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ABSTRACT

The term fertility transition appeared in the literature in the early 1970s and was given a precise meaning as change from natural fertility to family limitation. Presently, India is passing through fertility transition but the timing and pace of transition has varied spatially over the country. Transition in the eastern state of West Bengal in India began well before independence; though the pace was slow for quite some time, the state is fast approaching replacement level low fertility. This paper examines the timing and nature of the transition of fertility in the state. Trends in fertility assessed using data from the Indian censuses, the Sample Registration System, and large population surveys shows a moderate fall through the 1980s and a steep drop during the 1990s. An examination of proximate determinants reveals the dominant role of contraceptive prevalence in the decline. A detailed analysis in trends in the family building process is possible from individual fertility histories. It is seen that the age at marriage has risen marginally though that is not reflected in a corresponding rise in age at first birth. Analysis of the parity progression ratios shows that the progression to the first two parities has not changed much; however, notable fall has occurred in the progression to higher parities. The transition was quite slow initially, but quickened in the 1990s. Contraceptive practice has increased substantially over the period and the tendency of limiting family after two or three children has become widespread. Contraceptive use in West Bengal has not been dominated by sterilization unlike that in most other states of India and there has been considerable resort to traditional contraception suggesting that couples have a wide choice. It appears that the family planning programme in the state was not coercive in nature and the acceptance has been mostly voluntary.

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INTRODUCTION

The term fertility transition appeared in the literature in the early 1970s and was given a precise meaning as "change from natural fertility to family limitation" (Smith, 1989). It is referred to as an inflection in the curve and a mutation in behaviour, not to a slow adoption of the demographic regime over time (Knodel, 1979; Caldwell and Ruzicka, 1978). Social scientists, demographers, and researchers were trying to seek the underlying causes of this transition through socio-economic behaviour of the couple. The socio-economic perspective assumes that individual fertility behaviour is affected by individual socio-economic factors, such as educational attainment, standard of living etc. and that both fertility change and fertility differentials within population are functions of shifts in the marginal distributions of socio-economic variables, induced by exogenous change in economic and social structure.

The transition from high fertility to low fertility had its beginning in Europe, mainly in France in the second half of the nineteenth century. Fertility has declined very markedly in most of the developing countries over the past three to four decades. Currently more than 40 percent of the world population lives in countries with total fertility levels lower than 2.1 births per woman, the level that, under conditions of low mortality, assures the long term replacement of the population (UN, 2001). Fertility transition is now virtually accomplished in many parts of Asia and is well under way in most parts of the Indian sub continent. It is worth noting that even if fertility decline has been smooth and linear in the developed world and in developing countries which have entered into fertility transitions, it need not be smooth all the way to below replacement or even replacement level. It has been pointed out that if fertility transition truly occurs at a datable point in time to a particular population (be it socially or geographically defined) and if it is truly decisive and irreversible, then it must entail a mutation in the history of mentalities and cultures. The new behaviour, which is adopted by individual couples in certain economic and cultural circumstances, is the product of new norms that are shared and transmitted (de Walle, 1992) and thus the most widely recognized response to modernization is

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represented in the theory of demographic transition. Though this shift from high fertility-high mortality to low fertility –low mortality regime was primarily attributed to technology, industrialization and urbanization, the proponents of the theory were aware of the influence of the other social changes associated with it. Apart from the relationship between modernization and fertility transition, the transition theories increasingly use the concept of demand for children as a function of the utilities and costs of alternative family sizes which mainly focuses on the decision making process of the individual couples (Easterlin, 1975). Becker (1981) also placed his demand model within the context of altruism by parents towards children. Even the diffusion theory of fertility decline increasingly used utility cost concepts to explain rates of adoption of birth control (Carlson, 1966). The ideological change that accomplices the shift from high fertility to low fertility is often compatible with existing norms about family life and about the well lived life in general, the cultural and normative shift required to move from wanting many children to wanting only a few number of children is too massive to be realistically expected to grow out of existing trajectories of development, education and modernization (Nag, 1983; Caldwell, 1982). The prospect of finding clear-cut relationship between modernization and fertility is determined by the intrusion of a new factor, government action to control the population size (Cleland and Wilson, 1987). Retherford (1985) propounded a theory of fertility transition which integrates the impact of development and mortality decline on demand for children with innovation diffusion perspectives, where declining demand is seen as the underlying cause, while initial resistance to, or ignorance of, birth control account for the timing and rapidity of change.

India, where fertility is relatively high compared to nations in the developed world, is also passing through a transitional state. But there are wide variations in the fertility transition across the country. Fertility has reached low level, near or below replacement, in some southern states but is moderately high in many north-central states. West Bengal, a state in India with ambiguous geographical position in the popular north-south analytical dichotomy, does not show any extreme demographic regimes like Uttar Pradesh or Kerala. The fertility transition in West Bengal had started well before independence but major shift occurred in the 1990s demarcated with a sharp decline in Total Fertility Rate (TFR). According to Bhat (1996), fertility began to decline much earlier than the rest of the country in Calcutta (now Kolkata), the capital of the state, even before industrialization began. The most interesting feature in West Bengal is that the state government has been quite indifferent to population policy and never had the kind of aggressive or even efficient family planning campaign or programme that many other parts of India have embraced at various times (Basu and Amin, 2000), which conforms with the high practice of traditional family planning methods in the state (IIPS and ORC-Macro, 2000).

So it is important to understand the conditioning factors like economic development, social change through diffusion, and the family planning programme, that facilitate the fertility changes in the state.

The present paper examines the dynamics of fertility transition in West Bengal in the past few decades. Trends in fertility indicators are first described along with proximate determinants. A detailed analysis of changes in the family building process, in particular, age at marriage, age at fist birth, and parity progression ratios, has been carried out. Finally, trends in contraceptive acceptance and prevalence are examined.

THE STATE

West Bengal is one of the major states in India consisting 7.8 percent of country's total population. According to the 2001 census, the total population of the state was 80.2 million. The population is mostly rural (72.0 percent) and agrarian (53.3 percent of workers are cultivators or agricultural labourers) in nature. Educationally, West Bengal is a forward state with 68.6 percent population being literate compared to 64.8 percent at the national level. The sex ratio in West Bengal is 934 (India, Registrar General, 2004a). The Sample Registration System (SRS) estimated that in 2002 the Crude Birth Rate (CBR) was 20.3 and Total Fertility Rate (TFR) was 2.3 in West Bengal, well below the national averages of 25.0 and 3.0 respectively (India, Registrar General, 2004b). The Crude Death Rate in West Bengal is 6.6 per thousand and the Infant Mortality Rate is 46 (per thousand live births), lower than the national average of 60.

TRENDS IN FERTILITY IN WEST BENGAL AND INDIA

Data from the decadal censuses, the Sample Registration System and the National Family Health Survey, 1 and 2 enable us to assess fertility trends. Indian Census provided indirect estimates of fertility 1970s onwards for three time periods (1974-80, 1984-90, 1994-2000) and the National Family Health Surveys (NFHS) in 1990s for two time periods (1989-91 and 1996-98).The Sample Registration System (SRS) estimated TFRs and CBRs for every year from 1981 onwards in West Bengal; though SRS estimates for the 1970s are available for many states, for West Bengal these are available only after 1981.

The estimation of Crude Birth Rate (CBR) by the Sample Registration System (SRS) shows that there is a decline in CBR over the last two decades in West Bengal as well as in India (Table 1). However, from the beginning CBR in West Bengal was below the national average. But the rate of decline was

different and it was faster in the state compared to the nation. The pace of decline was more rapid in the late 1990s in West Bengal; therefore, it resulted in a wide gap between the CBR of West Bengal and India in the recent years (Fig 1).

Similarly, there is a prominent decline in the Total Fertility Rate (TFR) in West Bengal in the last three decades and the level has always been below the national average (Table 2). Indirect estimation from the census data shows that TFR declined from 4.0 in 1974-80 to 3.6 in 1984-90. But the pace increased in the 1990's and the TFR fell to 2.6 in 1994-2001.
Even the National Family Health Surveys (1 and 2) estimates of the TFR in West Bengal were 2.9 and 2.3, whereas India's TFRs were 3.1 and 2.8 in 1988-91 and 1994-98 respectively.

The annual decline in the TFR in West Bengal from 1981 to 2002 is well depicted as estimates given by the Sample Registration System. The TFR was 4.2 in 1981 in West Bengal and fell to 3.4 by the end of the decade and further declined to 2.3 by 2002, which is nearly the replacement level. Moreover, urban TFR in the state achieved the goal of replacement level in 1989 (India, Registrar General, 1999). It is important to notice that the decline which has occurred was not at the same pace, there was gradual decline in the 1980s and a rapid fall in the 1990s. Therefore, focus should be placed on the factors responsible for accelerating the decline.

The estimates of TFR vary with the sources due to the difference in the techniques used for the estimation. SRS has a dual registration system and it estimates TFR from a continuous registration system. Indirect estimates have been obtained by demographers by applying the Reverse Survival Ratio technique to census age distributions. On the other hand, the NFHS uses the retrospective fertility histories to estimate TFR for the three year period before the survey. Yet, for West Bengal, the differences in estimates from various sources are not large. However, for India, the NFHS estimates are much lower than other estimates for the same time periods. As a result, the NFHS estimates show narrower gaps between India and West Bengal than what the SRS estimates show. Nonetheless, all evidence points to a much lower fertility in West Bengal than the national average in the recent years.

The estimates of TFR and CBR give a total scenario of the fertility transition in the state and the country but trends in Age Specific Fertility Rates (ASFRs) describe changes in the pattern as well. According to SRS estimation, the ASFRs were always below India's level for the all age groups since 1981, except the age group of 15-19 years (Table 3). The decline is steeper in West Bengal than India

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in all age groups of prime child bearing period (20-24, 25-29, 30-34, and 35-39 years) in the last decade.

The ASFRs estimated by the National Family Health Survey-2 (1998-99) also reveal the same trend for the state and the country (Table 4). It shows that ASFRs declined among women of age group 20-24 and 25-29 from 1979/80-83/84 to 1994/95-98/99 in West Bengal, but the rate of decline is much lower in India compared to the state.

Apart from the standard measures like TFR, CBR and ASFRs, changes in the determining factors of fertility like age of entry to the reproduction, age at the initiation of child bearing, contraceptive practices also help explain the fertility transition in a particular area or a particular population. Since the transition from high to low fertility is virtually universal, it is clear that its onset does not solely depend on the level of development and the path it will follow is not entirely determined by socio-economic factors such as level of education, female employment, or urbanization. The proximate determinants framework propounded by Bongaarts (1978) and afterward Bongaarts and Potter (1983) has been the standard tool to study fertility. This paper mainly concentrates on the trends in the two factors (Cm) and (Cc) that reflect proportion married and the use of contraception. Other factors like induced abortion (Ca) and the lactational Infecundability (Ci), and Total Fecundity Rate (TF) have been taken as constant because the changes in these are very small over time or, as in the case of induced abortions, estimates are not available. Therefore,

TFR= Cm * Cc * Ca * Ci *TF

The estimates of these indexes, i.e., proximate determinants, for the three time points 1980, 1991, and 2001 provide a decomposition of the decline in TFR of West Bengal during 1980 to 91 and 1991 to 2001. It shows that the decline has been almost totally accounted for by the change in decline in proportion married and increase in use of contraceptives in the state (Table 5). The change in TFR during 1980 to 1990 was 0.81, whereas the combined effect of Cm and Cc was 0.86. Similarly, the change during the period of 1990 to 2001 in TFR was 0.71 and the explanation through Cm and Cc is 0.74. There is a marginal variation in estimates due to use of different data sources for different years.

AGE AT MARRIAGE

In societies where fertility is mostly within marriage, demographers assess the impacts of increasing age at marriage and falls in fertility within marriage (Hajnal, 1953; Davis and Blake, 1956; Agarwala,

1967; Bongaarts, 1978). A delay in the age at marriage can lead to decline in both natural fertility (due to reduction in the reproductive span) as well as volitional fertility (because delayed marriage could possibly reduce the desire and demand for children).

According to decadal censuses, the Female Singulate Mean Age at Marriage (SMAM) has remained always as high as or higher than national average in West Bengal. It shows a sharp increase during 1961 to 1971 from 15.9 years to 18.0 years, followed by a slow rise to 19.3 years and 19.7 years in 1981 and 1991 respectively (Table 6). Age at marriage also rose in India over the period, at a lower pace than West Bengal initially, but appears to have caught up with the state now. The National Family Health Survey 1 and 2 depict that SMAM in West Bengal is slightly lower than India in the recent years.

The detailed information provided by the National Family Health Survey-2 allows us to examine trends in age at marriage more systematically. The survey covered 4725 households and 4408 ever-married women of reproductive age group of 15-49 years (IIPS and ORC-Macro, 2001). The NFHS obtained the age at marriage for all ever married women interviewed in the survey. Besides, from the household records, it is possible to compute the proportion never married at specified ages. These proportions were used in conjunction with the data age at marriage to compute proportion of women married before specified ages.

The trends are presented by birth cohort of women (Fig 2).There is overall decline in the proportion married in younger age. Among women born during 1948/49-52/53 proportion married before the age 13 years was 0.20 but for the birth cohort of 1978/79-83-84 the proportion was only 0.05 (Table 7). It also shows that there is a gradual decline in proportion married by very early ages over time. Similarly, there is remarkable decline in proportion married before the age of 18 from the cohort 1948/49-52/53 (0.75) to the cohort 1973/74-78/79 (0.55). Yet, a majority of women even in the relatively young cohort of 1973/74-78-79 were married before the minimum legal age of 18 years. A similar decline is seen in proportion married before 20 years. By the age of 25, almost all women are married.

AGE AT FIRST BIRTH

In populations where fertility occurs mostly within marriage, a clear understanding of the family building process is provided by first examining the age at marriage followed by the first birth interval, that is, interval between marriage and the first birth. Data on the first birth interval are available from

the NFHS-2. However, it is observed from the data that *the first birth interval (v221)* is often quite short, less than seven months, which would be possible only if a large number of conceptions had occurred before marriage. In India, conception without wedlock is not socially acceptable and also not commonly practiced. So, it is surprising that a large number in West Bengal (13.9 percent) have given birth to a child even within four months of their marriage (Table 8). This is probably due to imperfections in the data.

The birth interval is reckoned in months, and it would be possible to obtain the value precisely if the calendar month and year of the marriage and the first birth are recorded correctly, But since the age of the women at the time of her marriage has been obtained in the survey in completed years it was difficult to calculate the first birth interval from the data set. The distortions seen above are presumably due to this factor; the rounding off of age has not been able to provide an accurate date of marriage and hence an accurate first birth interval. Clearly, the data on first birth interval as given cannot be used. Therefore, this study has focused on the age of the women at the time of first birth as such and not on the first birth interval. Since the first birth marks the initiation of childbearing per se, the age at first birth is important in studying fertility. Besides, these are implications for maternal and child health as a low age first birth is associated with relatively high maternal and infant mortality.

According to the NFHS-2, woman's median age at first birth is mostly between 18 and 19 years among the women aged 25-49 years at the time of the survey (IIPS and ORC-Macro, 2001). Further, the data reveal that woman's median age at first birth has remained almost the same over the decades in West Bengal except the decline in the younger cohort of aged 20-24 (Table 9). Almost all the women in the state have had experience of at least one child birth before attaining the age of 35 years. Proportions of women who have had their first birth by the age of 15 years are not very large and the trend shows a marginal fluctuation in the proportion in the last thirty years (Fig 3). Similarly, more than half of the women have their first child by the age of 20 years. Therefore, it is clear that though women's age at marriage has increased by more than two years in the last three decades, the age at first birth has remained nearly constant, which shows that delayed entry to the sexual union has not effected the age at initiation of childbearing in West Bengal.

PARITY PROGRESSION RATIO

To observe the family building process, age at entry to the sexual union and age at first birth have been analysed earlier. But the further process of family building is mainly examined through Period Parity Progression Ratios, which give a clear idea of the behaviour of reproduction in a specific population over time.

A woman's parity is defined as the number of children she has ever borne. *Parity Progression Ratio* (PPR) is the proportion of women who move from a given parity to the next during their lifetime. It is useful to understand the family building processes and to compute TFR. But truncation caused by the survey makes it difficult to study the recent changes. The Period Parity Progression Ratio (PPPR) technique is used to overcome this problem. This resembles the construction of synthetic cohorts as in the construction of synthetic cohort life table (see Feeney and Yu, 1987; Bhrolchain, 1987).

The PPPRs have been computed for progression from the women's birth to her first birth, then second birth, and subsequent births, i.e., 0-1, 1-2, ……., 5-6. Due to the insufficient number of women with parity six and more, progression beyond 6th parity has not been computed.

The results show (Table 10) that the trend in PPPRs for the first parity (woman's birth to her first birth) has some irregularity and there is a marginal decline from 0.95 in 1980 to 0.86 in 1997 in West Bengal. Similarly, proportion of women who moved from the first parity to the second also shows a very small decline over time, though there is clear decline in 1990s. There is visible decline among proportion of women who had moved from third to fourth and also fourth to fifth birth in last the twenty years. So, it is clear that the tendency to move to the higher parity shows a steep decline in the 1990s in the state.

The PPPRs give progression from one parity to the next. But often we would like to know the proportion of women who ever reach that parity. This can be obtained by the product of PPPRs up to that parity. e.g., the proportion who ever have the second birth (i.e., who have at least two births) is given by PPR (0-1) * PPR (1-2). Similarly, the proportion of women who ever have the third birth is given by PPR (0-1) * PPR (1-2) * PPR (2-3). Such ratios are known as ***Compound Parity Progression Ratios.*** The compound parity progression shows that progression to the second birth has declined gradually in the last two decades in West Bengal (Table 11). Further, very steep decline is seen in

proportion of women who have the third child, from 72 percent in 1978-82 compared to 38 percent in 1992-97. This trend continues for higher parities in the state in the recent time (Fig. 4).

Spatial variation in transition in fertility has been also observed by different scholars in recent years through PPPRs. In India, Kerala has already reached the fourth stage of fertility transition but states like Uttar Pradesh are still far behind in terms of fertility transition. Table 12 gives an idea of the stage of fertility transition of West Bengal in comparison with those of Kerala and Uttar Pradesh. Generally, the tendency to move to parities beyond the second has declined in West Bengal; however, the state is yet to reach Kerala's position. It shows that in 1988-92, West Bengal was ten years behind Kerala but ten years ahead of Uttar Pradesh. The gap has increased later due to sharper decline in fertility in Kerala than West Bengal and also there is stagnation in the proportion of women who moved from one parity to the next in Uttar Pradesh.

CONTRCEPTIVE PRACTICE

Historically, West Bengal has experienced moderately low fertility and a steep decline has occurred in the recent decade. Generally, an increase in couple protection rate would be expected to cause a decline in marital fertility rate if all other factors remained unchanged (Srinivasan, 1988). According to the service statistics provided by the Ministry of Health and Family Welfare, the number of users has fluctuated over time in West Bengal (Table 13). It reached a peak in number of sterilizations in 1976-77 due the programme intensification at that particular time point. There was a dip in number of sterilization accepters in consecutive two years from 1977-79 with a recovery and stabilization around 300 thousand sterilizations per year. The number of permanent method (sterilization) acceptors were higher than reversible and temporary methods like IUD and conventional contraceptive and oral pills till the1990s.

The trend has shifted afterwards and the tendency towards the use of temporary methods became more common in the recent years in the states. However, the number of sterilization accepters remains almost constant but a declining trend has been observed for IUD accepters from 1994-95 onwards. On the other hand, the number of accepters for oral pills has been rising.

Different sources depict different estimates of contraceptive prevalence in the state over time. It has been noted earlier that use of traditional methods is widely prevalent in West Bengal. But the Ministry

of Health and Family Welfare considers only acceptors of the modern family planning methods (sterilization/ oral pill/ condom/ IUD) and hence the estimates provided by the programme do not include the traditional methods. The programme estimates show that the prevalence of modern contraception in West Bengal has always been lower than the national level (Table 14). In 1970, only 9.5 couples were using modern contraceptive methods, this rate rose to 21.4 percent in 1980 and 32.2 percent in 2000.

But there were three surveys conducted by the Operational Research Group (ORG) at three different points of time and these show higher usage of family planning method among the couples in the state than the national level. They had included traditional method also to estimate the current contraceptive prevalence. According to them, in 1970, 21.1 percent couples were using family planning methods in West Bengal compared to 13.6 percent in India. There was a considerable increase in the next two decades and the figure shot up to more than double (54.8 percent) in the state in 1988 to remain higher than the national average (ORG, 1972, 1983, 1990). The National Family Health Surveys (NFHS-1 and 2) also estimate the contraceptive prevalence rate (includes traditional methods) in the country and also for the state. The NFHS-1 reveals that there was high usage of contraceptive methods in West Bengal and 61.8 percent couples were using any method of family planning in 1992-93, higher than the national average of 51.0 and the NFHS-2 estimates that the prevalence level in West Bengal (66.6 percent) was much higher than the national average (IIPS, 1995a, 1995b; IIPS and ORC-Macro, 2000, 2001). The ORG and NFHS surveys provide details of the method used and thus also give estimates of the prevalence of modern contraceptive use (also presented in Table 14). These show that though the prevalence of modern contraception is higher in West Bengal than India, the gap is not very wide. Besides, the survey estimates for India are not much different from the programme, but for West Bengal, the prevalence of modern methods is also underestimated by programme.

CONCLUSIONS

The above analyses show that in West Bengal fertility has been lower than national level in spite of low age at marriage, low age at child bearing and low prevalence of modern family planning methods. There has been an increase in median age at marriage and a decrease in proportion married by age at 20 years among recent cohorts. However, the age of the women for initiation of childbearing has remained almost constant in the last three decade. The marginal increase in age at marriage has made no impact on fertility transition in the state and on woman's reproductive span.

But trends in period parity progression ratios give strong evidence of rapid transition toward predominantly two child families in West Bengal. The time series of PPPRs for progression from women's birth to first birth and first birth to second birth show marginal decline in the last decade, whereas the decline is steep for higher progressions. Thus, over period, most women continue to have at least two births but increasingly avoid subsequent births. This has led to a rapid fertility decline in the state through the 1980s and especially the 1990s.

In West Bengal, use of modern family planning method has increased substantially, but still use of traditional method persists in the state. Thus, the state shows a different pattern of contraceptive use compared to other states in the country. But it seems West Bengal also follows the changes in many Western countries where the practice of modern contraception has increased but not that of natural methods.

Though overall the state has shown an impressive decline in fertility in the recent decades, variations by socio-economic factors remain. This paper has not addressed this aspect of fertility but it has focused on the aggregate picture of fertility transition in the state. There is a wide gap between rural and urban Total Fertility Rate in West Bengal and this has persisted though fertility has declined in both areas (India, Registrar General, 1999, 2004b, 2004c). Urban fertility had reached the replacement level in the 1970s but rural fertility is yet to reach that level and hence it appears that the diffusion of the small family norm from urban areas to rural areas has not been a speedy process. Perhaps the rural-urban interaction is weak. It is also possible that the government family planning programme that was expected to expedite the popularization of the small family norm has not been very effective in reaching certain sections in the state. At the same time, surveys have consistently shown that the practice of traditional methods is quite high in the state. Thus the process of fertility transition in West Bengal shows characteristics distinct from that at the national level. The causes of this are to be investigated.

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Table 1: Trends in Crude Birth Rate in West Bengal and India, 1981-83 to 2001-2003

(There year moving averages of SRS estimates)

Period	West Bengal	India
1981-83	32.5	33.8
1982-84	31.6	33.8
1983-85	30.6	33.6
1984-86	29.8	33.2
1985-87	29.9	32.6
1986-88	29.6	32.1
1987-89	28.8	31.5
1988-90	28.0	30.8
1989-91	27.5	30.1
1990-92	26.7	29.6
1991-93	25.8	29.1
1992-94	25.2	28.8
1993-95	24.8	28.5
1994-96	23.9	28.1
1995-97	22.9	27.7
1996-98	22.1	27.0
1997-99	21.4	26.5
1998-2000	20.9	26.1
1999-2001	20.6	26.1
2000-2002	20.6	25.7
2001-2003	20.5	25.0

Source: India, Registrar General (1999, 2003, 2004b, 2004c).

Table 2: Estimates of Total Fertility Rate in West Bengal

Year	SRS***		Census (indirect estimation)		NFHS	
	West Bengal	India	West Bengal	India	West Bengal	India
1974-80*			4.0	4.9		
1981	4.2	4.5				
1982	4.1	4.5				
1983	4.1	4.5				
1984	3.9	4.5				
1985	3.7	4.3				
1986	3.6	4.2				
1987	3.8	4.1				
1988	3.5	4.0				
1989	3.3	3.9				
1984-90*			3.6	4.1		
1990	3.4	3.8				
1991	3.2	3.6				
1992	2.9	3.6				
1989-91@					2.9	3.1
1993	3.0	3.5				
1994	3.0	3.5				
1995	2.8	3.5				
1996	2.6	3.4				
1997	2.6	3.3				
1998	2.4					
1996-98@					2.3	2.8
1999	2.4	3.2				
2000	2.4	3.2				
1994-2001**			2.6	3.2		
2001	2.4	3.1				
2002	2.3	3.0				

Source: * Bhat (1996), **Guilmoto and Rajan (2002), ***India, Registrar General (1999, 2004b, 2004c); @IIPS and ORC-Macro (2000, 2001).

Table: 3 Sample Registration System Estimates of Age Specific Fertility Rates in West Bengal and India

Age group of women

Year	West Bengal							India						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1981	129.5	235.1	196.1	140.4	89.6	35.7	14.9	90.4	246.9	232.1	167.7	102.5	44.0	19.6
1986	102.2	213.3	186.2	116.0	65.6	32.0	10.1	91.1	252.8	216.4	139.2	78.6	37.9	14.9
1991	83.5	212.9	157.8	96.1	54.0	24.5	12.3	76.1	234.0	191.3	117.0	66.8	30.6	12.1
1996	69.0	192.0	142.5	67.8	33.3	14.4	4.5	55.3	229.1	188.1	112.4	56.6	28.3	10.2
1998	67.8	177.6	127.6	65.0	30.5	13.8	4.7	54.0	220.3	182.8	104.2	54.3	25.0	9.0
1999	67.9	179.1	126.4	65.8	27.0	12.6	4.4	52.1	213.1	181.9	103.8	54.8	23.5	8.2
2000	68.2	178.2	128.4	63.6	24.8	11.6	4.9	51.1	218.7	184.5	100.8	53.1	21.7	7.7
2001	64.3	183.8	123.2	63.7	22.3	12.7	3.1	48.9	215.9	177.3	98.5	49.9	21.2	7.3
2002	69.2	177.1	128.0	52.9	23.6	6.0	2.0	47.0	214.0	175.9	92.8	47.8	18.5	6.6

Source: India, Registrar General (1999, 2004b, 2004c).

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Table 4: National Family Health Survey-2 (1998-99) estimates of Age Specific Fertility Rates in West Bengal and India

Period	West Bengal							India						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1979/80-83/84	0.178	0.269	0.201	[0.155]	U	U	U	0.174	0.289	0.232	[0.162]	U	U	U
1984/85-88/89	0.185	0.249	0.181	0.115	[0.066]	U	U	0.177	0.282	0.210	0.125	[0.066]	U	U
1989/90-93/94	0.160	0.219	0.147	0.076	0.048	[0.018]	U	0.160	0.264	0.186	0.099	0.049	[0.020]	U
1994/95-98/99	0.116	0.174	0.109	0.050	0.016	0.005	[0.004]	0.116	0.218	0.150	0.073	0.031	0.010	[0.003]

(Column groups headed "Age group of women")

Note: U = Not Available, [ ] = Truncated, Censored.

Source: IIPS and ORC-Macro (2000, 2001).

Table 5: Estimates of Measures of Fertility and Proximate Determinants in West Bengal 1980.
1991 and 2001

	Year			Ratio of Indexes	
	1980	1991	2001	1991/1981	2001/1991
Total Fertility Rate (TFR)*	4.2	3.4	2.4	0.81	0.71
Index of Marriage (Cm)	0.75*	0.67*	0.60*	0.89	0.90
Index of Contraception (Cc)	$0.65^{\#}$	$0.63^{@}$	$0.52^{\$}$	0.97	0.83
(Cm* Cc)	0.49	0.42	0.31	0.86	0.74

Source: TFR: Table 2

Cm: Computed from estimates of TMFR, India, Registrar General (1999, 2004b, 2004c).

Cc: Computed from estimates of contraceptive prevalence rate given by, Department of Family Welfare (various years).

*India, Registrar General (1999, 2004b, 2004c).

@ Computed and adjusted from the couple protection rate given in NFHS-1, IIPS (1995b).

$ Computed and adjusted from the couple protection rate given in NFHS-2, IIPS and ORC-Macro (2001).

Computed from the couple protection rate given in ORG (1983).

Table 6: Female Singulate Mean Age at Marriage in West Bengal and India, 1961-1998/99

	Year	West Bengal	India
Census**	1961	15.9	15.9
	1971	18.0	17.2
	1981	19.3	18.4
	1991	19.7	19.3
NFHS-1*	1992-93	19.2	20.0
NFHS-2**	1998-99	19.6	19.7

Source: * IIPS (1995a, 1995b).
**IIPS and ORC-Macro (2000, 2001).

Table 7: Woman's Age at marriage in West Bengal

(Proportion of women married before exact age)

Age at marriage	Woman's Year of birth						
	1948/49-52/53	1953/54-57/58	1958/59-62-63	1963/64-67/68	1968/69-72/73	1973/74-77/78	1978/79-83/84
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.02	0.01	0.00	0.00	0.00	0.00	0.00
8	0.02	0.01	0.01	0.00	0.00	0.00	0.00
9	0.03	0.01	0.01	0.01	0.01	0.00	0.00
10	0.06	0.03	0.03	0.01	0.01	0.00	0.00
11	0.07	0.05	0.04	0.03	0.02	0.01	0.01
12	0.12	0.09	0.09	0.07	0.05	0.03	0.02
13	0.20	0.17	0.17	0.12	0.09	0.08	0.05
14	0.32	0.24	0.24	0.20	0.17	0.14	0.08
15	0.42	0.38	0.38	0.31	0.27	0.23	0.15
16	0.55	0.50	0.50	0.45	0.41	0.34	
17	0.63	0.57	0.58	0.56	0.50	0.41	
18	0.75	0.70	0.70	0.66	0.62	0.55	
19	0.78	0.76	0.74	0.71	0.68	0.62	
20	0.85	0.84	0.79	0.77	0.74	0.70	
21	0.88	0.86	0.82	0.80	0.77		
22	0.91	0.89	0.85	0.83	0.82		
23	0.92	0.90	0.87	0.86	0.85		
24	0.94	0.91	0.89	0.88	0.86		
25	0.95	0.93	0.92	0.90	0.87		
26	0.96	0.94	0.94	0.92			
27	0.97	0.95	0.95	0.93			
28	0.98	0.95	0.95	0.94			
29	0.98	0.96	0.96	0.95			
30	0.98	0.96	0.96	0.95			
31	0.98	0.96	0.96				
32	0.99	0.97	0.97				
33	0.99	0.97	0.97				
34	0.99	0.97	0.97				
35	0.99	0.97	0.97				
Median age at marriage$	**15.6**	**16.0**	**16.0**	**16.5**	**17.0**	**17.7**	**N.C**
No. of ever married women	431	543	711	770	849	782	322
Proportion married	0.99	0.96	0.95	0.95	0.90	0.75	0.32
Total adjusted No. of women in the birth cohort including never married women	435	565	748	810	943	1042	1006

Note: N.C= not calculated because less than 50 percent women are married by that age, $Include both ever-married and never-married women

Source: Computed from NFHS-2 (1998-99) data files for individual and household.

Table 8: Percentage of women whose first birth is within seven months of marriage in West Bengal and India, NFHS-2, 1998-99

States	Within one month	Within four months	Within six months	Within seven months	Total number of women
West Bengal	2.2	13.9	19.5	19.5	3927
India	2.8	13.9	19.8	22.8	80872

Note: Only those aged between 15-49 years.

Source: Computed from NFHS-2 (1998-99) data files.

Table 9: TRENDS IN WOMAN'S AGE AT FIRST BIRTH IN WEST BENGAL
(Cumulative proportion of women who have had their first birth by that age)

Woman's age	Women's year of Birth					
	1948/49-52/53	1953/54-57/58	1958/59-62/63	1963/64-67/68	1968/69-72/73	1973/74-77/78
12	0.01	0.01	0.00	0.01	0.01	0.01
13	0.02	0.02	0.02	0.02	0.02	0.03
14	0.04	0.07	0.05	0.06	0.05	0.08
15	0.12	0.16	0.13	0.12	0.13	0.16
16	0.21	0.26	0.26	0.24	0.24	0.28
17	0.33	0.37	0.36	0.36	0.38	0.42
18	0.45	0.48	0.50	0.49	0.50	0.56
19	0.60	0.57	0.59	0.59	0.60	0.71
20	0.68	0.66	0.70	0.68	0.71	0.86
21	0.75	0.75	0.76	0.73	0.79	
22	0.83	0.82	0.80	0.80	0.85	
23	0.86	0.85	0.84	0.85	0.90	
24	0.90	0.88	0.88	0.87	0.93	
25	0.92	0.91	0.91	0.91	0.96	
26	0.94	0.92	0.93	0.93		
27	0.95	0.94	0.95	0.95		
28	0.96	0.96	0.97	0.96		
29	0.97	0.97	0.98	0.98		
30	0.99	0.98	0.99	0.98		
31	0.99	0.98	0.99			
32	0.99	0.99	0.99			
33	0.99	0.99	0.99			
34	0.99	1.00	1.00			
35	0.99	1.00	1.00			
36	0.99	1.00				
37	0.99	1.00				
38	0.99	1.00				
39	0.99	1.00				
40	0.99	1.00				
Median age at first birth[$]	**18.3**	**18.2**	**18.0**	**18.1**	**18.0**	**17.6**
No of ever-married women	411	528	678	736	786	635

Note: Based only on ever married women with at least one birth

Source: Computed from NFHS-2 (1998-99) data files for individual women.

Table 10: Trends in Period Parity Progression Ratios in West Bengal, 1978-97

Year	Progression from					
	Woman's birth to 1st birth	1st to 2nd birth	2nd to 3rd birth	3rd to 4th birth	4th to 5th birth	5th to 6th birth
1978	0.963	0.934	0.917	*	*	*
1979	0.860	0.911	0.857	0.843	0.583	0.508
1980	0.959	0.950	0.937	0.896	0.647	0.883
1981	0.946	0.887	0.765	0.678	0.774	0.703
1982	0.940	0.965	0.853	0.737	0.655	0.811
1983	0.948	0.942	0.782	0.818	0.583	0.766
1984	0.933	0.952	0.709	0.747	0.744	0.626
1985	0.986	0.892	0.807	0.682	0.734	0.544
1986	0.882	0.954	0.688	0.776	0.788	0.784
1987	0.908	0.944	0.699	0.544	0.610	0.639
1988	0.919	0.839	0.822	0.712	0.735	0.620
1989	0.884	0.874	0.735	0.574	0.570	0.690
1990	0.894	0.896	0.729	0.689	0.497	0.641
1991	0.921	0.886	0.802	0.552	0.610	0.545
1992	0.882	0.801	0.670	0.845	0.611	0.491
1993	0.862	0.855	0.668	0.714	0.558	0.658
1994	0.853	0.820	0.628	0.503	0.441	0.464
1995	0.812	0.828	0.544	0.456	0.490	0.435
1996	0.828	0.765	0.522	0.510	0.553	0.483
1997	0.865	0.830	0.455	0.572	0.277	0.271

Source: Computed from NFHS-2 (1998-99) data files

Table 11: Compound Period Parity Progression Ratios in West Bengal

Progression to Parity	Year			
	1978-82	1983-87	1988-92	1993-97
1	0.909	0.922	0.891	0.851
2	0.846	0.846	0.760	0.696
3	0.729	0.633	0.519	0.383
4	0.605	0.447	0.322	0.209
5	0.392	0.305	0.196	0.096

Source: Computed from NFHS-2 (1998-99) data files

Table 12: Period Parity Progression Ratios for West Bengal, Uttar Pradesh and Kerala

Period	Progression from				
	Woman's birth to 1st birth	1st to 2nd birth	2nd to 3rd birth	3rd to 4th birth	4th to 5th birth
West Bengal*					
1978-82	0.909	0.931	0.862	0.831	0.649
1983-87	0.922	0.918	0.749	0.707	0.684
1988-92	0.891	0.854	0.683	0.621	0.609
1993-97	0.851	0.819	0.551	0.548	0.464
Uttar Pradesh**					
1972-76	0.972	0.972	0.966	0.951	0.953
1977-81	0.968	0.976	0.965	0.942	0.892
1982-86	0.958	0.979	0.956	0.833	0.839
1987-91	0.932	0.976	0.906	0.822	0.764
Kerala***					
1972-76	0.899	0.956	0.880	0.775	-
1977-81	0.913	0.936	0.758	0.600	-
1982-86	0.879	0.920	0.656	0.420	-
1987-91	0.856	0.924	0.459	0.293	-

Source: * Computed from NFHS-2 (1998-99) data files.

** Mishra *et al.* (1999).

***Alagarajan and Kulkarni (1998).

Table 13: Number of Acceptors of Different Contraceptive Methods in West Bengal and India, 1966-67 to 2000-01

(Figures in thousands)

	Types of contraceptives							
Year	Sterilizations		IUD		Conventional Contraceptives @		Oral Pill @	
	West Bengal	India	West Bengal	India	West Bengal	India	West Bengal	India
1966-67	28	887	73	909	37	465	$	$
1967-68	226	1839	21	668	29	582	$	$
1968-69	172	1664	21	478	28	439	$	$
1969-70	69	1422	9	458	35	298	$	$
1970-71	73	1330	9	476	54	1963	$	$
1971-72	74	2187	9	488	64	2354	$	$
1972-73	22	3122	9	355	50	2398	$	$
1973-74	27	942	80	372	58	3010	$	$
1974-75	56	1354	102	433	63	2521	$	$
1975-76	206	2669	22	607	223	3495	#	32
1976-77	882	8261	27	581	234	3634	#	58
1977-78	35	949	7	326	79	3175	#	78
1978-79	67	1484	10	552	59	3387	#	82
1979-80	155	1778	21	635	100	2987	6	82
1980-81	209	2053	31	628	91	3718	6	91
1981-82	217	2792	31	751	108	4439	6	120
1982-83	269	3983	39	1097	131	5765	8	183
1983-84	371	4532	44	2134	133	7661	17	729
1984-85	271	4085	46	2562	111	8505	24	1290
1985-86	288	4902	61	3274	139	9387	17	1358
1986-87	301	5043	75	3935	154	9825	26	1829
1987-88	324	4940	94	4356	197	11342	81	2064
1988-89	335	4678	116	4851	252	12433	83	2419
1989-90	320	4181	131	4936	319	14186	99	2740
1990-91	320	4126	140	5370	315	14735	110	3125
1991-92	327	4090	168	4386	342	13875	131	3366
1992-93	312	4286	162	4740	370	15004	174	3001
1993-94	354	4497	164	6017	446	17283	184	4302
1994-95	361	4580	140	6702	489	17707	267	4873
1995-96	331	4422	129	6858	446	17297	259	5091
1996-97	326	3870	113	5681	402	17214	290	5250
1997-98	321	4239	101	6173	402	16796	332	6395
1998-99	269	4207	90	6083	383	17448	326	6944
1999-2000	289	4595	86	6200	349	18135	330	7747
2000-01	313	4735	87	6046	393	18202	386	7640

Note: @ Equivalent users, $ was not in programme, # included in conventional contraceptives.

Sources: India, Department of Family Welfare (several years).

Table 14: Estimates of Contraceptive Prevalence Rate in West Bengal and India

Year	Programme Estimates (Only Modern Methods)$		Survey Estimates (Modern Methods)		Survey Estimates (Traditional and Modern Methods)	
	West Bengal	India	West Bengal	India	West Bengal	India
1970	9.5	9.4	13.8*	9.7*	21.1*	13.6*
1971	9.7	10.4				
1972	10.0	12.2				
1973	12.2	14.5				
1974	11.6	14.7				
1975	11.5	14.8				
1976	14.3	17.0				
1977	24.4	25.5				
1978	22.0	22.5				
1979	21.1	22.4				
1980	21.4	22.3	33.3*	17.4*	48.8*	35.3*
1981	22.2	22.8				
1982	23.0	23.7				
1983	24.3	25.9				
1984	26.5	29.5				
1985	27.3	32.1				
1986	28.4	34.9				
1987	30.1	37.5				
1988	31.3	39.9	40.3*	39.9*	54.8*	44.9*
1989	32.7	41.9				
1990	33.1	43.3				
1991	33.3	44.1				
1992	34.5	43.6				
1992-93			36.5@	45.3@	61.8@	51.0@
1993	34.3	43.5				
1994	34.9	45.4				
1995	35.7	45.8				
1996	35.2	46.5				
1997	34.2	45.4				
1998	33.8	45.4				
1998-99			47.3@	42.8@	66.6@	48.2@
1999	32.9	44.0				
2000	32.2	46.2				

Source:.$ India, Department of Family Welfare (year books of various years). *ORG Surveys: ORG (1972, 1983, 1990), @ NFHS-1 and 2: IIPS (1995a, 1995b), IIPS and ORC Macro (2000, 2001).

Fig 1:

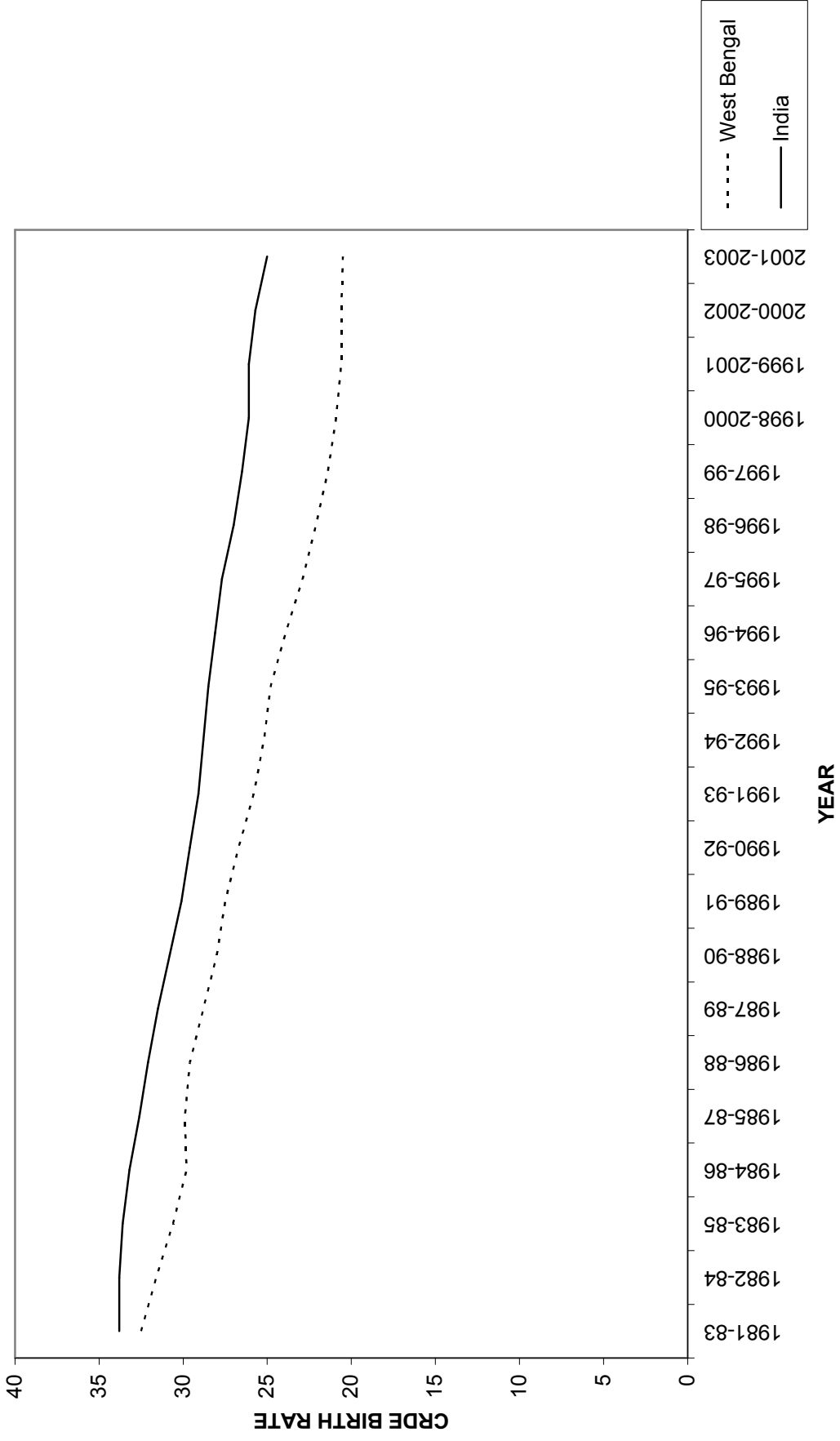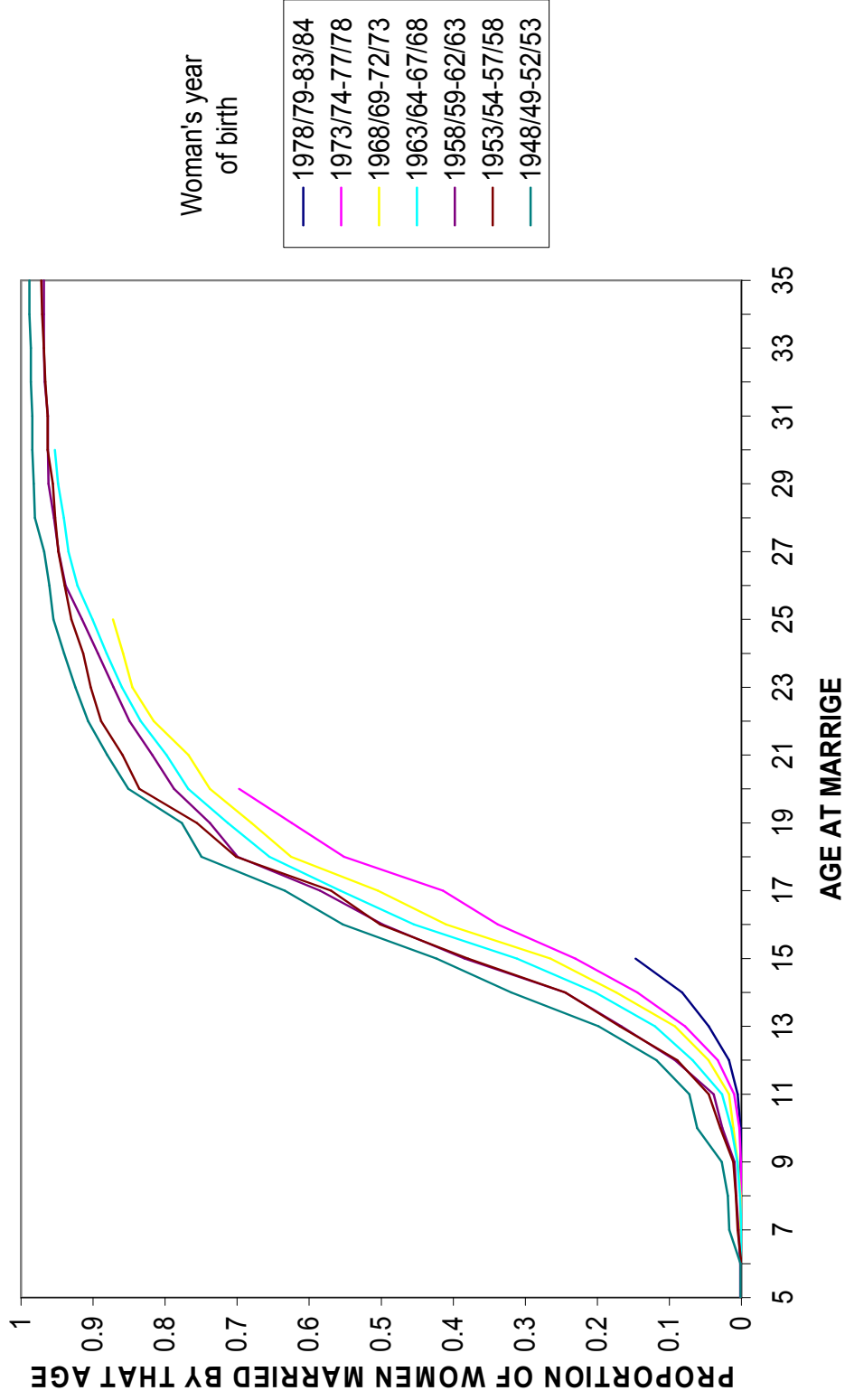## TRENDS IN CRUDE BIRTH RATE IN WEST BENGAL AND INDIA 1981-83 To 2001-2003
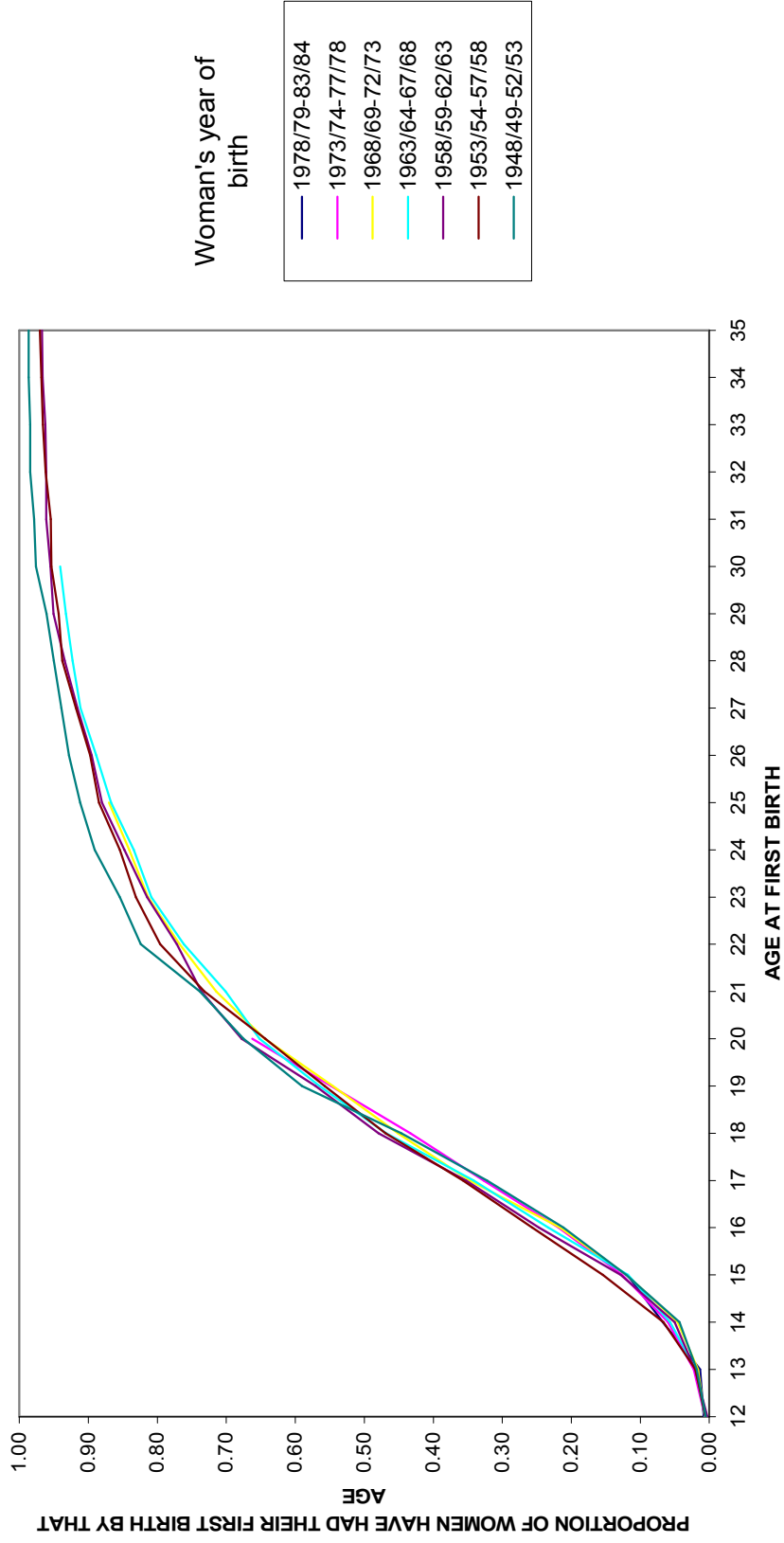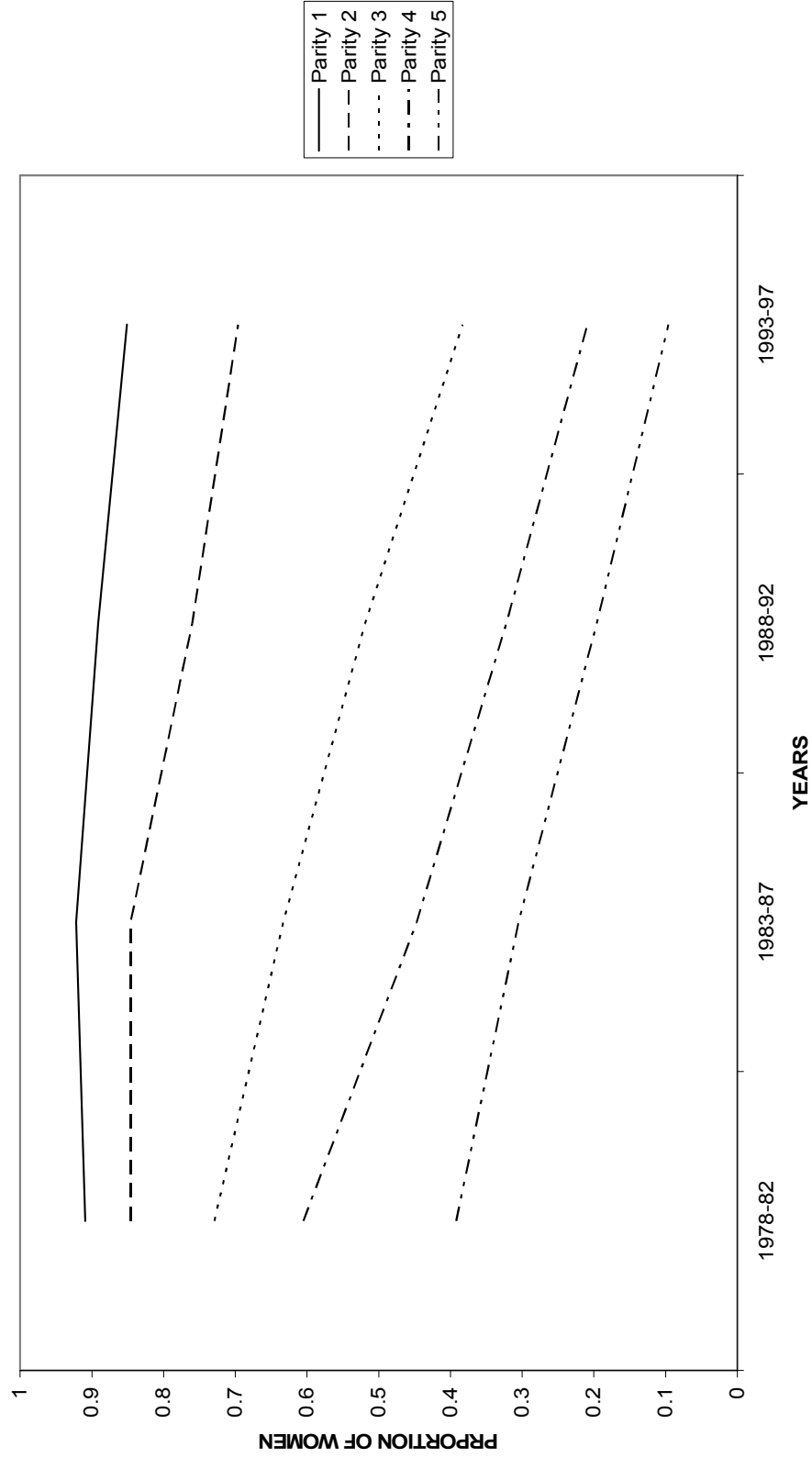
Fig. 2
WOMAN'S AGE AT MARRIGE IN WEST BENGAL

PROPORTION OF WOMEN MARRIED BY THAT AGE

AGE AT MARRIGE

Woman's year of birth
1978/79-83/84
1973/74-77/78
1968/69-72/73
1963/64-67/68
1958/59-62/63
1953/54-57/58
1948/49-52/53

Source:Computed from NFHS-2 data files

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Fig.3
WOMAN'S AGE AT FIRST BIRTH IN WEST BENGAL

Woman's year of birth

- 1978/79-83/84
- 1973/74-77/78
- 1968/69-72/73
- 1963/64-67/68
- 1958/59-62/63
- 1953/54-57/58
- 1948/49-52/53

PROPORTION OF WOMEN HAVE HAD THEIR FIRST BIRTH BY THAT AGE

AGE AT FIRST BIRTH

Source: computed from NFHS-2 data files

Fig 4:

COMPOUND PARITY PROGRESSION RATIOS IN WEST BENGAL

Source: Computed from NFHS-2 (1998-99) data files.

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