting firewood for fuel?

1.8. When you get old (above age 60), who would you live with?
☐ Son ☐ Daughter ☐ Husband ☐ Alone ☐ Old-age home ☐ Other

1.9. What do you do about income if something unforeseen happens (e.g. someone becomes ill)?
☐ the children leave school ☐ son/daughter in the city sends you more money
☐ use savings ☐ borrow from neighbours
☐ pawn jewellery ☐ other - who would help you?

Direct and opportunity costs of children

1.10. Are boys more expensive than girls? ☐ Yes ☐ No ☐ Do not know

1.11. Why/why not?

1.12. If there is not enough food, do boys get ☐ more ☐ less ☐ the same as girls?

1.13. If a child is ill, would you spend boys as girls? ☐ more ☐ same ☐ less on medical expenses for

1.14. Do you ever save aside money for your daughters?

1.15. Have you saved gold/jewellery for her?

1.16. Who looks after the children in the home when you are not here?

☐ Husband ☐ Mother ☐ Father☐ Mother-in-law
☐ Sister ☐ Brother ☐ Father-in-law ☐ Sister-in-law
☐ Daughter-in-law ☐ Brother-in-law ☐ Other relation ☐ Friend(s)
☐ Neighbour ☐ Servant ☐ No one - they stay on their own

II.2 Reproduction, contraception and health-care

Fertility

2.1. Do you wish to have another child?

☐ Yes ☐ No ☐ Not sure ☐ Do not know

2.2. If yes, would you prefer if it was a boy or a girl?

☐ Boy ☐ Girl ☐ Either ☐ Do not know

2.3. Why?

2.4. Is the birth of a boy ☐ better news ☐ worse news ☐ same as the birth of a girl?

2.5. Does your husband want another child?

☐ Yes ☐ No ☐ Not sure ☐ Do not know

2.6. Have your children been planned? ☐ Yes ☐ No

2.7. Do you have a desired number of children? ☐ Yes ☐ No

2.8. If yes, what is it?

2.9. Would you have wanted less children?

☐ Yes ☐ No ☐ Not sure ☐ Do not know

2.10.Why?

2.11. Do you think large families are better than small ones?

☐ Yes ☐ No ☐ Not sure ☐ Do not know

2.12. Did you breastfeed your children? ☐ Yes ☐ No

Contraception and health

2.13. Do you talk about contraception with your husband?

☐ Yes ☐ No ☐ Never ☐ Other comment

2.14. Have you ever used any birth control techniques?

☐ Pills/mala d. ☐ Inter-uterine device/copper-t ☐ Condom/nirodh
☐ Sterilisation operation ☐ Any other method ☐ Never used any method

2.15 Between you and your husband, who makes the decisions about birth control?

☐ Woman ☐ Husband ☐ Husband and wife together ☐ Not applicable

2.16. Apart from your spouse, which female family member would you discuss family planning with?

☐ Mother ☐ Sister ☐ Sister-in-law
☐ Mother-in-law ☐ Friend/neighbour ☐ Other

2.17.How often do you see your family planning officer or go to the health centre/hospital?

☐ Often ☐ Not often ☐ Only in illness ☐ Not at all

2.18. How easy is it for you to get access to contraception?
☐ Easy ☐ Not easy ☐ From the nurse who visits the locality

2.19. What are the sleeping arrangements for couples/ architecture of the house?

2.20.Does your religion permit contraception/abortion?
☐ Yes ☐ No ☐ Do not know ☐ Not sure ☐ Other comment

2.21. Do you have any personal views about the position of your religion on contraception/abortion?
☐ Yes ☐ No ☐ Do not know ☐ Not sure ☐ Other comment

2.22. What do you feel about the growth of population in your town/village?
☐ Too fast ☐ About right ☐ Too slow ☐ Do not know ☐ Not sure ☐ Other comment

II.3. Religion and women's status

Religion

3.1. Please rate on a scale of 1 to 5.
1. Not at all 2. Not very much 3. Medium 4. Quite a bit 5. Very much

3.1.1 How faithfully do you practice your religion?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.2. How much does it matter to you what the local priests think of you?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.3. Would you ask advice from your priest about aspects of your life?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.4. How often do you go to the temple/mosque/church?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.5. Do you interact with neighbours who do not belong to your religion?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.6. Are your children religious too and do they go to the temple/mosque/church/worship at home?
☐1 ☐2 ☐3 ☐4 ☐5

3.1.7. Do they practise religion to your satisfaction?
☐1 ☐2 ☐3 ☐4 ☐5

Women's status

3.2. Do you feel that women's views are represented through the Municipality?
☐ Yes ☐ No ☐ Do not know ☐ Other comment

3.3. Is this important to you?
☐ Yes ☐ No ☐ Do not know ☐ Other comment

3.4. Over the past five years, what do you feel about:

3.4.1. Your own economic position
☐ Better ☐ Same ☐ Worse

3.4.2. Relations between different religious groups in the village/town

☐ Better ☐ Same ☐ Worse

3.4.3. Level of violence between men

☐ Better ☐ Same ☐ Worse

3.4.4. Level of violence between men and women

☐ Better ☐ Same ☐ Worse

3.4.5. Position of women in your village/ town

☐ Better ☐ Same ☐ Worse

A.4.1: Initial starting-points for the multiple regression models of the determinants of female age at first marriage, Ramanagaram sample (1996)

No.	Intercept term	Woman's total education	Woman's primary education	Woman's secondary education	Woman's university education	Husband's total education	Husband's primary education	Husband's secondary education	Husband's university education	Age at menarche	Year of marriage	Husband's occupation	Expenditure	Measure of consanguinity	Religion measures	Caste measures
1	Intercept	Total years of education of woman				Total years of education of husband				Age at menarche	Year of marriage	Skilled[a]	Total expenditure of household in rupees	Marriage is consanguineous[d]	Woman is Muslim[f] + Woman is Hindu[g]	
2	Intercept		Total years of primary education	Total years of secondary education	Total years of university education	Total years of education of husband				Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Marriage is consanguineous	Woman is Muslim + Woman is Hindu	
3	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Marriage is consanguineous	Woman is Muslim + Woman is Hindu	
4	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Coefficient of inbreeding[e]	Woman is Muslim + Woman is Hindu	
5	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Marriage is consanguineous	Muslim vs. Hindu[h]	
6	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Farming[b]	Total expenditure of household in rupees	Marriage is consanguineous	Woman is Muslim + Woman is Hindu	
7	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Domestic industry[c]	Total expenditure of household in rupees	Marriage is consanguineous	Woman is Muslim + Woman is Hindu	
8	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Marriage is consanguineous		Belongs to high caste[i]+ Belongs to scheduled caste[j]
9	Intercept		Total years of primary education	Total years of secondary education	Total years of university education		Total years of primary education	Total years of secondary education	Total years of university education	Age at menarche	Year of marriage	Skilled	Total expenditure of household in rupees	Marriage is consanguineous		

[a]Skilled: 1 = husband has a skilled occupation (e.g. teacher or engineer), 0 = husband has an unskilled occupation (e.g. bricklayer or construction worker)
[b]Farming: 1 = husband has a farming occupation, 0 = husband has any other occupation
[c]Domestic industry: 1 = husband's occupation is domestic industry, 0 = husband has any other occupation
[d]Marriage is consanguineous: 1 = marriage is to a relation, 0 = marriage is to a non-relation
[e]The coefficient of inbreeding is defined as a statistical measure of the proportion of gene loci at which an individual is homozygous and describes the mean level of inbreeding in a population. It takes the following values: 0 = nonconsanguineous and unrelated, 0.125 = two sets of common grandparents (e.g. double first cousin or uncle-niece marriages), 0.0625 = first cousin, 0.0313 = first cousin once removed/double second cousin, 0.0156 = second cousin, < 0.0156 = other blood relation.
[f]Muslim: 1 = Muslim, 0 = non-Muslim; [g]Hindu: 1 = Hindu, 0 = non-Hindu; [h]Muslim vs. Hindu: 1 = Muslim, 0 = Hindu; Christians are excluded
[i]Belongs to high caste: 1 = belongs to a high caste, 0 = does not belong to a high caste; [j]Belongs to scheduled caste: 1 = belongs to a scheduled caste, 0 = does not belong to a scheduled caste

A.4.2: Final results from the preliminary multiple regression models of the determinants of the age at first marriage, Ramanagaram sample (1996)

No.	Intercept	Woman's total years of education	Woman's years of secondary education	Woman's years of university education	Husband's total years of education	Husband's years of primary education	Age at menarche	Year of marriage	Husband's occupation is skilled	Total expenditure	Woman is Muslim	Woman belongs to a high caste	adj R^2 (n^{**})
1	-209.63 (-5.25)*	0.15 (2.71)			0.12 (2.28)		0.39 (2.33)	0.11 (5.45)	2.34 (3.85)	0.00052 (2.47)			0.49 (187)
2	-203.97 (-5.08)		0.30 (2.96)		0.12 (2.35)		0.42 (2.48)	0.11 (5.27)	2.33 (3.85)	0.00057 (2.72)			0.50 (187)
3	-202.91 (-5.03)		0.34 (3.52)			0.24 (2.25)	0.43 (2.54)	0.11 (5.20)	2.51 (4.23)	0.00054 (2.54)			0.50 (187)
4	-202.91 (-5.03)		0.34 (3.52)			0.24 (2.25)	0.43 (2.54)	0.11 (5.20)	2.51 (4.23)	0.00054 (2.54)			0.50 (187)
5	-217.31 (-5.26)		0.38 (3.66)	0.58 (2.42)			0.40 (2.25)	0.11 (5.43)	2.58 (4.27)	0.00061 (2.65)			0.52 (173)+
6	-193.57 (-4.66)		0.36 (3.40)	0.68 (3.17)		0.36 (3.40)	0.34 (1.98)	0.10 (4.86)		0.00064 (2.47)	2.42 (2.60)		0.47 (187)
7	-193.57 (-4.66)		0.36 (3.40)	0.68 (3.17)		0.36 (3.40)	0.34 (1.98)	0.10 (4.86)		0.00064 (2.73)	2.42 (2.60)		0.47 (187)
8	-297.67 (-5.18)		0.35 (2.63)					0.16 (5.43)	1.97 (2.25)			0.68 (2.31)	0.47 (103)++
9	-288.89 (-4.91)		0.38 (2.82)					0.15 (5.17)	2.19 (2.45)				0.45 (103)++

* t-ratios are given in parenthesis below the coefficients

** n = total number of observations used for estimation

+ In this model, all Christian women have been excluded and only the ever-married Hindu and Muslim women are included in the sample (N = 173).

++ In the models which measure the influence of caste, only the ever-married Hindu women are included in the sample (N = 103).

A. 5.1: Initial starting-points for the preliminary logit models of the determinants of contraceptive choice, Ramanagaram sample (1996)

No.	Woman's education	Husband's education	Income	Woman's occupation	Husband's occupation	Consanguinity	Woman's age	Female extended family	Ease of access	Measure of religion		Woman belongs to a high caste	Woman belongs to a scheduled caste
1	Total years of education	Total years of education	Total expenditure	Housewife[a]	Skilled[d]	Consanguineous marriage[g]	Woman's age	Female extended family[i]	Easy[j]	Muslim[k]	Hindu[l]		
2	Total years of education	Total years of education	Total food expenditure	Housewife	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
3	Total years of education	Total years of education	Television ownership	Housewife	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
4	Total years of education	Total years of education	Total expenditure	Skilled[b]	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
5	Total years of education	Total years of education	Total expenditure	Silk-related[c]	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
6	Total years of education	Total years of education	Total expenditure	Housewife	Farming[e]	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
7	Total years of education	Total years of education	Total expenditure	Housewife	Domestic industry[f]	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim	Hindu		
8	Total years of education	Total years of education	Total expenditure	Housewife	Skilled	Coefficient of inbreeding[h]	Woman's age	Female extended family	Easy	Muslim	Hindu		
9	Total years of education	Total years of education	Total expenditure	Housewife	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Muslim/Hindu[m]			
10	Total years of education	Total years of education	Total expenditure	Housewife	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy	Index of piety[n]			
11	Total years of education	Total years of education	Total expenditure	Housewife	Skilled	Consanguineous marriage	Woman's age	Female extended family	Easy			Woman belongs to a high caste[o]	Woman belongs to a scheduled caste[p]

[a]Housewife: 1=woman performs a home-related occupation, 0 = woman performs a non-home-related occupation
[b]Skilled: 1 = woman has a skilled occupation, 0 = woman has an unskilled occupation
[c]Silk-related: 1 = woman employed in a silk-related occupation, 0 = all other occupations
[d]Skilled: 1 = husband performs a skilled occupation, 0 = husband performs an unskilled occupation
[e]Farming: 1 = husband is a farmer or does a farming-related job, 0 = all other occupations
[f]Domestic industry: 1 = husband works in domestic industry, 0 = all other occupations
[g]Consanguineous marriage: 1 = consanguineous marriage, 0 = non-consanguineous marriage
[h]Coefficient of inbreeding: This is defined as a statistical measure of the proportion of gene loci at which an individual is homozygous. It takes the following values: 0 = nonconsanguineous and unrelated, 0.125 = two sets of common grandparents (e.g. double first cousin or uncle-niece marriages), 0.0625 = first cousin, 0.0313 = first cousin once removed/double second cousin, 0.0156 = second cousin, < 0.0156 = other blood relation

[i]Female extended family: Number of female extended family members in the household
[j]Easy: 1 = woman says that access to contraception is easy, 0 = woman reports that access to contraception is not easy
[k]Muslim: 1 = Muslim, 0 = non-Muslim
[l]Hindu: 1 = Hindu, 0 = non-Hindu
[m]Muslim/Hindu: 1 = Muslim, 0 = Hindu
[n]Index of piety: An index calculated as the average of ratings provided by the women on five questions that attempted to measure women's faithfulness toward and observance of religion. The ratings were 1 = not at all, 2 = not very much, 3 = medium, 4 = quite a bit, 5 = very much.
[o]Woman belongs to a high caste: 1 = high caste member, 0 = all other castes
[p]Woman belongs to a scheduled caste: 1 = scheduled caste member, 0 = all other castes

A.5.2: Final results from the preliminary logit models of the determinants of contraceptive choice, Ramanagaram sample (1996)

	Constant		Woman's total education		Husband's total education		Female extended family members		Husband's occupation is skilled		Woman's age		Ease of access to contraception		Woman is Muslim		Woman is Hindu		Maximised value of the log-likelihood function	Goodness of fit (n)
	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio	Coef.	T-ratio		
1	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
2	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
3	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
4	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
5	0.48	0.34 [0.73]			0.16	4.43 [0.00]	-0.30	-2.19 [0.03]			-0.05	-2.69 [0.01]	2.70	2.81 [0.01]	-2.59	-2.60 [0.01]	-2.06	-2.07 [0.04]	-93.7296	0.7647 [187]
6	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
7	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
8	0.38	0.28 [0.78]	0.09	2.10 [0.04]	0.13	3.09 [0.03]	-0.28	-2.06 [0.04]			-0.04	-2.26 [0.03]	2.43	2.67 [0.01]	-2.57	-2.63 [0.01]	-1.86	-1.91 [0.06]	-95.9423	0.7219 [187]
9	-2.36	-1.79 [0.08]			0.18	4.93 [0.00]	-0.22	-1.65 [0.10]			-0.05	-2.75 [0.01]	3.49	2.89 [0.00]					-95.1606	0.7168 [173]*
10	-1.71	-1.57 [0.12]	0.09	2.32 [0.02]	0.13	3.26 [0.00]	-0.31	-2.22 [0.03]			-0.04	-2.24 [0.03]	2.36	2.48 [0.01]					-101.4191	0.6898 [187]
11	-0.36	-1.22 [0.22]	0.16	3.24 [0.00]			-0.45	-2.53 [0.01]	1.64	1.72 [0.01]									-57.6965	0.7185 [103]**

Coefficient: This is the logit coefficient i.e. $L = \log \{\text{prob(event)/prob (no event)}\} = B_0 + B_1X_1 + ... + B_PX_P$. where prob(event) = $1/1+e^{-Z}$, where Z is the linear combination, and $Z = B_0 + B_1X_1 + B_2X_2 ... + B_PX_P$. The logit coefficient represents the change in the log odds associated with a one unit change in the independent variable.

Goodness of fit: This statistic compares the observed probabilities to those predicted by the model. It is defined as $Z^2 = \text{Residual}_i^2 / P_i(1-P_i)$, where the residual is the difference between the observed value Y_i and the predicted value P_i.

* Model estimated on the sample of Hindus and Muslims only (N = 173).

** Model estimated on the sample of Hindus only (N = 103).

A.6.1: Initial starting-points for the preliminary multiple regression models of the determinants of fertility, Ramanagaram sample (1996)

No.	Constant	Measure of women's education	Women's secondary education	Women's university education	Measure of husband's education	Husband's secondary education	Husband's university education	Measure of income	Measure of consanguinity	Position of first-born son in birth-order	First measure of religion	Second measure of religion	Woman's occupation	Husband's occupation	Household uses piped water from a tap	Household uses gas or kerosene for fuel	Number of female extended family members	Woman's age	Measure of caste
1	Constant	Total number of years of education			Total number of years of husband's education			Total expenditure	Marriage is consanguineous[a]	Position of first-born son in the birth-order[d]	Woman is Muslim[e]	Woman is Hindu[f]	Woman has a primary occupation[g]	Farming[h]	Piped water[i]	Gas or kerosene[j]	Number of female extended family members	Woman's age	
2	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's education			Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
3	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
4	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total food expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
5	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Owns items of consumer equipment[c]	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
6	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Coefficient of inbreeding[f]	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
7	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Index of Piety[g]		Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
8	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Hindu/ Muslim dummy variable[h]		Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	

No.	Constant	Measure of women's education	Women's secondary education	Women's university education	Measure of husband's education	Husband's secondary education	Husband's university education	Measure of income	Measure of consanguinity	Position of first-born son in birth-order	First measure of religion	Second measure of religion	Woman's occupation	Husband's occupation	Household uses piped water from a tap	Household uses gas or kerosene for fuel	Number of female extended family members	Woman's age	Measure of caste
9	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman's occupation is skilled[i]	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
10	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman's occupation is silk-related[i]	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
11	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Skilled[m]	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
12	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Domestic Industry[n]	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	
13	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order	Woman is Muslim	Woman is Hindu	Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Total number of extended family members	Woman's age	
14	Constant	Total number of years of primary education	Total number of years of secondary education	Total number of years of university education	Total number of years of husband's primary education	Total number of years of husband's secondary education	Total number of years of husband's university education	Total expenditure	Marriage is consanguineous	Position of first-born son in the birth-order			Woman has a primary occupation	Farming	Piped water	Gas or kerosene	Number of female extended family members	Woman's age	Belongs to high caste[q] + Belongs to scheduled caste[r]

[a]Index for the ownership of items of consumer equipment: this index assigns a number from 1 through 8, depending on the number of items of consumer equipment owned by the household. The items were a transistor, bicycle, watch, bench/chair, television, scooter/moped, fan and cot. The detailed breakdown of the ownership of these items for the women of the Ramanagaram sample was presented in Chapter 2.
[b]Marriage is consanguineous: 1 = consanguineous marriage, 0 = non-consanguineous marriage
[c]Coefficient of inbreeding: This is defined as a statistical measure of the proportion of gene loci at which an individual is homozygous. It takes the following values: 0 = nonconsanguineous and unrelated, 0.125 = two sets of common grandparents (e.g. double first cousin or uncle-niece marriages), 0.0625 = first cousin, 0.0313 = first cousin once removed/double second cousin, 0.0156 = second cousin, < 0.0156 = other blood relation
[d]Position of first-born sons in birth-order: an index which assigns a number for the location of the first-born son in the birth-order. For example, if the first-born son is the second child, the number '2' is assigned to the household.
[e]Muslim: 1 = Muslim, 0 = non-Muslim
[f]Hindu: 1 = Hindu, 0 = non-Hindu
[g]Piety index: An index calculated as the average of ratings provided by the women on five questions that attempted to measure women's faithfulness toward and observance of religion. The ratings were 1 = not at all, 2 = not very much, 3 = medium, 4 = quite a bit, 5 = very much.
[h]Hindu/Muslim dummy variable: 1 = Muslim, 0 = Hindu
[i]Women's primary occupation: 1 = woman says she has a primary occupation, 0 = woman says she does not have a primary occupation

[j]Skilled: 1 = woman has a skilled occupation, 0 = woman has an unskilled occupation
[k]Silk-related: 1 = woman employed in a silk-related occupation, 0 = all other occupations
[l]Farming: 1 = husband is a farmer or does a farming-related job, 0 = all other occupations
[m]Husband's occupation is skilled: 1 = husband performs a skilled occupation, 0 = husband performs an unskilled occupation
[n]Domestic industry: 1 = husband works in domestic industry, 0 = all other occupations
[o]Piped water: 1 = household uses piped water, 0 = household collects water by hand
[p]Gas or kerosene: 1 = household uses gas or kerosene for fuel, 0 = household uses firewood
[q]High caste: 1 = high caste member, 0 = all other castes
[r]Scheduled caste: 1 = scheduled caste member, 0 = all other castes

A.6.2:Final results from the preliminary multiple regression models of the determinants of fertility, Ramanagaram sample (1996)

Model number	Intercept	Woman's total years of education	Woman's total years of secondary education	Woman's total years of university education	Total years of primary education of husband	Total years of secondary education of husband	Position of first-born son in the birth-order	Woman married a relation	Woman is Muslim	Woman is Hindu	Woman is employed in a skilled job	Woman is employed in a silk-related job	Husband employed in domestic industry	Woman's age	Female extended family members	Total extended family	Woman belongs to a high caste	adjusted R^2
1	-0.50 (-1.23)	-0.07 (-3.77)					0.45 (4.59)		0.66 (3.11)					0.09 (8.62)				0.50 (187)
2	-0.68 (-1.67)		-0.10 (-2.35)	-0.20 (-2.00)			0.44 (4.42)		0.62 (2.90)					0.09 (8.79)				0.51 (187)
3	-0.75 (-1.94)			-0.24 (-2.49)		-0.10 (-2.36)	0.44 (4.43)	0.44 (2.15)	0.60 (2.83)					0.09 (9.02)	-0.15 (-1.99)			0.53 (187)
4	-0.75 (-1.94)			-0.24 (-2.49)		-0.10 (-2.61)	0.44 (4.43)	0.44 (2.15)	0.60 (2.83)					0.09 (9.02)	-0.15 (-1.99)			0.53 (187)
5	-0.75 (-1.94)			-0.24 (-2.49)		-0.10 (-2.61)	0.44 (4.43)	0.44 (2.15)	0.60 (2.83)					0.09 (9.02)	-0.15 (-1.99)			0.53 (187)
6	-0.82 (-2.14)			-0.22 (-2.30)		-0.10 (-2.43)	0.47 (4.77)		0.60 (2.81)					0.10 (9.14)				0.52 (187)
7	-0.79 (-2.03)			-0.22 (-2.26)		-0.12 (-2.92)	0.49 (4.91)	0.47 (2.16)						0.10 (9.15)				0.51 (187)
8	-0.80 (-1.91)			-0.25 (-2.21)	0.16 (2.44)	-0.20 (-3.40)	0.44 (4.20)							0.10 (9.40)	-0.18 (-2.29)			0.53 (173)*
9	-1.75 (-3.43)						0.49 (4.93)		1.39 (3.65)	0.91 (2.43)	-1.06 (-4.16)			0.10 (9.44)				0.52 (187)
10	-1.39 (-2.65)					-0.11 (-3.01)	0.46 (4.68)	0.43 (2.09)	1.17 (3.10)	0.75 (2.02)		-0.58 (-2.66)		0.10 (9.30)				0.54 (187)
11	-0.75 (-1.94)			-0.24 (-2.49)		-0.10 (-2.61)	0.44 (4.43)	0.44 (2.15)	0.60 (2.83)					0.09 (9.02)	-0.15 (-1.99)			0.53 (187)
12	-1.43 (-2.70)			-0.20 (-2.17)	0.15 (2.52)	-0.23 (-4.02)	0.47 (4.97)		1.31 (3.53)	0.95 (2.56)			-0.86 (-3.48)	0.09 (9.50)	-0.19 (-2.51)			0.57 (187)
13	-1.42 (-2.69)			-0.21 (-2.24)	0.16 (2.56)	-0.22 (-4.04)	0.46 (4.89)		1.34 (3.65)	0.96 (2.60)			-0.87 (-3.52)	0.09 (9.58)		-0.11 (-3.05)		0.57 (187)
14	-1.12 (-2.67)						0.47 (3.48)							0.11 (8.27)			-0.30 (-2.58)	0.51 (103)**

*There are fewer observations because this model includes only ever-married Hindus and Muslims, excluding the Christians (N = 173).

** This model is estimated on the sample of Hindus only (N = 103).

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