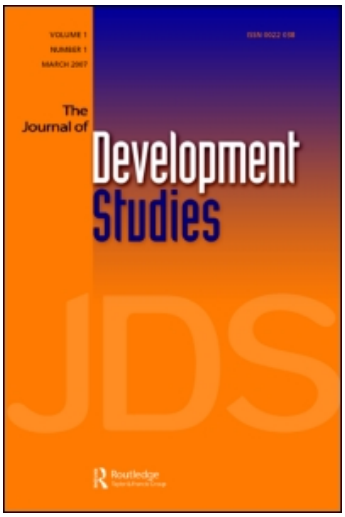

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Daughter Elimination in Tamil Nadu, India: A Tale of Two Ratios

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ABSTRACT *A disturbing feature of demographic trends in India is the sharp decline in the proportion of girls to boys. Most existing analyses of the Indian child sex ratio present a country wide picture and focus on trends across states. Such state level analyses may hide intra state variation. This paper uses district and village data on sex ratio at birth and infant mortality to examine the extent, geographical spread and nature (before or after birth) of daughter deficit within the South Indian state of Tamil Nadu. Our analysis shows that (i) daughter deficit in Tamil Nadu occurs in nearly half the state's districts; (ii) a large proportion of daughter deficit occurs before birth; (iii) daughter deficit rises with birth order and (iv) daughter elimination is not confined to particular socio-economic groups.*

I. Introduction

For a large part of the previous century India has witnessed a steady decline in its population sex ratio, reaching the lowest ever recorded ratio of 927 females per 1000 males in 1991. While the 2001 Census points to a slight improvement in the overall population sex ratio, the proportion of girls to boys or the sex ratio for the 0–6 age group continues to decline. This ratio has fallen from 976 in 1961 to 927 in 2001, giving 'rise to both alarm and despair' (Agnihotri, 2003: 4351). A substantial proportion of the decline is attributed to the differential survival chances of girls and boys in the 0–6 age group due to sex selective abortion, neglect, and female infanticide. In geographic terms, much of this decline is concentrated in states with a long history of gender differentials in survival among children notably Punjab, Haryana and Delhi in the north and Gujarat and Maharashtra in the west. However, a troublesome aspect is that gender differentials in survival are also becoming noticeable in other states. Tamil Nadu, a south Indian state and the focus of this paper, is one such case.

Early work on sex ratios in India pointed out a sharp regional dichotomy with masculine sex ratios in the north and the west and less adverse female to male sex

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ratios in the south and the east (for example, Sopher, 1980: 294–296; Miller, 1981: 71–74; Dyson and Moore, 1983). More recent work (Agnihotri, 2003) based on an analysis of the 2001 census data argues that the traditional north/west-south/east divide is no longer valid.[1] In the case of Tamil Nadu, despite the relatively high status of women, the state has recorded a steady decline in its 0–6 age group sex ratio. The ratio has fallen from 985 in 1961 to 942 in 2001 and some of the districts with the most unequal 0–6 sex ratios in the country lie within the state. Thus, while the level of the 0–6 sex ratio in Tamil Nadu may be higher than the national average, the temporal patterns in the ratio suggest that the state is experiencing a trend that is similar to the rest of the country.

Most existing analyses of sex ratios in India present a country-wide picture and focus on state level trends in the 0–6 sex ratio. While useful, since the 0–6 sex ratio reflects the combined effect of the sex ratio at birth (SRB) as well as age specific mortality up to age six it probably hides the extent of the female deficit occurring before and within a year after birth.[2] Furthermore, state level analyses may be misleading as they may mask wide intra state variations. Accordingly, this paper uses district level secondary data and village level primary data on sex ratio at birth and infant mortality to examine the extent, the geographical spread and the nature (before or after birth) of daughter deficit within the south Indian state of Tamil Nadu. Analysis of sex ratio at birth and infant mortality provides an idea of the dynamics underlying the development of female deficit while an intra state analysis allows us to capture the wide intra state variation in female deficit.

Existing work on Tamil Nadu focuses mainly on daughter deficit in the form of female infanticide.[3] Indeed, in the 1980s daughter elimination first came to light in Tamil Nadu in the form of female infanticide among certain castes such as the Kallars in Madurai (Soundarapandian, 1985; Venkatramani, 1986; Jeeva et al., 1998), Gounders in Salem district (Venkatachalam and Srinivasan, 1993) and Gounders in Vellore district (George et al., 1992). While these papers suggested that daughter deficit is restricted to a limited geographic area and occurs only among certain castes, more recent work by Chunkath and Athreya (1997) displays that female infanticide is far more widespread and occurs in several districts and across several castes. This paper extends the work of Chunkath and Athreya (1997) by systematically documenting the extent and geographic spread of daughter deficits before and after birth.

Consistent with the focus on infanticide, government and NGO interventions have mainly paid attention to preventing female infanticide. Female infanticide has been framed as a problem of poverty, and programmes and schemes have been targeted at households living below the poverty line (Srinivasan, 2006).[4] The notion that daughter elimination is a problem of underdevelopment and poverty receives support from George et al. (1992) and Natarajan (1997). For instance, based on data collected between 1987 and 1989 from Vellore district, George et al. (1992) point out that female infanticide is more likely to occur in remote villages with less educated populations. On the contrary, Nillesen and Harriss-White's (2004) analysis, based on data collected from Vellore and Thiruvanamallai districts in 1994 suggests that females are less likely to survive in wealthier households. This paper adds to the literature on such village level investigations. We use primary data collected from the

Salem district in 2002 to explore the link between daughter deficit and various socioeconomic characteristics.

The paper is organised as follows. The following section presents a description of the databases used. In sections III and IV we assess the extent, spread and magnitude of pre-birth and post-birth daughter deficit. These sections examine the 0–6 sex ratio, the sex ratio at birth (SRB) and infant mortality rate (IMR) separately for India and Tamil Nadu as a whole and, then in more detail for urban and rural Tamil Nadu. Section V examines the link between daughter elimination and various socio-economic characteristics. Section VI summarises and concludes the paper.

II. Data

Our analysis of daughter elimination is based on a combination of secondary and primary data on vital events from the state to village level. Secondary data sources used in this paper are the Census 2001 and, the Sample Registration System (SRS) of the Government of India (GOI) and, most importantly, the Vital Events Surveys (VES) conducted between 1996 and 2000 by the Government of Tamil Nadu. Primary data were obtained from a 2002 survey conducted in a village located in Salem, the district with the most masculine 0–6 sex ratio in the state.

Secondary Data

An intra state assessment of daughter deficit requires district level data on sex ratio at birth and information on male and female infant mortality. The civil registration system which in principle should be able to provide district level figures on birth, death, infant mortality and other vital events is not complete and far from reliable. In the absence of reliable data from the civil registration system, a widely used source to assess the extent of daughter deficit in India is census data on sex ratio for the 0–6 age group. These data are available for all districts. In addition to the census data we use information from the Sample Registration System (SRS), a countrywide survey of vital events covering about 1.1 million households (six million individuals) in each round. While SRS provides information on sex ratio at birth and infant mortality, these are available only at the state level and, therefore, unlike the census, do not support examination of intra state patterns.

To explore intra state patterns, we use four rounds of the Vital Events Surveys (VES) conducted by the Directorate of Public Health (DPH) of Tamil Nadu between 1996 and 2000. These surveys contain a large amount of information on vital events and for the most part have not yet been analysed. The surveys *do* provide data on sex ratio at birth, infant deaths, and other demographic variables disaggregated by district and gender. The first survey was carried out in 1996 for the reference year 1995. Subsequently, a second round was conducted in 1998 for the reference years 1996 and 1997, a third round was undertaken in 1999 for the reference period 1998 and, a fourth round was completed in 2000 for the reference year 1999. Each of the surveys gathered information from a sample of about six million individuals in rural (non-municipal) areas and three million individuals in urban (municipalities and corporations) areas.[5] At the district level, this entails a sample size of about 200,000 individuals in rural (non-municipal) areas and 100,000 individuals in municipal

areas. Pre-tested, machine readable questionnaires were developed for the exercise and the surveys were conducted by 36 trained enumerators per district; additional details on the surveys are available from Athreya (1999). The methodical approach to data collection and data capture and the large size of the sample suggest that the surveys contain high quality data on vital events.

We rely on the information gathered during the second, third and fourth rounds or surveys covering the reference period 1996–1999 for our analysis.[6] We pool together the information from the various rounds of the surveys to provide figures on sex ratio at birth and infant mortality rate. Thus, our analysis relies on responses from 36 million individuals or about 1.25 million individuals per district. The total number of births analysed in the paper are 694,605. The volume of data available in each of the VES surveys (nine million individuals and 174,000 births) may be contrasted with the SRS surveys for Tamil Nadu which usually cover 355,000 individuals and about 6000–7000 births in each round.

Primary Data

While the secondary data provide an idea of the extent of missing daughters, the geographic spread and pre- and post-birth deficit, they do not reveal the anatomy of missing daughters. For example, does the likelihood of daughter deficit vary with birth order? Are households with certain socioeconomic characteristics more likely to record daughter deficit? To provide answers to such questions the paper draws upon village level data. A detailed village study was carried out in 2002 in Salem. The village, located in Idapadi block, is a small agrarian multicaste village with three of the major castes of Salem district. In 2002, there were 184 households with a total population of 671 persons, 306 female and 365 male.

Based on structured surveys, information on household characteristics, the desired and actual number and composition of children, total number of pregnancies, outcomes by birth order, abortions and fertility status was gathered. These data were collected for 220 of the 240 married women in the village. In addition, unstructured interviews were conducted with women and men from different castes, classes and age groups to gather information on the emergence and prevalence of practices of female infanticide and sex selective abortion.

The sensitivity of the issue under investigation imposes some limitations on a direct assessment of the extent of daughter elimination. Additionally, fieldwork was carried out at a time when government and non-government agencies were under enormous pressure to prevent daughter elimination in Salem. During the discussions it seemed clear that information on households that had resorted to daughter elimination was commonplace. While most respondents denied the practice in their own households they talked easily about the practice in general and in impersonal terms. Although rare, some respondents did reveal that they had resorted to eliminating the female offspring.

Based on discussions with key informants (including the local nutrition and health workers, members of the women's self-help group) and an analysis of birth and death records in the local health and nutrition (Tamil Nadu Nutrition Programme) centre, a list of cases of female infanticide and sex selective abortion was drawn up.[7] Only women whose names were common across the key informants (or if they had

reported daughter elimination) were identified as households which had practised daughter elimination. Based on this approach we estimate that 50 of the 220 women in our sample had eliminated daughters (through sex selective abortion or infanticide). It is possible that the identification of respondents who have eliminated a daughter is incomplete and that we have a conservative estimate of daughter elimination.

III. The Spread of Daughter Deficit in Tamil Nadu

Benchmarking Sex Ratio at Birth and Infant Mortality Rates

To examine the pattern of daughter deficit in Tamil Nadu we pay attention to two ratios in particular. These are the sex ratio at birth (SRB) and differences in male and female infant mortality. Internationally, sex ratios are expressed as a proportion of males to females. However, in India the practice is to express population sex ratio and 0–6 sex ratio as proportion of females to males while sex ratio at birth is expressed as proportion of males to females. For the sake of consistency and to highlight daughter deficit, we define sex ratios across all age groups in terms of the proportion of females to males. To aid international comparisons, Table A1 (see Appendix) contains the female to male ratio and the corresponding male to female ratio.

To detect the extent of daughter deficit occurring before birth we need to compare the observed SRB with a 'normal' SRB. Thus, the first question is, what is the SRB which would prevail in India in the absence of interference? While there are variations over time and across regions, according to Guilmoto (2004) a ratio of 952 females to 1000 males appears to be 'a biological invariant observed in all human populations with only minor variations'. Based on their analysis of 240 years of Swedish data, Johansson and Nygren (1991) show that the SRB among live births is 'biologically very stable' and is close to 952 females per 1000 males. They point out that the SRB does not show significant variation across regions, nor does it vary with birth order or by mother's age. Johansson and Nygren (1991) also analyse data on live births for 12 other Western industrialised countries for the period 1970–1984. According to their analysis, the SRB in these countries conforms to the patterns found in the Swedish data. Based on 1994–2003 data from the United Nations *Demographic Yearbook* (United Nations, 2003), the sex ratio at birth for countries with a complete registration system (civil registration estimated at being over 90% complete) and with 150,000 or more live births per year (about the number of yearly live births in Tamil Nadu) lies between 939 and 965 with a mode of 951.[8] In the Indian context, in the absence of a complete civil registration system, the sex ratio at birth is commonly assumed to be 952 female live births per 1000 male live births (for instance, see Agnihotri, 2000; Premi, 2001; Bhat, 2002).[9]

Accordingly, in this paper we use 952 female births per 1000 male births as the SRB which may be expected to prevail in the absence of any interference. An SRB which is statistically different and less than 952 is treated as evidence of pre-birth daughter deficit. While there may be several factors that lead to a gap between the observed and the expected SRB, as will be discussed and argued later on in the text, the evidence assembled in the paper suggests that sex selective abortion is one of

the most likely explanations for the observed pre-birth daughter deficit in Tamil Nadu.[10]

Turning to the expected pattern of infant mortality rates, due to various factors, infant mortality (mortality in the age group 0–365 days and expressed as infant deaths per 1000 live births) is usually higher for males. Based on a review of the literature, Waldron (1983) concludes that, 'in most available data males have had higher mortality than females during the first year of birth'. Based on their analysis of male and female infant deaths in several developed countries for the period 1976–1984, Johansson and Nygren (1991) show that there is a consistent pattern. In all the countries that they analyse, male infant mortality is higher than female infant mortality. Additionally, there appears to be a 'normal' sex ratio of 130 male infant deaths for every 100 female infant deaths.[11] Despite this regularity, we adopt a cautious approach, and view situations where female infant mortality is statistically different from and higher than male infant mortality as evidence of post-birth deficit and in turn of female infanticide and neglect.

Temporal Patterns

We begin our discussion of daughter deficit by examining, in seriatim, temporal patterns in the 0–6 age range sex ratio, the sex ratio at birth and infant mortality rates. Table 1 presents and enables a comparison of temporal patterns in the all India and Tamil Nadu child (0–6 years) sex ratio. Between the period 1961 and 2001, the all India 0–6 sex ratio fell by 49 points from 976 to 927. Over the same duration, the 0–6 sex ratio in Tamil Nadu fell by 43 points from 985 to 942. While the extent of decline in Tamil Nadu is smaller than the decline recorded in several north Indian states, the state is clearly not an exception to the nationwide trend of declining 0–6 sex ratio. A visual depiction of the declining 0–6 sex ratio in Tamil Nadu is provided

Table 1. Population sex ratio, 0–6 sex ratio in India and Tamil Nadu

Year	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
Population sex ratio in India	972	964	955	950	945	946	941	930	934	927	933
Population sex ratio in Tamil Nadu	1044	1042	1029	1027	1012	1007	992	978	977	974	987
0–6 sex ratio in India	–	–	–	–	–	–	976	964	962	945	927
0–6 sex ratio in urban India	–	–	–	–	–	–	–	–	–	935	903
0–6 sex ratio in rural India	–	–	–	–	–	–	–	–	–	948	934
0–6 sex ratio in Tamil Nadu	–	–	–	–	–	–	985	974	967	948	942
0–6 sex ratio in urban Tamil Nadu							–	–	–	955	951
0–6 sex ratio in rural Tamil Nadu							–	–	–	945	931

Note: The ratios are defined as the number of females per 1000 males. All figures are based on census data.

in Figure 1. The changes are startling. In 1971, the 0–6 sex ratio was greater than 952 for the entire state, however by 2001, large parts of the state record ratios between 909–952 with some patches recording sex ratios lower than 869.[12]

A comparison of the 0–6 sex ratio across urban and rural areas provides a clearer picture of the similarities and differences between Tamil Nadu and the rest of the country. Unlike the rest of the country where the urban 0–6 sex ratio is considerably lower than the rural 0–6 sex ratio (903 versus 934 in 2001), the pattern in Tamil Nadu is exactly the opposite (951 versus 931 in 2001). Between 1991 and 2001, the 0–6 sex ratio in urban India records a drop of 32 points (935 to 903). Over the same period there is a modest decline of four points (955 to 951) in urban Tamil Nadu. The considerably higher 0–6 sex ratio and the smaller decline over the decade suggests that urban Tamil Nadu is different and does not closely track the trend prevailing in other parts of urban India. In marked contrast, the rural 0–6 sex ratio for Tamil Nadu is lower than the 0–6 sex ratio for rural India. Additionally, between 1991 and 2001, the 16 point decline in the 0–6 sex ratio in rural Tamil Nadu is similar to the decline (14 points) in the 0–6 sex ratio for rural India.

Turning to SRB, as shown in Table 2, the all India SRB has recorded a steady decline over time. The ratio drops from 943 in the period 1978–1992 to 899 in 1997, a drop of 44 points. Over the same duration, the Tamil Nadu SRB declines from 980 to 935, a decline of 45 points. Thus, while Tamil Nadu's SRB is higher than the all India SRB, the absolute decline is similar. A comparison of the 1997 SRB by urban and rural status shows that at 878 the SRB in urban India is substantially lower than the SRB in rural India (903). In contrast, at 943, the SRB in urban Tamil Nadu is