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[*] Associate Professor, Department of Economics, University of Chittagong and Postdoctoral Research Fellow, School of Economics, The University of Queensland.
[†] School of Economics, The University of Queensland, Brisbane QLD 4072, Australia
Email: c.tisdell@economics.uq.edu.au

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For more information write to Professor Clem Tisdell, School of Economics, University of Queensland, Brisbane 4072, Australia. (e-mail: c.tisdell@economics.uq.edu.au)

MAJOR DEMOGRAPHIC CHANGES IN BANGLADESH AND THEIR SOCIO-ECONOMIC CORRELATES: ANALYSIS OF TRENDS

Abstract

Catalogues the demographic changes in Bangladesh during the period 1975-2000 and examines how they relate to key socio-economic attributes. Trends are examined in population growth, growth of the working age population, women's workforce participation, age-dependency ratio, female-male ratio, longevity, fertility, mortality and mean age at first marriage. Bangladesh has made significant breakthroughs in all these areas, a feat not matched by most other South Asian countries, but comparable with the South-East Asia region as whole. The study isolates factors contributing to the changes in each attribute. It assesses the correlation between Bangladesh's demographic changes and selected socio-economic indicators namely, its per capita GDP, female labour force participation, per capita public health expenditure and educational achievements by both men and women. All five socio-economic variables display statistically significant correlation, in varying degrees, with measures of the demographic changes. Per capita GDP is probably the most significant determinant of demographic changes in Bangladesh. The study observes that men's education reinforces women's education and with increased workforce participation contributed to reduced fertility. The study suggests that the role of family planning programs in curbing population growth in Bangladesh maybe overestimated.

MAJOR DEMOGRAPHIC CHANGES IN BANGLADESH AND THEIR SOCIO-ECONOMIC CORRELATES: ANALYSIS OF TRENDS

1. Introduction

The history of economic development suggests that economic growth and demographic changes go side by side. The most recent examples include the spectacular development of several East Asian countries. Although the bulk of the literature to date has attributed the unprecedented and prolonged growth performances of these countries mostly to their shifts in trade policies to outward orientations (see, for examples, Krueger 1997, 1998; Lal 1997; Sachs and Warner 1995; Helleiner 1995), some studies also highlight the importance of education and health spending, governance, physical locations of the countries and cultural orientations, among other things (Lipton 1984; Bradford 1986; Myint 1987; Wade 1990; Young 1994; Krugman 1994). The East Asian nations clearly outshone their counterparts in South Asia, Africa as well as Latin America many of which have pursued similar trade policy regimes for a long time now.

Factors like government participation or the lack of it, geography and culture and expenditure on education and health can only explain part of the differences in economic performances between the East Asian countries and the rest of the developing world. Some argue that demographic changes such as declines in the population growth, increases in the working age population relative to total population, increased life expectancy, declines in the age dependency ratios and fertility and mortality rates may have been responsible for the "unexplained differences in regional economic performance" (Bloom, Canning and Malaney, 1999). On the other hand, economic growth has been found to be an important precursor to demographic changes (Hossain and Tisdell 2003a; Wang and Jamison 1997; Fogel 1994; Becker and Barro 1988). Furthermore, empirical studies also indicate causal relationships, including bi-directional causality, between demographic changes and health care facilities, female labour force participation and education, especially education of females (Hossain and Tisdell 2003a; Englehardt et al. 2001; Cheng 1996; Preston 1975, 1980). In other words, demographic changes do affect and are affected by socio-economic variables.

Bangladesh is one of the poorest and most densely populated countries in the world. Nevertheless, Bangladesh has made significant progress in its demographic transition and economic growth, particularly during the last two decades. Bangladesh's real GDP has consistently increased in recent years in the range 4-5 per cent per annum largely due to the

shift of the country's liberalisation of the external trade regime during the 1980s (Islam 1998; Hossain 2003). Consequently, its per capita GDP (in US dollars) has increased by more than 200 per cent during the last 25 years. The expansion of its low-skill manufacturing exports has also facilitated increased female labour force participation. The combined educational enrolment ratio increased by about 60 per cent, while the female enrolment ratio grew by about 135 per cent during the period 1975-2000.

Bangladesh has successfully put a brake on the growth of its level of population. During the 1970s population was growing at about 2.5 per cent per annum. The population growth rate came down to well below 2.00 per cent during the 1990s. Its infant mortality rate has also been dramatically reduced over time. By 2000, its infant mortality rate per 1000 live births had dropped to 51 from 192 in 1975. Similarly, its total fertility rate declined from 6.34 to 2.50 per 100 women during the same interval. Thus the demographic changes in Bangladesh can be described as a transition from a high fertility-high mortality situation to one of low fertility-low mortality.

Several micro-level studies on Bangladesh identify female workforce participation, education and the use of contraceptives as the major determinants of fertility control and, therefore, the decline in population growth rate (Razzaque et al., 1998; Khuda and Hossain, 1996; Khan and Raeside, 1998). However, recent country-specific empirical studies suggest that the economic development and its correlates such as the level of education and women's earnings are more important determinants of fertility regulation than the family planning programs. In the backdrop of the above discussion, the present study aims at an assessment of the extent of demographic changes in Bangladesh on the basis of the available aggregate data and how these changes are related to selected socio-economic variables. The rest of the paper is organised as follows. Section 2 examines the trends in the growth of population, growth of working age population, and the dependency ratio. Section 3 looks at the changes in the female-male ratio and sheds light on the infant mortality rate. Section 4 focuses on life expectancy as well as the female-male differences in life expectancy. Section 5 discusses the developments in fertility rate, crude birth rate, mortality rate and mean age at first marriage. Section 6 presents and analyses the correlation coefficients between selected demographic indicators and socio-economic variables. The concluding comments are presented in Section 7.

2. Population, Working Age Population and Dependency Ratio

The level of population has grown at a diminishing rate in Bangladesh over time. In the span of a quarter of a century, as reported in Table 1, the annual growth rate of its population has been almost halved, from 3.35 per cent in 1975 to 1.79 per cent in 2000. Between 1975 and 1980, the population grew at an average annual rate of 3.30 per cent, which dropped to 1.87 per cent during 1995-2000. The declining growth rate of its population is reflected on the growth of the density of population, as can be seen from Table 1 as well as Figure 1 below. Overall, the growth rate of the Bangladesh population has shown a clear declining trend. The growth rate of the working wage population, that is, the population in the 15 to 64 age group largely remained in the range of 2 to 3 per cent per annum with a clear downward trend between 1976 and 1986, a mixed but slightly downward trend between 1986 and 1994 and to some extent an upward trend thereafter. Overall, the working age population grew at about 2.5 per cent during the sample period. The growth rate of the working age population consistently surpassed the population growth rate by almost a uniform margin until between 1976 and 1986. Consequently, the growth rate of the working age population relative to total population grew at an identical rate (of about 0.40 per cent) during this period. Commensurate with the trends in population growth and working age population growth, the growth in working age population relative to total population has shown a mixed pattern since 1986. It can be seen from Figure I that the growth rates for the year 1975 for all three attributes mentioned above can be considered as outliers in relation to the overall trends. This is probably due to the massive casualties of the devastating famine of 1974.

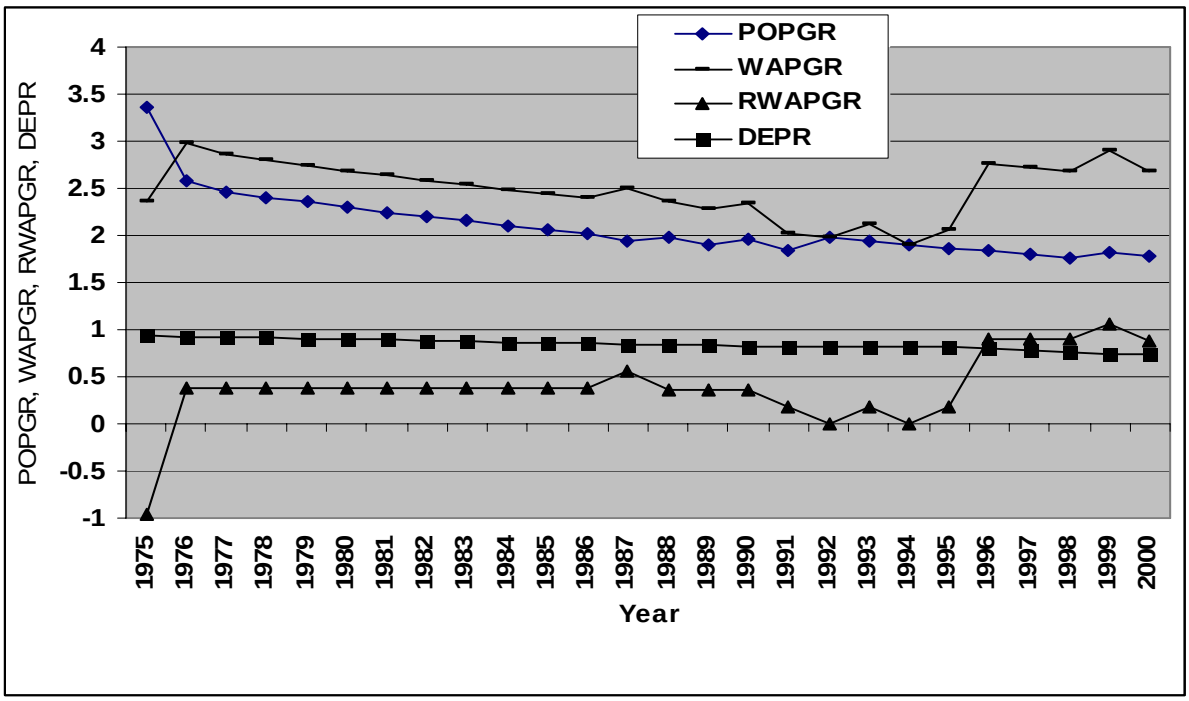
The dependency ratio, defined as the sum total of the population in the 0 to 14 and the 65 and above age groups relative to the working age population has considerably declined over time. Between 1975 and 2000, the dependency ratio dropped from 0.93 to 0.77 or by about 17 per cent. The gradual fall in the dependency ratio is aptly explained by the differences in the growth rates of the working age population and total population.

Table 1

Growth of Population, Working Age Population, Dependency Ratio and Population Density In Bangladesh, 1975-2000

Year/ Period	Growth of Population (%)	Growth of Working Age Population (%)	Growth of Working Age Population Relative to Total Population (%)	Dependency Ratio	Population Density
1975	3.35	2.36	(-) 0.96	0.93	535
1980	2.30	2.67	0.38	0.90	603
1985	2.06	2.44	0.37	0.86	671
1990	1.96	2.34	0.37	0.82	739
1995	1.87	2.05	0.18	0.81	812
2000	1.79	2.68	0.87	0.73	888
1975-1980	3.30	2.98	0.38	0.92	562
1980-1985	2.25	2.67	0.38	0.88	644
1985-1990	2.04	2.49	0.41	0.84	712
1990-1995	1.98	2.10	0.11	0.82	783
1995-2000	1.87	2.90	0.94	0.77	857

Source(s): Based on the Bangladesh Bureau of Statistics and the Asian Development Data



Source(s): Based on the Bangladesh Bureau of Statistics and the Asian Development data.
Note: A complete time series on the working age population is not available for Bangladesh. The missing data are therefore computed through interpolation using the exponential growth rates between intervals.

Figure 1: Trends in Population Growth, Working Age Population Growth, Growth of Working Age Population Relative to Total Population and Dependency Ratio in Bangladesh, 1975-2000

As discussed earlier, the declines in the growth rate of population in Bangladesh have come through the declining fertility rate, which in turn is a sequel to a host of factors including the family planning programmes, economic growth and the increased level of education of the population, particularly female education. While the success of the family planning programmes depend largely on the voluntary participation of the people, industrialisation and economic development create a built-in environment that forces people to have a smaller family size. In a predominantly agrarian society, as Caldwell (1982) argues, children are regarded as assets as they help raise the standard of living of the parents by performing light household and agricultural activities such as tending livestock, collecting fuel-wood and fetching water. The process of industrialisation necessarily raises the mobility of the people and makes education compulsory. Consequently, children can become a net economic burden to their parents. Becker and Barro (1988) argue that economic growth raises the opportunity cost of time which in turn leads to a decline in fertility rates. These explanations

seem to apply to Bangladesh. Over the years, the Bangladesh economy has undergone considerable structural change with respect to the sectoral composition of output. The share of agriculture in GDP shrunk from 53 per cent in 1978 to 24.6 per cent in 2000. During the same period, the contribution of industry rose from 9.8 per cent to 24.4 per cent and the share of the services sector increased from about 34 per cent to 51 per cent (BBS 1982; ADB 2003). Urbanisation of the population has kept pace with the growth of the industrial sector. In 1974, Bangladesh's urban population comprised just 8.8 per cent of its total population, which rose to 25 per cent in 2000 (BBS 1982, ADB 2003).

Recent studies suggest that the high rates of population growth in the developing countries are an outcome of the declines in mortality rates (Bloom and Williamson 1997; Bloom and Sachs 1998). These falls are followed by declines in fertility rate. The initial declines in mortality rates affect the lower end of the age distribution while the subsequent declines in fertility rates affect the age distribution at zero. The demographic transition, that is, the low mortality-low fertility combination over time affects the size of working age population and therefore the working age population relative to total population (Bloom, Canning and Malaney 1999). It can thus be concluded that persistent declines in mortality and fertility rates during the 1970s and 1980s (discussed later) are responsible for an increasing rate of growth of the working age population in Bangladesh since the mid-1990s.

3. Female-Male Ratio in the Population

Biologically, the secondary sex ratio, that is, the ratio necessary for maintaining the balance in human populations, is expected be 105 males for every 100 females (105:100) (Sergeant, 2002), which is roughly 95.23 females per 100 males. The average female-male ratio (FMR) of 0.99 for the world as a whole (Sen, 1987a, 1987b) suggests that the current secondary sex ratio for the world is in favour of the female component of the population. But the ratio is not uniform across countries. For example, India has an FMR of 0.927 (as of 1991) (Agnihorti et al., 1998) and China, only 0.853 (Junghong, 2001). Table 2 presents the available data on the FMR for the whole population as well the various age groups for Bangladesh spanning the last 50 years or so. The overall FMR appears to be on the rise, although it remained well below the expected ratio of 0.952 until 1974. Between 1981 and 1996, the FMR remained marginally lower than 0.952. The FMR just equalled the expected ratio in 2002.

Table 2

Trends In Female-Male Ratios In Bangladesh

Year	Overall	Age Groups					
		0-4	5-9	10-14	15-24	25-59	60^{+}
1951	0.911	1.010	0.964	0.792	1.027	0.857	0.815
1961	0.929	1.023	0.957	0.780	1.060	0.875	0.813
1974	0.928	1.007	0.988	0.841	0.944	0.914	0.770
1981	0.946	0.986	0.971	0.871	1.024	0.915	0.783
1991	0.945	0.972	0.935	0.873	1.056	0.928	0.833
1996	0.947	0.957	0.919	0.972	0.975	0.957	0.853
2002	0.952	---	---	---	---	---	---

Sources: Bangladesh Bureau of Statistics; UNDP.

The FMR in Bangladesh also varies across age groups. Although the FMR in the 0-4 age group showed a clear downward trend, until 1974 it remained over 100 per cent. Between 1961 and 1974, the FMR in the 0-4 group dropped by 1.6 percentage points. In 1996, the FMR in this group had dropped to 0.957, just over the expected rate. A similar downward trend is visible for the 5-9 age group. The FMR showed an improvement in the 10-14 age group and a mixed but slightly declining trend within the 15-24 age group.

One reason for the upward trend in the overall FMR after 1974 may be the improvement of the ratio in favour of females in the 25 and above age groups especially in the 60 and above age group. The improvement could be partly due to the massive casualties of males in the 15 and above age group during the Liberation War of 1971. Major wars are also found to be a significant determinant of sex ratio at birth. MacMohan and Pugh (1954) show that the number of male births far exceeded that of female births during and after the First and Second World Wars in the countries directly involved in the conflicts. While the Liberation War was responsible for an improvement in the overall FMR, it might have also been simultaneously responsible for the decline in the 0-4 age group FMR immediately after 1974 thereby conforming to the findings of MacMohan and Pugh (1954). The devastating famine of 1974 can also be described as a major natural cause for the changes in the FMR during the 1970s and the early 1980s. The declines in the FMR in the 0-4 and 5-9 age groups after 1974 may be linked with the preferential treatment of the male children during and immediately after 1974.

However, the cases of China and India suggest that in addition to the natural causes, government policies and the cultural disposition of a country can also affect the FMR. In China, it is the one-child policy of the government that resulted in a sharp decline in the female-male ratio. In India, in addition to government policy, socio-cultural orientations of the sections of the population and unethical practices of the medical profession contributed to the decline in the FMR (Agnihorti et al., 1998; Tisdell et al., 2001; Ramanamma and Bambwale, 1980). Although an official population control policy has been in place in Bangladesh since the 1950s, unlike China it does not impose the fertility decisions on the people. However, the socio-cultural orientations of the populace have been historically against the female offspring. This is largely because women are considered as being less capable of earning incomes for the family compared to men, although the scenario has considerably changed over recent years thanks to the expansion of the low-skill export oriented manufacturing industries and the micro-financing through various NGOs and the Grameen Bank.

The downward trends in FMRs in the 0-9 age group and the upward trends in the overall population as well as the upper age groups present an apparent contradiction. Several socio-economic factors may have contributed to the improvement in the overall FMR in Bangladesh. First, the extension of health-care facilities to women and greater access to cheaper life-saving drugs has considerably raised the life expectancy of women in Bangladesh (discussed further in the next section). This has been further supplemented by the fall in the maternal mortality rate due to the expansion of pre- and post-natal services. Second, increasing female labour force participation (FLP) may have had a role. Empirical evidence suggests that the FLP has a positive association with the FMR (see, for example, Agnihorti, et al., 1998). This positive link is interpreted as the combined impact of the changes in various other factors and attributes that the FLP forces to occur. The direct impacts of the FLP are women's exposure to the outside world and their acquiring exchange entitlements through income earnings. As an indirect effect, this may reduce the female mortality disadvantage in childhood (Kishor, 1993; Rosenweig and Schultz, 1982). Alternative explanations for the negative association between the FLP and the female mortality rate in childhood are: a higher FLP raises the returns to investment in female children, lowers the dowry levels, raises the cost of children by raising the cost of female time, lowers women's dependence on sons in old age, enhances women's status in the society and therefore the value of the female children, and raises the bargaining power of the women

in the family (Murthi et al., 1995). Overall, these factors are expected to contribute to a rise in the FMR, although some of them may have altogether different implications for the female child mortality rate (Agnihorti et al., 1998).

Studies on Bangladesh indicate that female labour force participation in Bangladesh has risen tremendously over time both in absolute terms and as a ratio of total employment in the country. As Hossain and Tisdell (2003b) show, the FLP increased from 4.1 per cent in 1974 to 37.7 per cent in 2000, while during the same period female employment as share of total employment increased from 4.2 per cent to about 52.0 per cent. It is, therefore, tempting to conclude that increased female labour force participation has had an impact on the overall female-male ratio in Bangladesh. Nonetheless, while exploring the link between the FLP and the FMR for Bangladesh one has to keep in mind that women's labour force participation in Bangladesh has become significant only in recent years, or more precisely, since the mid-1980s. Thus the focus of attention should be on the 0-4 and 5-9 age groups after the late 1980s. Table 3 clearly shows that compared to 1981 FMRs in both these age groups were lower in 1991 and even lower in 1996, which points to an inverse relationship between the FLP and the FMR. Given that the changes in the FMR may be affected by a multiplicity of socio-economic factors, the issue needs to be separately explored. To date, there has been no representative study on the issue.

Table 3

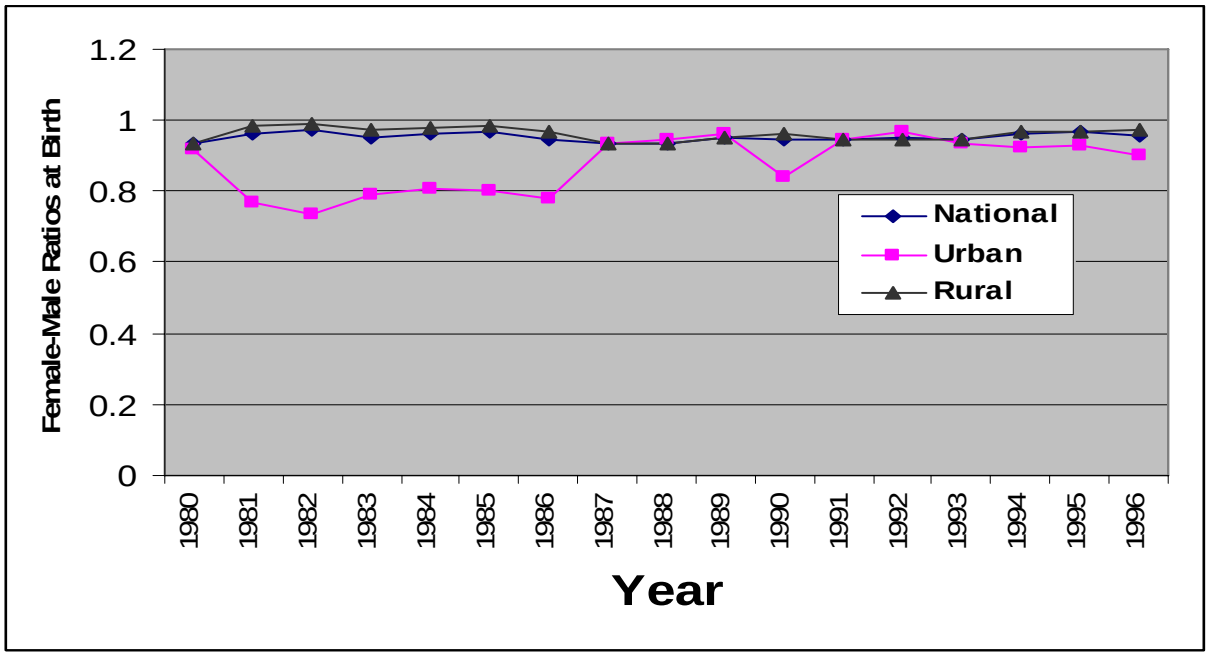
Infant Mortality Rates In Bangladesh

Year	Overall	National		Urban		Rural	
		Male	Female	Male	Female	Male	Female
1975	192	102	97	84	76	106	101
1980	102	102	97	84	76	106	101
1984	122	134	109	141	97	133	111
1988	106	116	105	96	87	108	107
1992	88	90	86	68	62	95	90
1996	67	68	67	52	49	78	74
2000	51	58*	56*	49*	45*	68*	64*

Source: Bangladesh Bureau of Statistics. * denotes that the figures are for 1998.

It is also hard to establish a positive impact of female education or labour force participation on the female mortality rate at childhood from the aggregated data. Infant mortality rates for both males and females increased between 1980 and 1984 and consistently fell thereafter in both the urban and rural areas (Table 3). Between 1984 and 1998, the overall male and

female infant mortality rates fell by 56.72 and 48.62 per cent respectively. The rates of decrease for Bangladesh's urban area are respectively 65.25 and 53.61 per cent and for its rural area, 48.87 and 42.34 per cent respectively. These statistics rather support the contention that women's work force participation and education have had a negative impact on the FMR.



Source: Based on the Bangladesh Bureau of Statistics data

Figure 2: Female-Male Ratios at Births, 1980-1996

The female to male birth ratios (FMBR), plotted in Figure II, tell a slightly different story. FMBRs showed a fluctuating tendency between 1980 and 1996, with the urban FMBR being particularly sporadic. The rural FMBR rose between 1980 and 1982, remained steady between 1982 and 1985, fell between 1985 and 1987 and remained relatively stable until 1993 before showing a tendency to rise in the later years. Figure III clearly shows that the FMBR for Bangladesh's rural area and, therefore, the whole country, was perceptibly higher until the mid-1980s than the period after. In Bangladesh's urban area, the opposite patterns hold. However, the FMBR in the urban area has consistently declined since 1992 and, at the same time, remained below the rural FMBR. Given that the relative frequency of women's paid employment in urban areas far outweighs that in rural areas, one can conjecture that the gap between urban and rural FMBRs as well as the widening of the gap in recent years may be an outcome of greater female labour force participation in the urban areas. It may as well

be an outcome of an extension of the medical facilities in the urban areas that enabled the parents to pre-select an offspring.

4. Length of Life and the Gender Gap in Life Expectancy

The life expectancy at birth is affected by a host of factors of which the per capita gross domestic product (GDP), education, employment, health expenditure per capita, the ratio of physicians in the population and the number of hospital beds in relation to the size of population are the most notable ones. The gender gap in life expectancy depends on how the benefits of these attributes are distributed between males and females. Gender equity in health requires that men and women will have the same opportunity to enjoy health, access health resources and have power in the health sector in order to enable them to remain healthy. It must be emphasised though that because of their reproductive role, women face a greater number of unavoidable health risks and more and varying health needs than men. But typically women have less opportunity to enjoy good heath as they have less access to nutrition, education, employment and income. Although women occupy a majority of the health related employment, they have less ability to influence health policy and decision-making as they are clustered at the lower end of the health labour force (Pan American Health Organisation).

Despite the odds against them, historically female versus male life expectancy has been in favour of females and has in fact widened over time for most parts of the world with exceptions in South Asia (Kane, 1991; Kinsella and Gist, 1998). The female advantage in life expectancy is in general lower in the developing countries than the developed countries. However, with the growing educational attainments by females, the survival and health status of women are expected to improve with time (Liu et al., 1998). Let us now examine if the improvements in educational attainments and employment have reflected on the female advantage in life expectancy in Bangladesh.

As can be seen from Table 4, contrary to the world scenario, historically men enjoyed greater longevity than women in Bangladesh. However, the gap has been considerably reduced over time. Both female and male life expectancies are on the rise although the growth rates differ between rural and urban areas. The overall female life expectancy at birth grew at a faster rate than the male life expectancy. Between 1974 and 2000, the overall female and male life

expectancies rose by 20.52 per cent while the male life expectancy rose by 11.71 per cent. Figure III shows the dynamics of female advantage in life expectancy at the national level.[1]

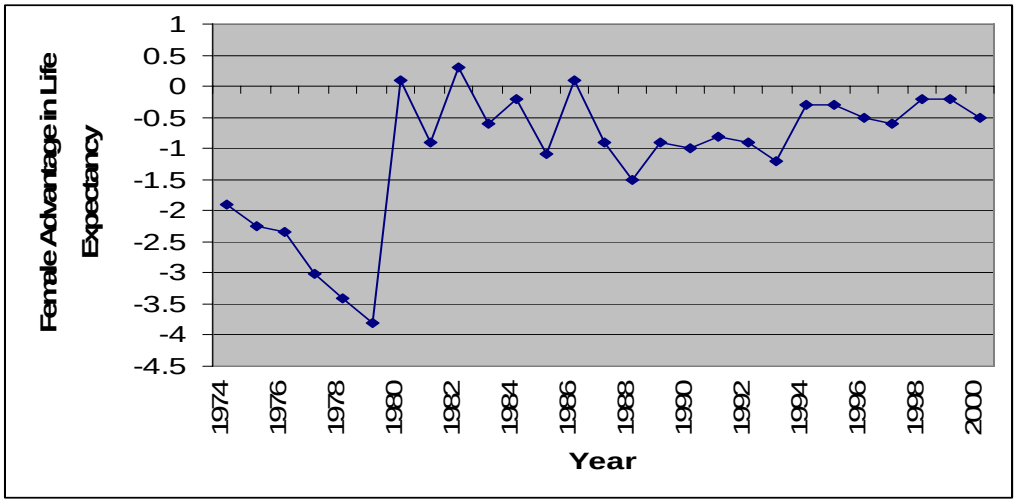
Table 4

Life Expectancies at Birth for Males and Females

and the Gender Gap in Life Expectancy in Bangladesh

Year	Female Life Expectancy			Male Life Expectancy			FLE Less MLE		
	National	Urban	Rural	National	Urban	Rural	National	Urban	Rural
1974	49.7	---	---	51.6	---	---	-1.90	---	---
1981	54.4	60.5	53.8	55.3	59.8	54.9	-0.90	+0.70	-1.10
1985	54.6	60.5	54.1	55.7	59.9	55.3	-1.10	+0.60	-1.20
1989	55.1	60.3	54.8	56.0	61.5	55.2	-0.90	-1.20	-0.40
1993	56.6	60.4	57.4	57.8	61.3	57.7	-1.20	-0.90	-0.30
1997	59.9	62.0	59.2	60.5	62.7	59.6	-0.60	-0.70	-0.40
2000	59.9	---	---	60.4			-0.50	---	---

Source: Bangladesh Bureau of Statistics



Source: Based on the Bangladesh Bureau of Statistics data

Figure 3: Dynamics of Female Advantage in Life Expectancy at the National Level in Bangladesh

The following observations can be made from Table 4 and Figure 3:

(a) The overall life expectancy for both men and women has slowly risen over time with female life expectancy registering a slightly higher growth rate.

(b) The female advantage in life expectancy in Bangladesh's rural area as well as in the country as a whole has been consistently negative.
(c) The positive advantage in life expectancy that women had in the urban area disappeared with time, which in fact turned into a disadvantage after the mid-1980s.
(d) In all cases, the gender gap in life expectancy has shown a tendency to moderate.

In hindsight, rising educational attainments for both men and women, the growth of per capita GDP, the expansion of the health care facilities and increased government expenditure in the health sector may have had an impact on the overall longevity. The overall enrolment in education as share of total population grew from 0.138 to 0.223 between 1974 and 2000 with the female enrolment ratio growing at a faster rate than the male enrolment ratio.[2] . In 1974, female and male enrolment ratios were respectively 0.099 and 0.171. The corresponding figures for 2000 were respectively 0.210 and 0.235. During the period 1974-2000, Bangladesh's per capita GDP rose from about US$115.00 to over US$330.00. Per capita public health expenditure, although still very low, increased from about US$0.75 to just over US$3.00. The number of hospital beds increased from 12,649 in 1974 to 43,293 in 1999.

5. Fertility Rate, Crude Birth Rate, Mortality Rate and Mean Age at First Marriage

Experience of the developed countries suggests that female labour force participation (FLP) in combination with education leads to a sustained decline in fertility and mortality rates. There are quite a number of channels through which FLP impacts on fertility rates. Women's employment enhances their status in terms of their control over resources and participation in family decisions. FLP reduces discrimination against daughters as a result of which more is invested in girls' education. This lifts the average age at first marriage as well as the average age at first pregnancy. The latter is also affected by women's decisions to build up careers before marriage. Women's economic participation also requires a choice on the allocation of time between work and raising children especially in the absence of alternative childcare arrangements. Education alone constitutes a major determinant of a completed family size. Education combines, among other things, ability, motivation and awareness that help change attitudes towards ensuring a better quality of life for themselves and their children. It is, however, hard to imagine that women can make the fertility decisions independently of the opinion of their husbands. In a male dominated society like Bangladesh, it is more likely that the husband will decide as to how many children to have. It can at best be a joint decision by

the couple. This argument underscores the fact that men's educational attainments and earning opportunities are also likely to affect fertility decisions

Table 5

Total Fertility Rates, Crude Birth Rates, Mortality Rates and Mean Age at First Marriage in Bangladesh

Year	Fertility Rate/Woman	Crude Birth Rate/1000 Women	Mortality Rate /1000 Persons	Mean Age at First Marriage	
				Female	Male
1974	7.08	48.3	19.4	15.9	24.0
1980	4.99	33.4	10.2	16.4	24.9
1984	4.83	34.8	12.3	17.8	23.9
1988	4.39	33.2	11.3	17.6	24.8
1992	4.18	30.8	11.0	18.2	25.2
1996	3.41	25.6	8.1	20.1	27.6
2000	2.50	17.9	3.7	20.2*	27.6*

Source: Bangladesh Bureau of Statistics. Note: *1998 figures.

As presented in Table 5, the total fertility rate (TFR) and the crude birth rate (CBR) in Bangladesh have significantly gone down over the years. The TFR and the CBR at the national level declined respectively by about 65 and 63 per cent between 1974 and 2000. It might be noted that the use of contraceptives and other family planning measures have had a crucial impact on the TFR and the CBR in Bangladesh (Khuda and Hossain, 1996). Studies also suggest that women's participation in income generating activities has been an important determinant of fertility regulation in Bangladesh (Amin and Pebley 1994; Hossain and Tisdell 2003a). The mortality rate has dropped quite dramatically in recent years. In 1974, the mortality rate was 19.4 per 1,000 people, which came down to 3.7 per 1,000 people in 2000. The mean age at first marriage for both men and women in Bangladesh has significantly fallen over time. In 1974, the mean age at first marriage for women was 15.9 years and that of men was 24.0 years. The respective figures for 2000 were 20.2 and 27.6 years. Thus the average age at first marriage for women has risen at a faster rate (about two months per year) than that for men (1.66 months per year).

6. Degree of Association Between Demographic Changes and Selected Socio-Economic Variables

This section makes an assessment of the relationship between demographic changes captured by the attributes discussed above and selected socio-economic variables such as the per capita

GDP, the female labour force participation rate, educational attainments by both males and females and per capita public health expenditure. We estimate the correlation coefficients between the two sets of variables. It is acknowledged that the correlation coefficients do not necessarily indicate a causal link between variables. This notwithstanding, the correlation coefficient or the degree of association can shed light on the potential of a causal relationship and the direction thereof. The variables considered are abbreviated as follows:

PGR	=	Population Growth Rate
RWP	=	Ratio of Working Age Population to Total Population
DPR	=	Dependency Ratio
FMR	=	Female-Male Ratio in the Population
INF	=	Infant Mortality Rate
FLE	=	Female Life Expectancy
MLE	=	Male Life Expectancy
FAL	=	Female Advantage in Life Expectancy
TFR	=	Total Fertility rate
CBR	=	Crude Birth Rate
CDR	=	Crude Death Rate
AMF	=	Mean Age at First Marriage for Females
AMM	=	Mean Age at First Marriage for Males
GDP	=	Per Capita Real GDP
FLP	=	Female Labour Force Participation Rate
PHE	=	Per Capita Public health Expenditure
FER	=	Female Enrolment Ratio
MER	=	Male Enrolment Ratio

The estimated correlation coefficients are presented in Table 6. As expected, the socio-economic variables, namely, GDP, FLP, PHE, FER and MER all have a negative correlation with PGR, DPR, INF, TFR, CBR and CDR and a positive correlation with RWP, FMR, FLE, MLE, FAL, AMF and AMM. The correlation coefficients are all found to be significant on the basis of the t-test at the 5 per cent level of significance except the correlation coefficient between female advantage in life expectancy (FAL) and the male enrolment ratio (MLE), which is, however, significantly different from zero at the 10 per cent level of significance.

Table 6

Correlation Coefficients Between Selected Indicators of Demographic Change and Socio-Economic Variables in Bangladesh (Sample Period: 1975-2000)

Variable	GDP	FLP	PHE	FER	MER
PGR	-0.77	-0.75	-0.66	-0.69	-0.50
RWP	0.58	0.50	0.51	0.50	0.41
DPR	-0.98	-0.98	-0.93	-0.94	-0.85
FMR	0.71	0.67	0.67	0.65	0.54
INF	-0.88	-0.83	-0.83	-0.83	-0.72
FLE	0.92	0.90	0.88	0.88	0.79
MLE	0.94	0.91	0.91	0.91	0.83
FAL	0.50	0.50	0.44	0.45	0.37
TFR	-0.98	-0.97	-0.94	-0.94	-0.87
CBR	-0.94	-0.90	-0.88	-0.87	-0.76
CDR	-0.92	-0.87	-0.87	-0.85	-0.74
AMF	0.93	0.95	0.93	0.93	0.88
AMM	0.86	0.84	0.91	0.88	0.87

While the correlation coefficients are self-explanatory, several important observations can be made in relation to the strength of association and therefore the relative importance of the socio-economic variables for the demographic changes. First, the growth of per capita GDP has the highest degree of association (in absolute terms) with almost all the demographic indicators. This highlights the fact that the level of economic development is potentially the most important determinant of demographic changes. Secondly, female labour force participation and educational attainment are often highlighted as the major determinants of the total fertility rate, the infant mortality rate and the crude birth rate. The correlation estimates in the last column of Table 6 suggest that men's educational attainment can also be an important factor. In addition, men's earning opportunities, as reflected by the growth of GDP, can also be a potential determinant. It must, however, be pointed out that Bangladesh's female enrolment ratio (FER) has in general a stronger degree of association with the demographic indicators than the male enrolment ratio (MER) does. Finally, the existence of a strong positive correlation between both female and male education and mean age at first marriage for both men and women suggests that social awareness about the quality of life as well as the desire for self-dependence has improved with time in Bangladesh.

7. Conclusion

Over a period of 25 years or so, considerable demographic changes have taken place in Bangladesh. Bangladesh has successfully overcome the problem of high fertility and high mortality of the 1970s and turned itself into a country of low fertility and low mortality in recent years. Population growth has been steadily reduced while the growth of the working age population has started rising in recent years. These two factors have combined to reduce the age dependency ratio over time. Life expectancy has risen considerably, especially female life expectancy, which has contributed to a moderation of the female disadvantage in life expectancy. The overall female-male ratio is now bordering around the expected secondary sex ratio, which was significantly below the expected mark only a decade ago. Bangladesh's progress in several demographic areas are substantially greater than most of Bangladesh's more illustrious neighbours as well as South Asian countries as a whole. For example, the Bangladesh population grew at an average annual rate of 1.86 per cent during the 1990s. For South Asia as whole, the growth rate was 2.17 per cent. This rate is even smaller than the average population growth rate (1.90 per cent) in South-East Asia as a whole during the same period. Table 7 makes a comparison of Bangladesh's achievements with those of India, Nepal and Pakistan in respect of population growth, growth of the working age population, the infant mortality rate and fertility rate between 1990 and 2000. The statistics in Table 7 clearly show that Bangladesh outperformed the other three countries in all four different areas. Of particular interest is the fact that the working age population as percentage of the total population dropped in India, Nepal and Pakistan between 1990 and 2000 whereas it increased at an annual rate of 0.72 per cent in Bangladesh during the same period. In other words, while the dependency ratio in Bangladesh is on the decline, in some of the similar countries the dependency ratio is creeping up with time.

Table 7

Average Annual Growth Rates of Selected Indicators of Demographic Change for Bangladesh, India, Nepal and Pakistan for the Period 1990-2000

Country	Population Growth	Working Age Population Growth	Infant Mortality Rate	Total Fertility Rate
Bangladesh	1.86	0.72	-4.07	-1.95
India	2.15	-0.07	-1.38	-1.79
Nepal	2.65	-0.06	-2.87	-0.96
Pakistan	2.73	-0.31	-2.34	-1.17

Source: Asian Development Bank (2002)

This study indicates that socio-economic indicators such as the growth of per capita GDP, female workforce participation, per capita expenditure on public health and educational attainments by the population can be considered as potentially important determinants of demographic change. This suggests that the role of family planning programs in reducing fertility, the prime mover of the declines in the population growth rate, cannot be overestimated. Further, contrary to popular belief, men's education can also be a defining factor alongside female labour force participation and female education in the decisions on fertility. This suggests that the analysis of and policy decisions on population control should also emphasise the role of men as well as women.

Notes:

[1] The male and female life expectancies for the years 1975 through 1978 are calculated on the basis of the exponential growth rates between 1974 and 1979 for the respective series.

[2] These statistics and the ones that follow in the rest of this section are based on the Bangladesh bureau of Statistics data.

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