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Characteristics of
Sex-Ratio Imbalance in India,
and Future Scenarios

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1. INTRODUCTION

For multiple reasons, India's experience is crucial to understanding the current increase in the proportion of males versus females in populations across Asia. First, rising sex ratios in India have been recorded since the early 1980s, and have since continued increasing with no sign, so far, of reversing course. The impact of this early rise is already visible among the adult population of several Indian districts. Second, even if sex-ratio values in India are still beneath those of China, its potential contribution to the overall "masculinization" of Asia (and, consequently, of the world's population) is particularly formidable in view of India's demographic weight.¹ The prospect of further worsening of India's sex composition requires close monitoring of current sex-ratio trends in the country. Lastly, the Indian scenario of female discrimination is extremely complex in view of India's social and economic diversity: the interplay of cultural and economic factors, along with the impact of policy initiatives, has produced a heterogeneous situation; in turn, this complexity offers ways to better understand the mechanisms at work, and to inform the policy debate on the struggle against gender discrimination.

A vast amount of knowledge on sex discrimination in India has been accumulated over the last twenty years. Moreover, detailed statistics from various sources exist² that describe several aspects of sex discrimination – such as sex ratio at birth (hereafter SRB), child sex ratio, female excess mortality and abortion practices – at various scales of analyses (state, district, municipalities) and for many different subpopulations (classified by age, religion, literacy rate, etc.). This paper will therefore summarize the available literature³ and statistical sources (only a few statistical details will be given here), in order to propose a comprehensive review of the main dimensions of the recent sex-ratio degradation in India: its origin, its mechanisms and social characteristics, its implications in the long run and its major causes. This will then lead us to a discussion of the recent policy experience and its future prospects.

The first section focuses on the recent demographic trends observed in India. We examine the evolution of the sex ratio over the last decades, and the variations observed within the country. In the next section, we present some results of demographic projections up to 2050, and examine the future consequences of skewed SRBs over India's age and sex distribution, as well as their potential implications on social and economic organization. The next section examines the underlying factors behind the recent reduction in the proportion of female children, distinguishing in particular between the supply- and demand-side factors. The last section is devoted to policy responses and future prospects, opening up the discussion on potential avenues for confronting the current challenges.

2. SEX-RATIO TRANSITION IN INDIA

Sex discrimination has long had visible demographic repercussions on India's population. In view of this historical dimension, it may be useful to discuss the discriminatory regimes that characterize the social and demographic systems that have prevailed in India at different periods. We will therefore emphasize both their relative stability over time, as well as their gradual transition to the demographic system present today. We will first depict a few elements of the old regime that characterized most of India till the 1970s.

2.1 Old Regime: Neglect and Infanticide

The first censuses conducted by the British administration in colonial India had already stressed the unusually male-heavy character of the Indian population. Boys predominated among Indian children, and high sex ratios were even recorded among older age groups. However, in the absence of reliable statistics, it took decades for statisticians to make sense of this apparent oddity, and to establish that the inflated sex ratios observed in many parts of India since the 19th century were not the

¹ For a general perspective, see Croll (2000) and Attané and Guilimoto (2007). On India, see Agnihotri (2000).

² The major sources to study the sex-ratio scenario in India are the following: 2001 Census of India (on last births and child population by population characteristics), National Family and Health Survey rounds (on births and child mortality by characteristics of parents), Sample Registration System (for vital statistics).

³ For a detailed bibliography, see Mishra *et al.* (2006) and *45 Million Missing Daughters* (n.d.).

artificial offshoot of poor registration or female under-enumeration. Rather, they were directly related to unusually high mortality levels among women of all ages (Visaria, 1971).

Unfavourable death rates were indeed common amongst Indian women of all ages. The practice of female infanticide had been detected early on in some provinces of West India, where a few caste groups chose to limit the number of daughters by killing them immediately after birth. But the real culprit was the less visible impact of excess female mortality among infants and children. Extremely high death rates observed during the colonial period meant that more than a quarter of children born would not reach the age of 5; a slight level of female excess mortality could thus translate into a significantly reduced number of girls. As a result, the sex ratio did not decrease with age in India, as observed elsewhere. Higher mortality conditions were also at work among young adult women (maternal mortality), and even among some older groups (such as widows). While largely applicable to South Asia, this pattern was more pronounced in the Northern provinces and regions encompassing the contemporary states of Punjab to Gujarat, which already had the distinction of having the highest child sex ratio in the country.

While life expectancy started to increase regularly in India after 1920, it appears that men reaped more benefits from this progress than did women. On the whole, health facilities, improved nutrition and better protection against epidemics or death were geared more towards enhancing survival conditions for boys and men, which was considered a prime objective for many households and communities.

As pointed out previously, this demographic system was based on the overall impact of excess female mortality. With the exception of cases of infanticide, limited to small regions and specific communities, higher mortality could hardly be construed as a deliberate attempt to reduce the lifespan of girls and women. Rather, it was the prevalence of systematic differential treatment that caused these lower survival rates: poorer food intake, lesser access to medical care, etc. These various factors – usually labelled as “female neglect” – exacerbated mortality rates among women, even though the difference, for lack of reliable vital statistics, remained invisible (Das Gupta, 1987; Miller, 1981). In fact, because of the mortality risks, having more children was the first demographic imperative, and less importance was therefore given to the actual sex composition of the offspring.

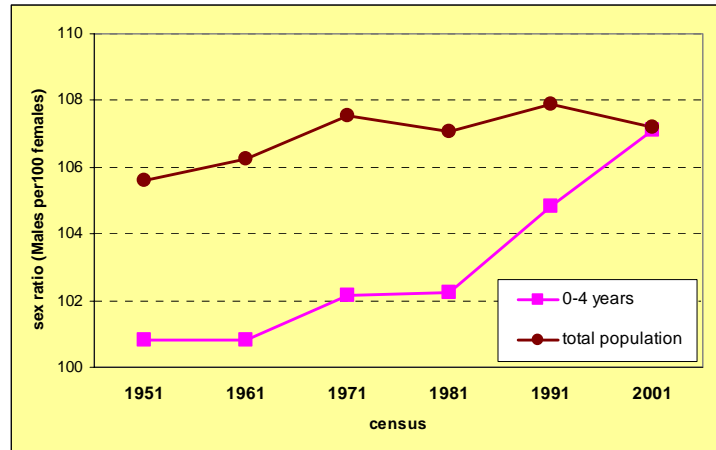
Consequently, the old regime can be said to have been characterized by archaic and crude discriminatory methods, such as neglect or infanticide. The latter, due to its overall threat to human values, could never spread beyond a handful of communities. Along with abortion, infanticide was also sporadically practiced as a last-resort technique to eliminate unwanted births, such as out-of-wedlock pregnancies, but was also often gender-blind. In spite of its overall toll on Indian girls and women, excess female mortality was the outcome of a passive strategy aimed at better resource allocation for boys and men from birth. Its local impact on given families was somewhat erratic, however, and many girls and women did in fact survive the hard conditions meted out to them. In a way, mortality differential reflects a rather ineffective *modus operandi* to alter the sex composition, due to its reliance on crude and low-tech methods.

2.2 The New Regime and Sex-selective Abortions from the 1980s

Mortality conditions rapidly improved after Independence in 1947. The survival environment likewise began to improve for women, who increasingly benefited from improvements in child and adult mortality. However, the sex-discrimination regime started to undergo a deep change during the late 1970s, as summarized by Figure 1, showing the rapid increase in the child sex ratio (0 to 4 years) after 1981.⁴

⁴ A similar picture emerges using the sex ratio of children below age 1. Thanks to K.M. Sathyanarayana for providing the comparative data.

Figure 1: Sex ratio of the child and overall population, India, 1951-2001

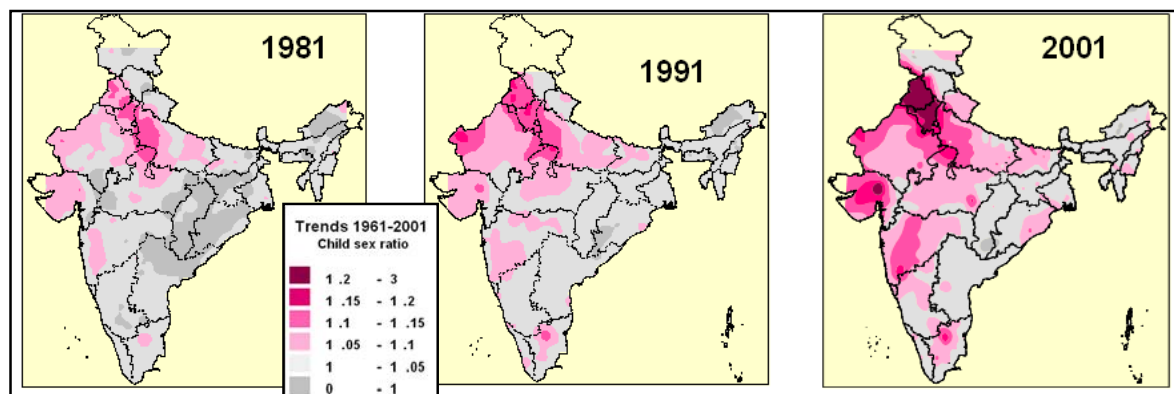


The reason for this dramatic shift stems from the introduction into India of methods of pre-natal sex determination, such as amniocentesis and ultrasound technology. While part of an overall effort to improve health conditions for both mothers and children, these new technologies had the unexpected option of offering couples advanced information on the sex of their future children. Some years earlier, India had also established a new and rather liberal law on abortion, which in many cases rendered the termination of a pregnancy considerably easier, for reasons ranging from foetal physical defect to contraception failure. As such, the change in abortion regulations was an offshoot of a government endeavour unrelated to sex discrimination. The law was primarily meant to address the issue of unwanted pregnancies, as part of a comprehensive family-planning strategy that encompassed many contraceptive options, as well. But the combination of new technologies for pre-natal sex determination and abortion proved to be a dramatic cocktail, which would quickly become an efficient sex-selection device. From the 1980s, sex-selective abortions became the primary method used to alter the sex composition of children.⁵

The emergence of sex-identification techniques heralded a new discriminatory regime in India, which is responsible today for the dramatic sex-ratio situation in many of its regions. What primarily distinguishes the combination of scan and abortion from older methods is its high level of efficiency in terms of outcome. Moreover, these services were provided by the medical community, and thus inspired much more trust than the traditional methods implemented by local specialists (such as traditional healers). A further advantage lay in the shortened duration of the process of sex selection, as families did not have to wait until delivery. While still traumatic for many women, abortion was considered far less physically or psychologically painful than a pregnancy followed by infanticide, or later infant or child deaths. Compared to the older methods, this new technique also spares women months of pregnancy and final delivery, or of raising an "unwanted" girl child; it also appears to be a modern way to go about sex selection. Another advantage over the techniques of the old regime relates to the fact that an early abortion allows women to avoid exposure from others outside their immediate family members. Many couples could therefore conceal their pregnancy, and implement their sex-discrimination strategy, with little scrutiny from the community at large.

⁵ See among others Das Gupta and Bhat (1987), Arnold et al., (2002), Patel (2007).

Figure 2: Child sex ratio in India at district level, 1971-2001



Modern techniques therefore set the new regime apart from older discrimination strategies. In addition, the immediate entourage now plays a much larger role in the decision-making than in the past, when community values and preferences – at the village or caste level – could be more strictly implemented. Modernization reduced the role of many traditional institutions operating at a larger scale, and the new regime penetrated households at a time when the small-family norm was also making rapid progress. In particular, fertility reduction meant that parents could decide the number of offspring they had according to their available resources, rather than by following traditional values. In addition to the quantity of children, this new demographic perception also resulted in efforts to adjust the “quality” of the offspring, through better health care and education. However, gender composition also emerged as a crucial dimension of this new strategy, for reasons we will enumerate later.

It may not come as a surprise to learn that, from the trial period when pre-natal monitoring techniques were first tested in India, women expressed great interest in knowing the sex of their foetus. Other family members, such as the father or his parents, also understood its potential for sex selection, and encouraged women to overcome their physical or psychological reservations on abortion if they wanted to avoid the birth of a girl. While some see the spread of sex selection mainly as supply-driven, there is no denying that son preference had nearly always prevailed, and preceded introduction of modern technology. Present-day economists might say that the “markets” in the old regime were somewhat inefficient, as they had offered little by way of effective technical solutions to respond to this unmet demand.

2.3 Demographic Outcome and Mechanisms

The demographic outcome of these changes in the discriminatory regime is now better known, especially since the 2001 census has provided detailed figures on child sex ratio for various components of the population. For instance, Table 1 shows the gradual increase in the proportion of boys (per 100 girls) from 1981 to 2001, a rise that was significantly faster in urban areas (see also Figure 1). A ratio favourable to boys and adverse to girls coincides with the introduction of modern pre-natal sex-determination methods.⁶

⁶ The best account of changing sex ratios in India is found in Bhat (2002a, 2002b). See also Arokiasamy (2004, 2007) for regional details.

Table 1: Child sex ratio in urban and rural areas, India, 1981-2001

Year	Total	Rural	Urban
1981	104.0	103.8	107.4
1991	105.8	105.5	107.0
2001	107.9	107.1	110.4

As we will see, this increase was more pronounced in cities, as well as in the Northern and Western parts of India. Child sex ratio further deteriorated between 1991 and 2001 in these areas, with some district-level values going higher than 115. (Some higher, rather aberrant, figures above 130 were also reported in a few pockets.) Elsewhere in India, there was apparently no large-scale deterioration in sex-ratio figures, which by and large remained below the national average. However, close scrutiny of the district-level data shown in Figure 3 also indicates a small rise in child sex ratio in some areas, such as Kerala, Maharashtra, etc. This increase, albeit modest, points to a potentially worrying trend, as the child sex ratio in areas long thought to be immune from significant sex discrimination may also be on the rise.

Sex selection appears to have played a major role in causing the deterioration observed in child sex ratio. Excess female mortality among infants and children contributes only moderately to the deficit of girls. For instance, Table 2 shows that mortality is indeed higher for girls one month after birth, but the absolute mortality gap itself is limited. While old techniques have not completely disappeared, they are today more common among lower sections of society.

Table 2: Neonatal and post-neonatal mortality rates in India, 1998-99

Source/Year	Sex	NN mort (1)	PNN mort (2)
NFHS 1998/1999	Male	50.7	24.2
	Female	44.6	26.6
	F/M ratio	0.880	1.099
(1) Neonatal (NN) mortality: probability of dying within the first month of life			
(2) Post-neonatal (PNN) mortality: probability of dying between the first month and the 1 st anniversary of life			

Even if reliable data on abortions are missing, the intensity of sex-selective abortions can be gauged by examining the SRB according to the stage in family formation. For a majority of pregnancies, SRB appears close to its normal value. This is the case for first births, for instance, for which sex ratio is often very close to normal values. Most families do cherish diversity, after all, and do not shun the birth of an initial daughter. Similarly, births that follow the birth of a son may not be greatly affected by sex selection. Rather, it is with regards to later pregnancies among sonless couples that SRB values tend to surge. Parents want to avoid the "worst-case" scenario – i.e., a family without a son. This is reflected in the sex ratio of higher-parity births (meaning, the second, third, etc.), as Table 3 shows for Punjab and Haryana. While the proportion of these amount to less than a quarter of all pregnancies, among these the SRB may jump to values of 130 or more, roughly indicating an excess of 25 (130-105 males versus females) male births out of a total of 230 (130+100). These additional male births have probably followed one or more abortion attempts.

Table 3: Sex ratio at birth by birth order, India, 1978-98

Year	India		Haryana		Punjab	
	1978-92	1984-98	1978-92	1984-98	1972-98	1984-98
All birth order	106	108	110	114	114	120
1 st birth	105	107	109	110	109	101
2 nd	107	108	100	114	111	123
3 rd	107	108	114	129	117	136
4 th +	106	108	116	108	122	134

Source: Retherford and Roy, 2003, based on NFHS data.

While the arithmetic of SRB by rank and previous birth is somewhat complicated, simple observation indicates that pregnancies at risk (in which the life of the woman, for instance, is in danger) constitute a minor proportion of all pregnancies. This may have important policy consequences. Nevertheless, the sex ratio for all births may rise above 110, and this is not without consequence. One worse-case scenario would involve cases in which even the first birth of a daughter is avoided, at which point sex ratio could go even higher than 130.

2.4 Region, Religion and Economic Status

One of the main traits of increasing proportion of males within the Indian population corresponds to the wide variations in sex ratio observed within the country, and at times even within regions. Census data have provided a detailed mapping of such differentials across the country, but we will offer here a brief summary of the main distinctive features observed.⁷

The first factor is the geographical patterning of differences, to which we have already referred. The deterioration of child sex ratio has been observed in a limited number of states, particularly those in the West of the country, stretching from Punjab to Maharashtra. On the whole, this spatial clustering has remained steady over the years, as indicated by the maps for 1991 and 2001, even though this stability partly conceals the actual intensification observed in states already affected. Other regions in India appear practically unaffected and, except for isolated pockets in specific states (such as in Tamil Nadu or Orissa), local sex-ratio values are seemingly normal, particularly in view of levels observed in Western India. The following map shows that regional differences in child sex ratio are also visible on a district level.

⁷ For more detail, see Kishor (1993), Retherford *et al.* (2003), Bhat and Zavier (2007) and Guilimoto (2005).

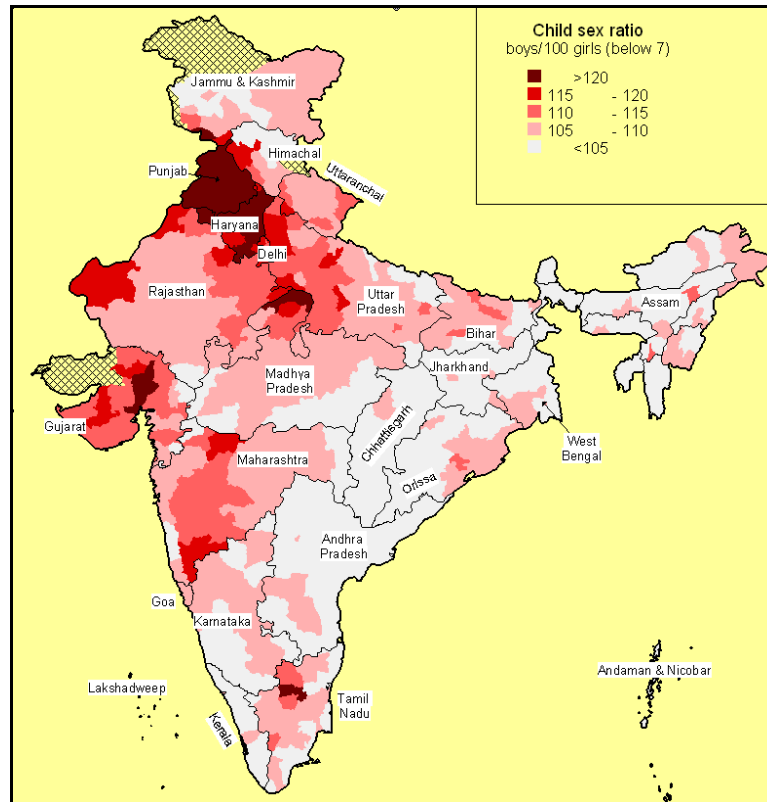


Figure 3: Child sex ratio in India at district level, 2001.

Another factor observed (see Table 4) consists of the socio-cultural composition of the population. Some religious groups, such as Sikhs or Jains, exhibit extreme sex-ratio values on the whole, while such figures tend to be normal or low among other groups, such as tribal communities. It stands to reason that, had the census variables been detailed enough to identify other communities (such as individual caste groups), many more differentials regarding specific communities would also have come to light.

An additional dimension that emerges from this analysis springs from socio-economic differentials. We have already seen that higher sex ratio is observed in urban India as compared to the country's villages. But further analysis also points to the positive linkage between abnormal sex ratio and better socio-economic status and literacy. This contradicts the spontaneous explanation of sex selection being an archaic practice common only among the uneducated. In fact, it can even be shown that, all other things being equal, female literacy and other economic indicators tend to increase the sex ratio of children, at least in India. For instance, the sex ratio of last births in Punjab was 127, according to the 2001 census, but it proved even higher (139) among the most educated women. This finding sits somewhat uncomfortably alongside the assumption that improvement in women's agency – closely related to education, standard of living and modern employment – is a key to social development. Moreover, it is important to understand the active role played by elite households in gender discrimination.

The global picture of sex-ratio variations appears somewhat complex in view of the three distinctions reviewed above – viz., geographical variations across regions, socio-cultural determinants and the positive influence of socio-economic status on child sex ratio. Observers often confuse one with the other, and conclude that higher rates in Punjab are linked to the state's relative economic affluence, to its religious composition or to some unknown local factors (observers have at times even hinted at a mysterious "Bermuda Triangle" effect in Northwest India). In fact, the discriminatory behaviour may be best understood as the combined offshoot of these three factors, playing a cumulative role on sex ratio.

Table 4: Sex ratio of last birth by population characteristics, India, 2001

Background characteristics	Sex ratio of births during the previous year
All	110.4
Residence	
Rural	110.4
Urban	110.6
Religion	
Hindu	110.9
Muslim	107.4
Christian	103.8
Sikh	129.8
Buddhist	108.4
Jain	118.0
Caste/Tribe	
Scheduled Tribe	106.4
Scheduled Caste	108.6
Others	111.5
Mother's education level	
Illiterate	108.7
Literate but below primary	110.0
Primary but below middle	111.8
Middle but below matric/secondary	113.0
Matric/secondary but below graduate	115.3
Graduate and above	114.1
Numbers (in millions)	19.9

3. SEX-RATIO IMBALANCE AND EXCESS MALE POPULATION

Changing sex ratios among children are going to have a lasting impact on population dynamics in India, as most of today's births will survive for more than 60 years. In this section, we will examine some of the most obvious impacts of high SRB in the long term, by examining the characteristics of projected age and sex distribution. Population characteristics lend themselves quite easily to such forecasting exercises, in view of their strong inertia. While this is true of several demographic features (such as mortality or fertility), it is no longer the case for variables that are far less predictable, such as migration or urbanization. In the case of masculinization, we are hardly in a better position, since increasing SRB is a trend that has never been documented in the past, anywhere in the world. Consequently, our projections' set of hypotheses remains speculative.

3.1 Options and Hypotheses

Demographic projections are already available for Indian states, prepared by the Census of India. However, these projections have two serious limitations. First, they run only up to 2026, while we need to go well beyond this date, as generations born today are likely to reach marriageable age after 2026. We have therefore opted for a longer timeframe, and chosen to project the population until 2050, as done by the UN Population Division. A second drawback of the available census projections relates to their unique SRB scenario. We will subsequently attempt to explore various options, in order to understand the effects of such SRB variations on age and sex structures.

The projections are run for two sets of populations: the total population of India; and the adjacent states of Haryana and Punjab, and Chandigarh Union Territory (referred to hereafter as "Northwest India"). These states form a bulk of almost 50 million people, and have been selected for their extreme situation with regard to current levels of child sex ratio. They are characterized by a

relatively high level of social and cultural homogeneity, the imprint of Punjabi culture and rapid economic development over the last decades, including in rural areas.

Hypotheses for this set of projections have been kept extremely simple. Mortality and fertility are supposed to follow the United Nations' projected estimates for 2005-2050 at the national level (United Nations, 2006). As for Northwest India, we have simply corrected the UN estimates by assuming the same differentials as are observed today. Life expectancies are therefore higher in Northwest India than in the country as a whole, but fertility (the average number of children a woman has during her lifetime) is lower in Northwest India. The projection procedure further assumes no migratory exchanges, including between regions, and uses the South Asia mortality models and the Asia model for age-specific fertility rates.

Table 5: Fertility and mortality hypotheses used for 2001-2050 projections

	India		Northwest India	
	2001	2050	2001	2050
Fertility rates	3.11	1.85	2.71	1.85
Male life expectancy	61.7	73.4	65.2	76.9
Female life expectancy	64.2	77.9	67.2	80.9

Scenarios related to future SRB constitute a more delicate affair, since we have no historical experience in human history to help us anticipate the course of SRB in Asia. Using the highest observed Asian value of 138 (recorded in Jiangxi Province in China in 2000) and the standard biological value of 106, we have developed four distinct scenarios:

- High-Higher: SRB moves from its current level to 138 in 2030, and stays at this level. To a certain extent, this represents the "worst-case scenario", as we assume that SRB will further increase to the highest value and fail to decrease till 2050. This scenario is probably not plausible, but serves as an upper limit.
- High-High: in this "business-as-usual scenario", SRB stays at the 2001 level until 2050. Here we assume that no progress is made in alleviating son preference or the use of sex-selection technology. This scenario indicates what would happen if things were to remain as they were at the beginning of the 21st century. For India, this means an SRB of 111; but for Northwest India, the 2001 value of 126 is probably untenable in the long run.
- High-Low: this is a truly "transitional scenario", in which high SRB gradually declines from its actual value in 2001 to 106 in 2030, and thereafter stays at the same level. This corresponds to a reasonably optimistic scenario, in which the sex-ratio crisis ends completely in less than 25 years.
- Low-Low: in this "floor-level scenario", SRB reverts to 106 from 2001 onwards. While implausible (as SRB is unlikely to have come back to normal value immediately after the last census), this estimate will serve as a reference to help us to imagine the population dynamics as if no further sex selection had ever taken place.

Table 6 summarizes the values used to project SRB according to our four scenarios.

Table 6: Four scenarios of evolution of sex ratio at birth, used for 2001-2050 projections

	Sex ratio at birth					
	2001	2030	2050	2001	2030	2050
	<i>India</i>			<i>Northwest India</i>		
High-Higher	111	138	138	126	138	138
High-High	111	111	111	126	126	126
High-Low	111	106	106	126	106	106
Low-Low	106	106	106	106	106	106

3.2 Findings and the Meaning for Future Population Structures

Projections of India's populations subsequently show the impact of these four scenarios on overall population growth. India will have a population of 1.733 billion in 2050 according the Low-Low scenario, but of only 1.694 billion according to the High-Higher scenario. Thus, high SRBs may reduce the overall growth of India's population by several million people, though this can in no way be considered a "just" decline. These differences in the final population for 2050 are quite sizeable, in view of the fact that fertility and mortality conditions are assumed to be identical for all scenarios. In fact, they reflect the impact that a lack of women would have on fertility potential: fewer women today translates into fewer births after 20 years.

The next figures present findings related to the overall sex ratio. As can be expected, the extreme High-Higher and Low-Low scenarios lead to divergent sex-ratio profiles for the next fifty years. In the High-Higher scenario, the overall index reaches 117, but in the High-High scenario, the overall sex ratio will shrink slightly in the next decades. This reduction is, of course, more pronounced for the next scenarios, in which SRB is declining or already back at a normal level. The change in India is rapid as a result of India's continuous population growth after 2040.

In the two intermediary scenarios (High-High and High-Low), which most likely delimit the demographic future of India, the SRB remains within a more reasonable range (103-106). But it may also be noted that the sex ratio will remain distinctly in favour of males till 2050. This is even true for the speculative Low-Low scenario, indicating that the combination of past gender imbalances and future age structures will not be enough to turn around the heavily male nature of India's population. These trends translate into wide gaps between the male and female populations: for instance, if SRB remains at 2001 levels (the High-High scenario), there will be 47 million more men than women in 2050. Sex-ratio estimates above 100 may also be compared to the rest of world (Asia excluded), where the sex ratio of 97 in 2005 is not expected to rise in the next several decades.

Figure 4: Overall sex ratio, 2001-2050, India (left) and Northwest India (right)

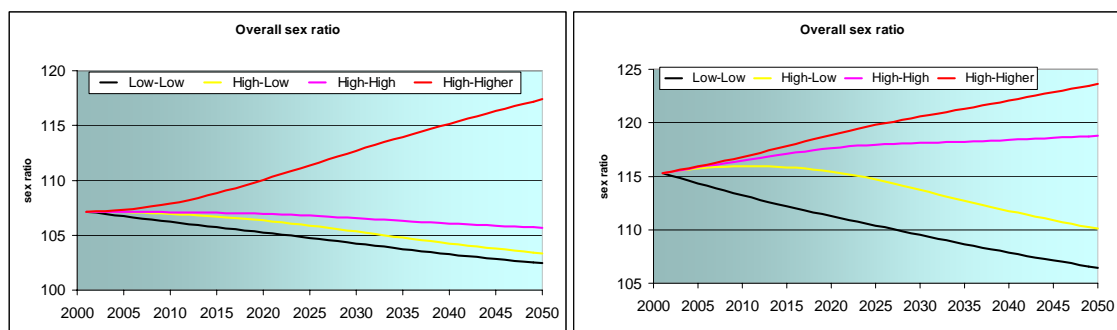


Figure 4 also shows the trend for Northwest India. Starting from a very high level at the beginning of the century, this region is unlikely to witness the kind of improvements that can be envisioned for the rest of the country. In fact, if SRB stays at the same level (the High-High scenario), the process of masculinization will gradually involve all age groups, as younger generations (which are heavily male) age, and the overall indicator will continue to increase to about 119 in 2050. The transitional scenario will bring about a decline in the overall sex ratio only in the 2010s, but the sex ratio of the entire regional population will remain above 110 by 2050.

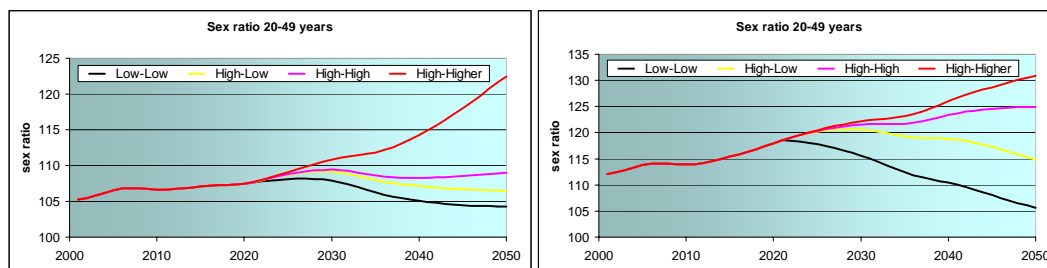
The widening divergence between those two scenarios (High-High and High-Low) corresponds to the impact of a possible SRB decline between 2000 and 2030. The overall demographic gap between males and females in 2050 represents 14 per cent of the projected female population in the High-Low scenario, compared to 23 per cent in the High-High scenario.

3.3 Skewed Sex Ratios and Marriage Patterns

Our projections also allow for a more detailed exploration of these data by age group. We will consider here only young adults, in order to examine the impact of skewed SRBs on the population of

marriageable age. We have retained here the 20-49 age group for both sexes, a choice dictated chiefly by our comparative regional perspective.⁸

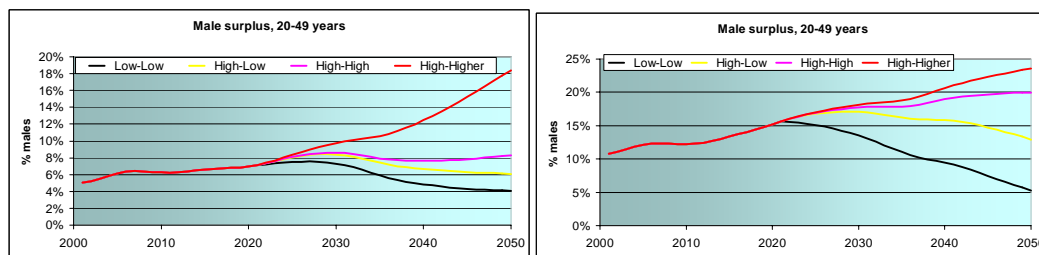
Figure 5: Sex ratio of 20-49 age group, 2001-2050, India (left) and Northwest India (right)



We first computed the sex ratio of this age group according to the four scenarios. As can be expected, differences will be visible only after 2020, when the consequences of unbalanced SRBs post-2000 will become visible among adults. As our simulation indicates, this sex ratio is already at 105, and will increase slightly till 2025. After this date, trajectories are divergent, but our central scenarios (High-High and High-Low) do not translate into large differences in 2050, as sex ratio among adults will remain in the 106-109 range.

Even if SRB were to remain at the normal level of 106 over the whole projection period, the female deficit in the marriageable age group (20-49) would be at least 25 million in India by 2030, as a result of previous skewed sex ratios and dynamics affecting the age structure of a population. But other scenarios point to a deficit in the range of 29-34 million, with limited possibilities of decline in the following decades. In fact, even in the optimistic transitional scenario, the female deficit in the 20-49 age group would be around 23 million. Figure 6 indicates that the gap between men and women in this broad age group will hover at around 8 per cent of the adult male population if there is no transition. This gap will reduce to 6 per cent if SRB comes back to 106 in 2030.

Figure 6: Male surplus among the 20-49 age group, 2001-2050, India (left) and Northwest India (right)



The different scenarios have a more visible impact in Northwest India, due to the current high level of SRB in that region. In fact, if nothing changes, the sex ratio in the 20-49 age group will climb to 125, as against 115 in case of decline. As the right half of Figure 6 shows, all scenarios lead to a 15 per cent excess of men by 2020, which may further climb to 20 per cent if SRB stays at its current level. Even in the more optimistic case of a transitional scenario, the surplus will remain above 15 per cent of the adult male population till the 2040s. Indeed, this deficit is already being felt in many pockets of Punjab, where young men have difficulties finding brides (Kaur, 2004). Men in such situations are increasingly resorting to unusual solutions, such as non-endogamous unions (involving other caste groups), import of brides from other regions (such as tribal India or Southern states) or trafficking.

In terms of marriage patterns, a shortage of potential brides may force men to delay their marriages. Marrying older is the first adjustment to adversely imbalanced sex ratios. But the effect of

⁸ This broad age group does not correspond to India’s “marriage market”, where many women marry before the age of 20 and where there is a noticeable age gap between spouses.

delayed marriages for one generation of men will then be felt on the younger generation, as they become adults. As in a queue, unmarried men will accumulate as new cohorts of bachelors reach marriageable age. This growing pool of unmarried men will create a bottleneck that is unlikely to be solved solely by delaying marriages. Single men reaching 25 in 2025 and entering the marriage market will not only exceed the number of young women of corresponding age, but will also have to compete with a larger than expected number of older men who are still single. As a result, many of these men will not be able to marry.

This means that not only will a significant share of men above 30 still be single, but also that many will never be able to marry at all. Of course, this assumes that marriage patterns do not undergo highly improbable changes, such as earlier female marriages, generalized polyandry (wherein a woman takes multiple husbands), same-sex arrangements or extremely high levels of divorce and remarriage among women.⁹ While high proportions of unmarried men or women above age 40 have already been observed in many countries (post-war Ireland being a prime example of late marriage and high proportions of people never marrying), these marriage patterns are mostly unrelated to the marriage squeeze, resulting instead from deliberate behaviour.

In India, where unmarried persons lack a clear status in traditional society, the proportion of men and women unmarried at age 50 is usually extremely low (less than 1 per cent), indicating that marriage acts as a compulsory institution for almost everyone. As such, rising proportions of unmarried men are obviously at odds with the prevailing custom. When restricted to specific regions, broadening the marriage radius can, to a large extent, help to solve the marriage squeeze by allowing inter-caste and inter-regional unions, as is seen today in Northwest India. But the sheer magnitude of the projected deficit renders this solution unfeasible when more than a million potential brides are missing, and even migrations from neighbouring countries (most of whose populations are not of the same religion) may not be a workable solution. From a strictly quantitative viewpoint, male migrations out of South Asia would appear to be a more feasible solution, even if current barriers to international mobility would not allow for such demographic transfers.

3.4 Implications for Men and Women

Going beyond marriage itself, the reduced number of women would mean that women's family roles – as wife, daughter-in-law or mother – would become increasingly in demand. These traditional family roles would, therefore, be enhanced at the expense of other life courses, such as decisions regarding celibacy, or opting for a career. As mentioned earlier, pressure towards early marriage may be detrimental to women's education, training and employment; their permanent or temporary withdrawal from the workforce may be encouraged, in order to give them adequate time to act as (traditional) wives or mothers. As such, we may foresee a decrease in women's participation rates outside of the home, which may seem difficult when such figures for Indian women are already very low by international standards. At the same time, this would raise the demand for male labour, especially in the low-skilled and low-wage sectors that are currently largely occupied by women.

The impact for men of delayed marriage would probably be favourable to longer educational and training periods, resulting in better human capital and skills. But the consequence on participation rates is less clear. A family life that is bound to start later is likely to require higher income levels and savings, particularly if the competition for brides is severe. But at the same time, we can also envisage unemployment, enhanced job mobility and lower rates of participation and savings among some men who are excluded from or opting out of the marriage system.

In fact, the entire Indian family structure would undergo significant changes. Many unmarried men would have to be accommodated within the family structure, but with a reduced share of domestic power due to their marital status. Some may also live on their own, an unusual arrangement for most Asian countries. Late marriage also means a more fragile status for men. Even while marrying older men, women may have a stronger role in the new family settings, as enhanced possibilities for divorce and remarriage may strengthen their position vis-à-vis their in-laws. In such a context, it is difficult to forecast whether the patrilineal system could survive in its current form. Parents of girls, even in smaller numbers, could benefit from a reversed flow of the dowry system, to encourage new living arrangements and more flexible or symmetrical family solidarity. But at the same time, scarcity of

⁹ There are various reasons not discussed here for these different scenarios to be implausible in India.

women would probably not enhance their position in society, due to the increased risk of gender-based violence, the rising demand for sex work and the development of trafficking networks.¹⁰

Lower demographic weight in democratic systems would also translate into a weaker political voice in public decision-making, a trend that could be reinforced by women's lower involvement in non-domestic activities such as employment and civil life. At the same time, men would strengthen their control on public and political institutions, and may be able to bend legislation relevant to women in order to accommodate their own needs.

3.5 Marriage Squeeze and Potential Losers

These various scenarios refer to an "aggregate" society, as if each family and member were in a similar position vis-à-vis a shortage of women. This is far from being the case, however, and we can easily identify some of the potential winners and losers in the changing demographic equation that would follow a long-term increase in the proportion of male versus female births. The marriage system is basically "hypergamic" in India, with women marrying up into slightly better-off families. Such a system stimulates efforts by potential brides and their family to invest large resources (such as dowry) to marry into families further up the socio-economic or status ladder. Hypergamy always puts elite women and destitute men at the greatest risk: the former may not find available grooms in the proper stratum, while the latter may not be able to attract even the poorest women, aspiring to marry into better households ("Don't marry me to a ploughman," goes a common wedding song sung by rural Indian brides).

The few studies devoted to the impact of past sex-ratio distortions in Northwest India have already shown that men unable to marry locally have resorted to the importation of brides from distant regions, lower economic backgrounds or lower caste groups. While this solution is compatible with hypergamy, strict caste rules may have to be stretched in order to allow marriage with distant communities. Moreover, dowry demands are likely to be reduced in order to facilitate such arrangements. These marriages may also be difficult to organize, thereby creating new networks (of villages, of matchmakers) or, at times, criminal organizations (women traffickers). Such practices are, of course, bound to intensify in the future, with unmarried men compelled to broaden their search radius even wider in order to reach women from other regions, low-status groups (such as tribal communities), etc.

What seems obvious is that dowry will become less relevant, and that money, particularly in prosperous regions like Northwest India, may help to attract potential women from other regions. Hence, we can easily imagine that the poorest men will be affected at disproportionate rates by the marriage squeeze, and that many among them may end up remaining single for lack of resources to marry, as already observed in some Indian regions. These individuals are likely to become the main losers in the new marriage system. If, on the whole, a tenth of the male population is to be considered as surplus due to the marriage squeeze, this proportion is likely to be much higher among the underprivileged, with the number of men forced to remain single being several times greater. This will most likely act as a strong destabilizing factor for this male population, and may translate into class-based tensions.

4. SEX SELECTION: HOW AND WHY?

To understand the underlying determinants for sex selection in India, we will use a framework originally devised in 1973 by Ansley Coale for researching fertility decline. According to Coale, three preconditions needed to be met in order for birth rates to fall: birth limitation had to be within the "calculus of conscious choice" for parents; it had to be advantageous to them; and it had to be feasible. We will now adapt these prerequisites (conceivable, advantageous and feasible) to the SRB scenario.¹¹

These conditions can be translated into a simple matrix: parents should be willing and ready to practice sex selection, and also able to do it. The first condition sounds straightforward, as the

¹⁰ Hudson and de Boer (2004) provide the most pessimistic view of the consequences of the growing number of unmarried men.

¹¹ There are, of course, many other differences with Coale's original framework that will not be discussed here.

availability of the requisite technology is an indispensable ingredient for sex selection. But as we have seen, there are different methods available, and each entails certain costs or limitations. Legal conditions may also act as a hindrance to sex selection. To a large extent, this latter component refers to supply-side factors, although this also needs to be widened to include non-material elements such as prohibitions or awareness factors.

The second condition encompasses two aspects. First, this includes the ethical or religious context. As some of its ingredients (especially abortion) may be repugnant to them, parents may be unable to adopt them as techniques to regulate the sex composition of their offspring. The second aspect relates to what can be referred to as the rationale framework: parents will engage in sex selection only if they gain distinct benefits from their efforts. Even when sex selection is both acceptable and accessible, it may not be of any interest, as is seen in many parts of India where sex-ratio levels appear normal. To explore this component, we will review various determinants, including the economic and symbolic, such as prestige.

4.1 Able?

The discussion of feasibility factors for sex selection should start with the technological evolution. As we have seen, many methods existed in the past to influence the sex composition of one's family. But a major breakthrough occurred when new techniques based on scan-and-abortion emerged.

4.1.1 *Methods*

We briefly reviewed the basic methods used to influence child sex ratios. But many other folk methods (based on timing, specific diet, rituals, etc.) existed in the past, and are still reported today. These were probably of limited reliability, however, and unlikely to have left any tangible impact on India's sex composition. Of course, the dramatic technological breakthrough due to the introduction of ultrasound technology is probably the main cause for rising SRBs, but remnants of the old discriminatory regime have not completely disappeared. In fact, the existing sex differentials in infant and child mortality demonstrate that neglect, as an indirect method to eliminate "surplus girls", is still common. Moreover, the influence of new technology is far from complete, though government intervention has blocked the introduction of more "high-tech" methods of sex selection. As such, supply is somewhat crippled by current legislation, and may tend to lie below the actual level of demand for sex selection. Such a situation, of course, is likely to encourage criminal or other initiatives to circumvent regulations.

4.1.1.1 *Traditional methods*

One of India's oldest means used to alter the gender composition of children is also the crudest, i.e., female infanticide. The method relies on a set of procedures to kill girls within a few days after their birth. Techniques vary locally according to indigenous know-how and available resources (such as local poisonous plants). Such techniques have also evolved spontaneously over the years, incorporating newly available elements (such as pesticide). Infanticide's efficiency is beyond doubt, and its financial cost is also extremely limited because of its reliance on local resources. But this method also presents many drawbacks, especially due to the distress caused to mothers. The huge psychological cost of female infanticide has subsequently made its use exceptional, and often limited to especially unwanted births (e.g., the pregnancy of single or widowed women). As a result, infanticide as a routine practice (and not as a last-resort solution) has never spread widely in India, as was the case in some East Asian countries, remaining instead restricted to a few communities, such as specific sub-castes in Western India or in Tamil Nadu (Vella, 2005). Lack of privacy related to matters such as pregnancy and delivery also tended to facilitate knowledge of infanticide, requiring both local tolerance and discretion in case of legal threats.

Neglect is a far more common method. It consists of a passive strategy intended to deprive girls of fair access to and share of resources, with a reduced probability of survival as a consequence. Discrimination may be extremely subtle, and surveys are often unable to capture inequality in resource allocation. Some of the factors most often mentioned include post-natal care, proper clothing, parental surveillance, breastfeeding, food allocation (both quantity and quality), recourse to health facilities (frequency and expenses), immunization, etc. It is also expressed in other attitudes towards girls (such as with regards to schooling) that have no demographic consequences. All discrimination strategies towards girls do not invariably cause mortality, of course, as many Indian girls survive childhood in spite of severe deprivation. We may therefore conclude that neglect is typically a low-tech technique. While it requires almost no financial or other parental effort, its own reliability as a way to eliminate

daughters is limited. It may even be asked whether this constitutes a strategy *per se*, rather than merely being the random, unpredictable outcome of a certain set of practices.

4.1.1.2 *Sex determination and selective abortion*

Pre-natal diagnostic techniques involve two main technologies, viz. amniocentesis and ultrasonography. In India, pre-natal sex determination relies mostly on the latter, a non-invasive technology that is also easier and cheaper to conduct than amniocentesis, and is reliable after at least 14-16 weeks of gestation. Both of these techniques were first tested in India in 1974, starting with amniocentesis. By the 1980s, thousands of pre-natal clinics were already in operation.

Abortion in India benefited from an early liberal legislation – the MTP (Medical Termination of Pregnancy) Act, discussed since 1964, ratified in 1971 and introduced in 1974 (though not in Jammu & Kashmir). In 1975, the MTP Rules and Regulations defined when (12-20 weeks of pregnancy), by whom (registered allopathic doctors) and where unwanted pregnancies could be legally terminated. The Act was amended in 2002 and 2003, to improve women's access to safe abortion. One peculiar dimension of this Act is that it appears to focus on *married* women, and can be misconstrued as discriminating against single, divorced or widowed women. Apart from the usual social and health reasons, the most liberal provision of the Act includes contraceptive failure as a reason for abortion, paving the way for the probable use of abortion as a last-resort family-planning method.

The number of abortions that take place in India is poorly known, especially because many terminations take place outside registered centres and are performed by uncertified providers (who may, however, often be medical practitioners). Estimates vary from 13 to 21 per 1000 births, based on large-scale surveys and state statistics, while micro-level studies may provide lower estimates. In absolute terms, estimates are of 4-6 million abortions every year, but some figures go much higher. In the public health-care system, an abortion in 2006 could be obtained through 11,000 approved clinics, although with a disproportionate share of these being in urban areas. A large number of users in cities choose to go to private clinics, even if costs in public institutions are free or nominal. Only a small proportion of primary health centres provides MTP services.

Because of the lack of proper statistics, it is not easy to assess the proportion of abortions conducted for purposes of sex selection in India, and the estimates on this aspect necessarily vary. Kulkarni has recently produced a set of estimates based on the gap between estimated and expected SRBs, the difference corresponding to the number of sex-selective abortions of female foetuses. When comparing a biological SRB of 106 for India to (adjusted) observed SRB values, the total number of selective abortions in 1981-2005 can be estimated at 8.0 million. This also corresponds to an average of 557,000 abortions per year since 2001, representing a little more than 2 per cent of annual births.¹² It should also be emphasized that most pregnancy terminations conducted in India take place before the second trimester of pregnancy, and are most likely aimed at limiting or spacing births, rather than sex selection.

4.1.1.3 *Latest sex-selection technology*

There are several sex-selection techniques not known to be widely available in India, even if the Ericsson method (of sperm sorting) may have been at some point available in clinics in Punjab. Some of the characteristics of these techniques are worth mentioning. Two major pre-implantation methods exist that can be used for sex selection: sperm sorting (sperm that is sorted by sex and then used in artificial insemination or in-vitro fertilization – IVF – procedures), and pre-implantation genetic diagnosis (in which IVF embryos are genetically tested to determine sex and then implanted). These techniques, which are available in industrialized countries, are expensive and require well-equipped labs. For a variety of reasons, including cost and legal prohibition, these methods are not likely to be accessible to Indian residents in the near future. But to affluent Indians (who are able to travel or who have international connections), these methods may offer an almost undetectable way to carry out sex selection, without resorting to second-trimester abortion.

The technology of sex determination has also undergone constant progress since the introduction of amniocentesis and ultrasound. One of the latest products, of particular relevance to the Indian experience, is "foetal DNA testing". As the blood of the pregnant mother is known to contain the DNA of her baby after six weeks of gestation, a sample of this blood can be tested to identify the sex of

¹² Estimates kindly provided to the author by Prof. P.M. Kulkarni in September 2007. Results are close to estimates provided by Jha *et al.* (2006).

the embryo. The test is reported to be 95 per cent accurate and costs less than US\$ 300. The potential of this technique for Indian users is enormous, especially given that testing can be done from a distance: simply send a sample by mail, and lab results are available a few days later through the Internet. (Interestingly, one British company marketing such a product offers worldwide shipping, *except for India and China*.) Compared to classic scans, this method offers fast and early results with satisfactory reliability. Since the sex of the embryo can subsequently be determined about two months earlier than by ultrasound, this method offers to shorten the gestation period for aborting women. It may also prove more difficult to detect and monitor.

4.1.2 Knowledge and accessibility

4.1.2.1 Knowledge

The availability of sex-selection methods is first mediated by awareness of their existence. Traditional methods had long been in place in India, and were therefore well known in certain communities, with local specialists responsible for preserving the most sophisticated methods (such as abortion-inducing plants or ways to dispose of infants). New methods, such as sex-selective abortions, were unknown to most of India's population thirty years ago. Ever since, however, they have spread through multiple channels, ranging from interpersonal exchanges among users to aggressive publicity by suppliers. (Small clinics are said to have played a decisive role in accelerating awareness among potential users by advertising the "benefits" of sex-selective abortions with such famous slogans as "Better a thousand rupees now than a lakh [100,000] in twenty years", meaning that it is better to pay a small amount today for a sex-selective abortion than a larger amount later for your daughter's dowry.)

Because of the proximity of both ingredients of sex-selective abortions – sex identification and pregnancy termination – to family planning and reproductive-health efforts, these two procedures separately benefited from wide publicity, either as a component of modern pre-natal care or as part of fertility-control methods. Amniocentesis and, later, ultrasound received wide publicity as modern instruments for the monitoring of the foetus, and to avoid birth defects. Initially, they were made available to pregnant mothers at a limited cost in well-equipped health centres. In many parts of India, recourse to multiple ultrasound examinations by expectant mothers is still extremely common, though rarely as an instrument to decide the fate of a pregnancy. Surveys have shown that knowledge of modern sex-selection instruments is today widespread, and that their diffusion most likely followed hierarchical channels, spreading from large cities to smaller towns to villages, and from more affluent groups towards the lower strata of local society.

4.1.2.2 Clinics

As pre-natal care was incorporated into India's reproductive-health efforts during this period, it received wide publicity as an essential tool to monitor the growth of the foetus. While sex determination was initially available through local government facilities, a change in health policy in the 1980s to regulate sex determination stimulated the growth of private-sector sex-selection services. Compared to government institutions, the private health sector offered services that were widespread, numerous and in several ways of better quality, even if less affordable. To many patients, the wide distribution of clinics around the country meant that the necessary equipment to perform sex determination was available in almost all localities (such as market towns frequently visited by villagers). While considered expensive at the beginning, scanning later benefited from rapidly decreasing costs, largely fuelled by competition as the private health sector developed.

Ultrasound is today a relatively easy technique to implement. It does not require a highly trained staff or extra operational expenditure. A machine costs around Rs 500,000 (about US\$ 11,600), and individual ultrasound test cost Rs 300-1000. After the amendment of the PC & PNDT (Pre-conception and Pre-natal Diagnostic Techniques) Act in 2003, the total number of registered units two years later was 26,954. (The history of the PNDT Act is detailed below in section 5.1.1.) These units were not evenly distributed throughout the country (Delhi had more than Madhya Pradesh, Bihar and Jharkhand put together), and were more numerous in the Southern states, even though sex selection in these areas is almost negligible. The intra-regional picture may be different, as a detailed analysis conducted in Maharashtra has shown registered clinics to be concentrated in districts with high sex ratios. Close examination of the registration data has indicated many discrepancies, however: registered owners with no qualification to operate the ultrasound machine, individual doctors associated with a large number of units, mobile units likely to escape registration, possible under-reporting of customers, etc.

4.1.2.3 Providers

Enterprising doctors and clinic managers have played an active role in the diffusion of sex-selection technology, along with health workers who have publicized the services. Providers acted mostly as advisers to women who wanted to avoid births, while the fact that, in many cases, the births to be avoided happened to be female births was considered irrelevant, at least initially. Familiar with both technologies and their practicalities, health workers and doctors at various levels were thus the first channels for quality information on the feasibility of sex-selective abortions.

Today, physicians are largely conscious of the potential perverse effects of this technology, and are opposed to sex selection and its ethical implications. As early as 1986, the Federation of Obstetric and Gynaecological Societies of India passed a resolution against pre-natal sex determination and sex-selective abortions. Since then, many medical practitioners have joined campaigns against the misuse of these technologies, with the support of professional associations. In 2006, the Indian Medical Association took a firm stand against sex selection, and intends to collaborate fully with the implementation of the PC & PNDT Act.

Doctors have, however, been put in a difficult position due to the activities of a small number among them – those who became rich by performing illegal sex diagnoses or sex-selective abortions. Initially, during surveys in the 1980s, many doctors freely acknowledged their role in offering sex-selection services; ever since then, however, they have been more careful in their public declarations. It should also be noted that it is the medical community that often voices the most favourable comments regarding sex selection, including criticism over the legal provisions of the PC & PNDT Act. In particular, some doctors have stressed that sex selection, despite being condemnable, exists only in response to latent demands from women and their families, and therefore is merely fulfilling a need. Many other arguments have also been advanced in favour of sex selection: the freedom and autonomy of patients to decide upon such procedures for themselves, the family-planning aspect of avoiding unwanted births through abortion, deterrence vis-à-vis infanticide, humanitarian attempts to “relieve” women and girl children of their social and economic burdens, etc.

4.1.3 Legislation

Legislation is now a central part of the supply framework for sex selection in India, and we will describe it in a separate section of this paper. The major change related to supply in recent years actually relates to the effect of successive legislations, geared towards preventing the misuse of ultrasound technology to detect the sex of a foetus; and, to a far lesser extent, to the stricter implementation of existing criminal laws against infanticide in some areas. In the eyes of potential users of sex-selection methods, law enforcement has meant increasing difficulties in getting access to new technology and providers, as well as increased monitoring of their equipment and activities. As a result, access to these facilities has become more difficult of late, as well as more expensive. Many providers have been obliged to stop providing information on a foetus's sex to new customers, while illegal abortions are increasingly conducted by untrained and unregistered practitioners, with serious potential health consequences for women.

4.2 Willing?

Understanding the rationale behind sex selection is no doubt key to deciphering the dynamics of sex ratio in India. In this section, we will examine whether sex selection is socially acceptable, and why the birth of a son should be perceived as being more advantageous than that of a girl. We will review various domains, oscillating between narrow economic reasoning and a more comprehensive perspective encompassing non-material motives.¹³

4.2.1 *Social acceptability of sex selection*

As already noted, sex selection needs to be acceptable and conceivable in both principle and procedure. There are very few known philosophical or religious principles that bar individuals or groups in India from envisaging a deliberate choice in the sex composition of their offspring. Some limited sections of the population may be opposed to sex discrimination on a larger plane, but when confronted with individual choices and facing certain constraints, general principles of gender equity may carry little weight. Another factor related to the legitimacy of sex selection may also be the acceptability of using rational reasoning (such as the cost-benefit analysis examined below) to make a decision about one's offspring. To a large extent, rapid fertility decline itself has shown that people have accepted the principle of controlled fertility, and it may therefore logically follow that manipulating the "contents" of one's fertility is part of this fundamental behavioural change.

A more significant dimension relates to the actual methods used, such as the difference between infanticide and abortion: the latter option is far less repugnant to most Indians, even though in some isolated villages or communities, sex-selective infanticide has been condoned in the relatively recent past. While perceived as progress in moral terms, abortion still remains a very sensitive matter for many mothers. It often goes unreported in surveys, and it is usually carried out on the sly. In some specific religious communities – such as among Christians and Muslims – abortion is condemned, and sex ratios are at near-normal levels.

4.2.2 *Economic rationale*

A common explanation for gender discrimination usually boils down to the fact that girls constitute a source of impoverishment for their family. It is therefore appealing to attempt a cost-benefit analysis, in order to examine specific "costs" related to girls, as well as "benefits" accruing from boys. It is important to emphasize at the outset that this overview is unavoidably based on "stylized" facts, which may not always fit nicely with the anthropological diversity of India, where marriage and kinship systems are extremely heterogeneous. Readers familiar with this diversity will therefore have to endure what may appear to be generalizations concealing significant exceptions or anomalies.

4.2.2.1 *Cost factors*

According to many Indian parents, raising a girl entails extra costs related to protective efforts extended especially to daughters. Girls are perceived to be particularly vulnerable, as family honour seems, at times, to rest exclusively on women's behaviour, rather than on men's. But apart from this aspect, raising daughters cannot be said to be more expensive than raising sons, especially when they receive care and education of inferior quality compared to their brothers. As such, it is only with reference to costs arising during or after their marriage that daughters appear to be more "expensive" than sons. In addition, though the "investment" in daughters is essentially the same as sons before marriage, this money is subsequently considered wasted due to the "patrilocal" nature of marriage, meaning that married couples in India generally live near the husband's family, rather than the wife's.

Marriage and related expenditures constitute a large category of costs. This includes several sub-categories, such as wedding expenses borne by the bride's family, customary gifts to the groom's side, and especially dowry (paid to the groom's family), or even post-marriage expenses (additional dowry demands, support at time of first pregnancy, etc.). Dowry encompasses cash, gold and other jewellery, and additional durables, and it constitutes the major bulk of marriage expenses, often exceeding several years' of household income. While the debate on the nature of dowry is still unresolved, it is safe to say that it is more likely to relate to an actual "groom purchase" – through which the bride's family gets the most "suitable" boy – than to a pre-mortem bequest supposed to compensate for the daughters' exclusion from inheritance rights. Indeed, it has been observed that a

¹³ For descriptions of the local context for female discrimination, see George *et al.* (1992, 1998), Sekher *et al.* (2007), Agrawal *et al.* (2007). See also Kishor *et al.* (1993) and Sudha *et al.* (1999).

dowry's amount is more proportional to the "quality" of the groom and his family – education, background, income, etc. – than to the potential share for the bride herself in the family assets. High dowry will ensure a proper marriage into the best possible family – hypergamy being a tacit norm – and ensures additional prestige and reputation to the bride's family. It is important to stress that the very low status customarily assigned to unmarried daughters in India usually prevents them from opting out of the system by remaining single.

Dowry arrangements have long been common among higher-status groups in North India, but since Independence such arrangements have recorded a formidable spread towards both lower castes and South India. There are today very few communities in which dowry has not been introduced. Another contemporary feature of the dowry system relates to its apparent unending inflation, fuelled by the combined effect of enhanced competition for suitable grooms, growing economic heterogeneity within endogamous caste groups, affluence in time of rapid economic growth and increasing materialism.

The resource flow is almost the opposite in the case of boys, as the groom's family will directly receive a large part of the dowry from the bride's family. For that reason, raising and educating boys seem highly profitable, whereas girls could be seen to mean further expenses. A traditional nickname for a woman within her family is *paraya dhan*, which means "somebody else's property". Hence, an oft-heard saying has it that raising a daughter is like watering your neighbour's garden. Indeed, the traditional Hindu ideal of "giving away" one's daughters (*kanyadana*) has become economic nonsense.

In rural settings, rich peasants – among whom women generally enjoy no secure rights over family land, as daughters or as widows – may have to part with some of their fields in order to cover dowry expenditures. But among the lower classes, the picture is slightly different, owing to the absence of transmissible assets (such as land or jewellery). As such, the women's labour is considered a more decisive contribution to the prosperity of the household. While dowry has been introduced into many poor communities, such as the landless, the amounts transacted have remained moderate, including for poor families.

4.2.2.2 *Economic support and other benefits*

In settings characterized by joint family arrangements, resources are usually pooled between parents and children. This is the case for a large part of the dowry transfer, which may not directly reach the newly wed couple. But the later income of married children will also benefit their parents, as is the case of rural households in which sons work on family land or business. Joint family cohabitation also means that parents can enjoy constant financial and emotional support from their sons' families, whereas married daughters are not supposed to contribute to their parents' expenses after marriage.

This is also true for married sons who are not living with their parents, as they are expected to contribute to their parents' well being until the end of their lives. In a country where pension benefits and social security are almost entirely absent, long-time support extended by sons is a major source of security for ageing parents. But this may not be true to the same degree everywhere in India, as some communities or social categories have a more balanced and less patrilineal family structure.

4.2.3 *Symbols and tradition*

A comprehensive cost-benefit analysis of children distinguished by sex also needs to be extended to non-financial domains. For instance, sons living in the vicinity represent a source of protection and affection for their parents. In many marriage systems, daughters are supposed to live away from their parents, and therefore have limited interaction with them after marriage.¹⁴

There are many other more-symbolic advantages in having sons. First of all, as in any patrilineal society, sons are vital to continue the family lineage (*gotra*), and often the family activities.

¹⁴ Here it may be relevant to introduce a more anthropological caveat, by stressing that the traditional South Indian kinship system is somewhat different from what we have described: in particular, marriages are not exogamous (but often among cross-cousins or other relatives), and married daughters usually stay close socially and geographically to their original family. Dowries were unheard of until the recent past, and inheritance of daughters was not ruled out. While this system is undergoing many changes today, and is quickly moving closer to the pan-Indian system, characterized by dowry inflation, it has retained many features that contradict the overall stylized patterns depicted here.

Since daughters are usually excluded from an equal share of the inheritance, surviving boys are assured to inherit their parents' property, and will carry on the family name. In fact, in the most common exogamous system in India (in which grooms marry same-caste brides, but from different lineages and localities), women join the *gotra* of their husband at marriage, thereby losing membership in their original lineage. Sons are subsequently the only legitimate descendants in this patriarchal system, as their married sisters belong to another lineage altogether. One of the most publicized roles for Hindu sons is also to perform the requisite rituals upon the death of their father (such as lighting the funeral fire), a task from which women are customarily excluded.

The prominent role of sons within the patrilineal system has, of course, added prestige to their status, and is a common source of pride for parents. On the other hand, sonless parents may feel permanent anguish in the face of their family's and community's reaction. But this social pressure is to a large extent merely an echo of the social and economic disadvantages experienced by girl-only families in patriarchal societies.

Many dimensions covered in this section relate to status symbols and to purely economic advantages. For that reason, it is fair to say that high-ranking communities (typically high castes among Hindus) and high-income groups (typically the landed peasantry or urban middle classes) will be especially responsive to demands related to ritual, reputation and financial exchange. Lower-status or lower-income groups, such as backward castes or tribal populations, are therefore in a different position, and son preference in these communities is usually less acute than in the rest of society. But the powerful top-down mechanisms at work in contemporary India mean that many high-caste or urban customs are being "borrowed" by other classes and communities, in a bid to improve their overall social status.

4.3 Limitations of the Utilitarian Framework

Arguments in favour of a family having boys rather than girls seem to stem logically from the previous analyses, as investment in sons generally appears to offer more "returns" to families within a kinship system characterized by dowry and patriarchy. It is only among deprived groups that the patrilineal norms have less economic implications, due to households' limited assets and the proportionally larger contribution of women's work to the domestic economy. This also tallies with variations observed in child sex ratio across social categories, and it would therefore appear that the new technologies available have simply met the "latent demand" for sex selection.

Nonetheless, it is essential to remember that the rules of the economic game in any society are only partly economic. Profit maximization, for instance, is subject to many other constraints, such as government intervention and social norms. These latter processes are shaped by historical developments (or "path dependency"), and rarely conform to a strictly economic rationale. This may in part explain why infanticide could never become a common birth-control method. Norms such as those regulating the marriage system clearly influence bargaining positions in a way that is not strictly economic, and act as constraints to a strict socio-economic *laissez-faire* system. To a large extent, they represent the legacy of a different period and society, rather than being a reflection of current economic necessities.

Moreover, as will be seen briefly below, normative systems change in ways that are difficult to predict. At times, they may conform more closely to current economic pressures; but changes in the value systems also take place that are likely to undermine the economic rationale of old behaviours.

5 POLICY RESPONSES AND FUTURE PROSPECTS

To a large extent, the increase in the proportion of males to females in India appears to have been a spontaneous process. It corresponds to the logical consequence of widespread demand for sons in many communities, as well as the appearance of sex-selection technology. Left on its own, the Indian demographic make-up is naturally more male than female. It is therefore likely to result in skewed SRBs for a long time, before other factors reverse its course towards higher proportions of men in each age group. But apart from the combined effects of longstanding son preference and free markets (exemplified by the buoyant private health sector in India) that are at the base of rising SRBs in the country, there are many other actors in Indian society that might also impact on gender differentials, now and in the future.

In this section, we will examine the role of the state and other organizations in light of the important sex-selection-related changes that have taken place in India, particularly after the publication of the 2001 census results. We will also review structural factors and social mechanisms that can influence future prospects for sex-ratio stabilization or further degradation.

5.1 Legal Response

Sex selection in India does not take place in a legal vacuum. In fact, just a few years after the introduction of the new ultrasound and amniocentesis technologies, in 1983 the Indian Parliament banned the practice of sex determination in all public institutions. In 1988, a pioneer law was passed in Maharashtra to prevent sex determination, following pressure from local activists. But the prime legislation at the all-India level remains the Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, the PNDT Act, passed in 1994.

5.1.1 The law against sex selection

The PNDT Act prohibited doctors and clinics from using pre-natal diagnostic techniques, such as scans, to determine the sex of a foetus. First offenders faced a penalty of up to three years of imprisonment and a fine of Rs 10,000 (US\$ 230), and repeat offenders risked a five-year imprisonment and a Rs 50,000 fine. The act also prohibited any advertising for diagnosis facilities. Another provision of the law established the presumption that women were compelled to perform sex determination by their husband or another relative, who could in turn be similarly subjected to a three-year imprisonment and a fine of Rs 10,000. Until 2003, however, the law was largely ignored by private providers and families. In fact, the country's SRB recorded a rapid increase during this period, due to the large number of sex-selective abortions.

The context changed with the publication of the 2001 census results, which brought starkly to light the country's deteriorating sex-ratio levels. Two years earlier, a public-interest litigation had also been filed by activists and NGOs, questioning the failure of the 1994 law. The Act was subsequently amended in 2003, and renamed the Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, the PC & PNDT Act, in order to include pre-implantation techniques. But it also attempted to strengthen the control of scan providers, by requiring registration and detailed records of scans provided to pregnant women. The law was unsuccessfully challenged in 2005, and further amendments to the PC & PNDT Act are now in the offing.

The amended law bans sex selection before and after conception, and further regulates the use of pre-natal diagnostic techniques for strictly medical purposes. In particular, the law restricts the use of diagnostic techniques to registered institutions and operators, which have to maintain detailed records. It also expressly prohibits persons conducting pre-natal diagnostic procedures from communicating the sex of the foetus by "words, signs, or in any other manner", while also banning the advertisement of such techniques. "District Appropriate Authorities" provide registration for such units, and are in charge of inspection and investigation, as well as the penalizing of defaulters, with quasi-judicial power. In addition, the National Inspection and Monitoring Committee assesses the ground realities through field visits, and provides its reports to the concerned state authorities and the Health Ministry at the Centre.

5.1.2 Implementation and results

Surveys conducted on the implementation of the law have thus far yielded mixed results. The legislation has received wide publicity, both at national and regional levels, especially in areas where sex selection was thought to be widespread. Following the amendment of the law, there has been a formidable increase in the number of registered bodies (clinics, genetic centres, etc.). As we will see further below, many public departments and civil-society organizations have also seized upon the provisions of the law in order to push for stronger implementation.

At the same time, many difficulties and loopholes in the provisions of the Act have been identified. We can only emphasize a few of them here, but they include: lack of resources to carry out inspection and monitoring, lack of corresponding qualified staff, poor performance of advisory committees at various levels, political pressures brought on the "Appropriate Authorities", conflict of interest for doctors charged with the prosecution of other doctors, insufficient understanding of the law

and procedural errors, and, in some cases, victimization of pregnant women.¹⁵ Doctors have also already complained of harassment, with the Indian Radiological and Imaging Association having created a website to document such cases.

Indian officials acknowledge that the law is not yet being enforced throughout the country. By 2006, almost 400 doctors had been prosecuted under the Act, most of them for failing to register their facilities or not keeping proper records. About 11 per cent of these cases referred to the actual communication of the foetus. But very few doctors have actually been convicted – the first jail term was awarded only in March 2006, in Haryana.

5.1.3 Enforcing PNDT

So far, governments at various levels in India do not have much political incentive to launch large-scale operations to implement the PC & PNDT Act. As our analysis of sex-ratio variations within India indicated, regional circumstances vary greatly within the country, and require different solutions. Effective strategies should therefore be implemented by state or local authorities, as disparities in discriminatory behaviour between, for instance, rural Kerala and urban Haryana preclude any common strategy.

On a larger plane, there are many reasons why governments are reluctant to invest many resources in the implementation of the Act. Sex-ratio deterioration is not yet perceived as a catastrophe for which strong government intervention is required. The short-term view of the current situation, which overlooks its harmful consequences for gender equity and future demographic equilibrium, is widely shared among politicians and the public, many of whom may not anticipate the after-effects of sustained demographic imbalances. Sex-selection is typically a crime with neither a known victim nor a complainant. As a result, vigorous enforcement of the Act may at times be perceived as mere bureaucratic harassment of health providers or of pregnant mothers. Moreover, vigorous intervention by the government into families' demographic strategies has long been considered an anathema in democratic India. A more structural factor relates to the obviously top-down diffusion of new discriminatory behaviour: offenders (doctors, middle-class families, etc.) are more likely to belong to the privileged classes that are politically more problematic to target.

The PC & PNDT Act provides formidable tools to act against the misuse of technology, but also requires a pronounced effort from local authorities to boost the overworked bureaucratic machinery, and to coordinate operations with the medical community and other civil-society organizations. It is therefore not surprising that the levels of success and zeal have varied greatly across regions. Many state or district officials and other local organizations have indeed chosen to use the provisions of the Act to sustain independent and original initiatives to fight sex selection head-on. But what is most encouraging is that many individuals within the government apparatus have also been able to use the provisions of the Act to launch vigorous drives towards stronger law enforcement. We will now review two such successful experiences.

An impressive initiative was launched in Hyderabad in 2004 by the District Collector, based on the application of the PC & PNDT Act. This started with a sensitization campaign aimed at implementers, followed by an informational workshop for all owners of ultrasound centres in the district. Forms submitted by operators were then examined, with a vast majority among them being found deficient, mostly for lack of proper information on owners, operators, patients, etc. Following further communication with these 389 registered centres, 91 saw their registration suspended, 74 scan machines were seized, and prosecution was launched against three suppliers and 18 centres. The District Collector reported a sizeable downward impact on the SRB following the strict implementation of the PC & PNDT Act.

Another experiment took place in Punjab's Nawanshahr District, an area characterized by one of the highest child sex ratios recorded in the country in 2001. A massive awareness drive was launched there in 2005, with the active cooperation of local NGOs, which especially targeted the area's ultrasound centres. Local authorities also launched a programme offering a computerized record of pregnancies in the district. Records (including telephone numbers, for follow-ups with mothers) were monitored, and all cases of abortion investigated; teachers and girl students were called upon to act as "ambassadors of the drive against female foeticide". Unconventional measures, such as "mourning the death of unborn girls" in front of the errant parents and clinics, were also adopted.

¹⁵ See, for instance, *Reflections on the Campaign ...* (2007) and *Proceedings...* (2006).

These innovative approaches appear to have delivered results, though only a systematic appraisal based on birth data will show their actual impact. The programme caught the attention of the media, government institutions and NGOs elsewhere in India, with calls to reproduce the “Nawanshahr Model”. One of the lessons of this initiative relates to the combination of enforcement and awareness strategies: monitoring (based on pregnancy records) is part of a larger drive to modernize and disseminate records as part of “e-governance”, while advocacy and awareness also include the special targeting of offending clinics and households.

Many NGOs have also initially launched sting operations, such as luring doctors into revealing the sex of a foetus. While often receiving wide publicity, these initiatives are proving somewhat less effective for legal reasons, as proof of criminal wrongdoing is often difficult to establish. But they nonetheless have had an unmistakable impact on clinic operators in some areas, who have come to realize that the Act can be implemented by non-official entities.

5.2 Advocacy Efforts and Gender-Equity Initiatives

The PC & PNDT Act aims to disrupt the supply side of India’s discriminatory sex-selection regime, the dimension that is largely responsible for the brutal deterioration recorded in sex-ratio levels since 1980. But irrespective of the law’s effectiveness, many questions are left regarding the effect of rampant son preference and undervaluation of girls. Other initiatives in India have, however, focused on this aspect of the sex-ratio predicament, with some even jointly addressing the supply- and demand-side dimensions.

5.2.1 Gender equity

Demand-orientated policies are still not very common in India’s attempts to crack down on sex-selection, for a variety of reasons already mentioned. There are, however, several important innovations in the related legal apparatus that are worth mentioning. For instance, the formidable change introduced in the Hindu Succession (Amendment) Act of 2005, hailed as a milestone in reversing intra-family gender inequality, in the future may lead to positive changes in women’s status. The deletion of a specific section of the original Hindu Succession law, from 1956, is likely to affect inheritance rules that were highly gender-unequal in rural Northwest India. One of the consequences of this move will hopefully be to economically empower women, and to counteract the ingrained *paraya dhan* attitude of treating daughters as a transferable asset – and, consequently, sons as the only financial providers.

Another landmark legislation is a law passed in 2006 that seeks to protect women from domestic violence, and bans harassment under the guise of dowry demands. Despite the fact that the scale of violence towards women in India has been extensively documented in recent surveys, there had been no specific legislation to deal with such abuse at home. While conscious of the fact that the law may not change mindsets, many feminist NGOs welcomed the new legislation. Such legal changes may have beneficial consequences for the practice of dowry, against which similar legislation from 1961 has had little impact. For instance, if women can become equal inheritors, parents may not have to depend only on their sons for security in their old age, because daughters too will be empowered to take care of them.

Another strategy of demand-side measures aims to counterbalance the economics of gender inequality, by offering advantages such as cash or pension benefits to girl-only families, or by setting up positive-discrimination measures for daughters. Several state governments (e.g., Tamil Nadu, Haryana, Andhra Pradesh) have introduced such steps, which often comprise cash or education incentives to families with only girls. However, while attractive on paper, these propositions are both expensive and difficult to implement, especially when potential offenders are richer than the rest of population. Governments should ideally try to tax male births, in order to raise compensation funds for girl-only families and women’s upliftment. But such policies would not only be socially unacceptable, but also unfair to the poorest groups.

5.2.2 Advocacy and the press

Skewed sex ratios constitute a typical “externality”, or harmful consequence of opportunistic behaviour, for which there are almost no identifiable victims. It is therefore crucial to reverse the usual attitude, according to which abortions of female foetuses are considered legitimate, as they pertain to rational household decisions that only belong in the private sphere. Many dimensions of gender discrimination and violence have long been protected from public scrutiny by the sanctity of the family

domain, and have for that reason often remained ignored or underplayed. Shaping public opinion towards a greater awareness of the meaning and consequences of sex selection is one of the main objectives of concerted campaigns in newspapers and through NGOs.¹⁶

5.2.2.1 *Sex ratio and the press*

There is no question that the press plays an increasingly important role in demographic matters, by relating statistical phenomena to the public's behaviour. The press in India has closely followed actions undertaken as a response to the sex-ratio crisis, and a large number of articles have been published. Initially, the census data of 2001 provided the core of their analysis. Disaggregated findings pertaining to individual cities or districts allowed a careful identification of the worst affected areas. But the interest in sex-ratio matters continued, and the press has subsequently reported widely on the experiments launched at local levels. Much information and monitoring initiatives received wide coverage thanks in part to the familiarity gained by journalists on sex-ratio issues. While also stressing the role of individuals (women, doctors, bureaucrats, etc.), the press tends to utilize census data in order to place collective blame on entire localities.

The press has also reported in detail some of the most visible aspects of the enforcement of the PC & PNDT Act, such as decoy operations conducted by NGOs or the prosecution of medical doctors. Scandals related to abortions (such as the frequent discovery of fetuses dumped in the open after possible illegal abortions) have also made headlines. The slower and more systematic implementation of the Act, and the ensuing monitoring of the activities of ultrasound clinics, have understandably not received the same coverage.

Several articles have also covered issues related to female deficit and its consequences – especially on marriage patterns – as observed in areas where sex-selection practices were introduced during the 1980s. For instance, journalists now are regularly writing about brides being imported to Punjab and Haryana. But much of this reporting is too often incorrectly associated with issues of women trafficking, which is only a secondary aspect of the emerging crisis. In fact, women's geographical mobility, through marriage or otherwise, remains widely perceived as a threat to patriarchal order, and is often mechanically related to trafficking or prostitution. However, the stress on the new generation of young male adults in regions experiencing a scarcity of marriageable women is an entirely new phenomenon, and the press coverage (along with research by social scientists) will gradually help to unravel the exact ramifications of local male surpluses.

5.2.2.2 *Advocacy*

Numerous advocacy programmes have also been conducted at various scales focusing on the issue of pre-natal sex selection. These activities are carried out mostly by civil-society organizations and public bodies, often with support from international agencies such as UNFPA, and target a wide variety of groups, such as women, the youth, the media, medical associations, NGOs, elected representatives, government administration, etc. Religious organizations have also been enlisted in some campaigns. In going through the various projects that have been launched by NGOs, we have come to realize the wide gamut of stakeholders that have been taken on board in these awareness campaigns, as well as the large number of communication strategies (through local media, schools and colleges, workshops, street theatre, health infrastructure, local panchayats, etc.) devised to reach out to them.

While campaigns were often aimed primarily at potential offenders, such as young women and medical personnel, fighting sex-selection in fact requires simultaneously addressing several constituencies beyond individual mothers and health providers. This process needs also to integrate the central themes carried by these campaigns, two of which were directed towards gender equity and the crime against women manifested in sex selection on one hand, and on the PNDT law and its implementation on the other.

The first option focuses on rights and the unequal status of girls. The design of such campaigns looks primarily at the positive aspects of having a girl child, and at examples of successful girls and women. It is also based in part on wider dissemination of information contained in laws that provide for equal opportunities to girls and women. The second message is driven more by fear and shame, by emphasizing the risks associated with skirting the law, from health hazards related to unsafe abortions

¹⁶ Materials for this section can be found in *Reflections on the Campaign...* (2007) and *45 Million Daughters Missing* (nd). See also *Pre-Natal Sex Selection...* (2007)

to fines and even jail terms faced by offenders. There is also a need to educate the public on the negative effects of the widening demographic gap between girls and boys born in India.

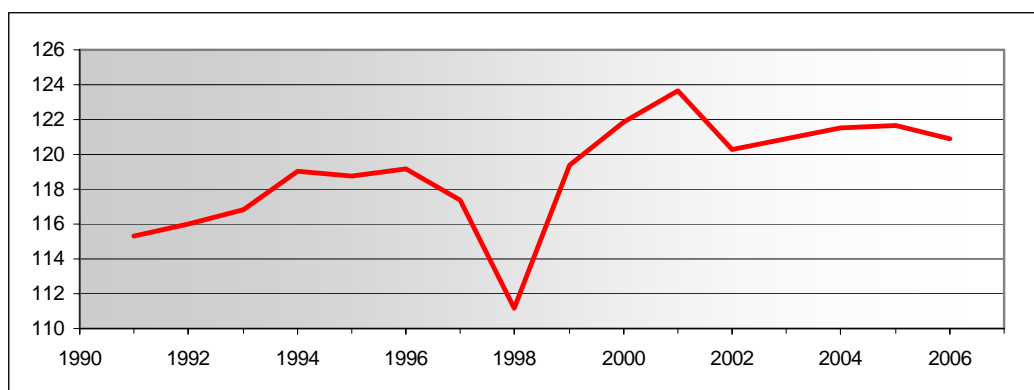
These are somewhat divergent orientations, which seem almost impossible to reconcile within a single advocacy platform. As a result, advocacy actions seem to be segmented and lacking in coordination. While there is undoubtedly a pressing need to amplify the current sensitization and advocacy campaigns, the many initiatives are also in great need of streamlining, in order to facilitate the synergy between the main actors.

5.3 Monitoring Change

Local statistics have also appeared in the press lately, with an eye to publicizing success stories. These often originate from local authorities who are eager to advertise progress in sex-ratio levels. But these data are often ambiguous or incomplete, as they are based on unreliable sources, with samples that are often too small to allow for significant interpretation. In fact, when more reliable data are made available, the emerging picture is only moderately encouraging, as no real improvement in SRB seems to be discernible.

Figure 7 displays the evolution of SRB as measured for Delhi, where the quality of civil registration is among the best in the country.¹⁷ Although these data, based on civil-registration records, are not yet perfect (as the erratic 1998 value seems to suggest), they probably do not demonstrate any clear downward trend since 2000, as the SRB remains above 120. When available for other Western or Northwestern regions, such as Gujarat, no clear improvement is discernible thus far. But these statistics nevertheless point to a stabilization of SRB values in these areas. It would be crucial to monitor SRB evaluation in less-affected areas, such as Orissa or Western Uttar Pradesh, where a rapid increase had already been observed before 2001.

Figure 7: Sex ratio at birth in Delhi, civil-registration data, 1991-2006



In fact, throughout this report we have mentioned our imperfect database, and to some extent, we are indeed groping in the dark regarding SRB trends. The last census, in 2001, managed to use data on the child population to send a dramatic picture of sex-ratio degradation in India, but our knowledge has barely improved since then. We are thus unable to monitor adequately the SRB in India since 2001, other than in a few places, as mentioned previously. At the same time, better birth registration has been encouraged from various sources, including for urban residents who often need birth certificates for school registration. Several municipalities and state statistical offices, such as that of Delhi, have improved their machinery in order to generate and disseminate more social and economic information on their constituencies. Civil registration is, in fact, a rather straightforward source when it comes to estimating SRB, but there still seems to be no coordinated effort to systematically collate and publish recent available data.

¹⁷ I would like to express my gratitude to Dr Patnaik of the Municipal Corporation of Delhi for his assistance.

There is no question that sex-ratio data from the 2001 census did provide strong materials for press campaigns and many other advocacy initiatives. These brought wide publicity to affected areas, which often contributed to the public mobilization necessary to eventually reverse trends. Publicity and state-sponsored statistical monitoring has indeed contributed in a significant way to practically banishing female infanticide from Tamil Nadu's countryside. Transparency in matters of demographic change greatly contributes to faster reaction from social and government institutions. In spite of current statistical limitations, the emergence of sex-ratio statistics in the public debate in many Indian states is bound to stay, and to enlarge the discussion, by providing stakeholders new materials with which to monitor policy initiatives and their outcomes.

5.4 Aggravation or Improvement in the Future

While the projection exercise conducted earlier in this paper provides a rather theoretical overview of things to come, it may be useful to show how some of the intervening factors are likely to influence the circumstances of sex selection in India. We will first consider two dimensions – what can be referred to as “intensification” and “diffusion” – and then examine some of the structural factors likely to influence the course of India's sex ratio in the future.

5.4.1 *Intensification*

“Intensification” refers to households practising more rigorous sex selection. This may in particular concern the first pregnancy, which so far we have seen to be weakly influenced by sex-selection strategies implemented by parents. However, a more elaborate discriminatory system may result from lower fertility, when a larger proportion of the population opts for a single child. In fact, if just a few parents were to start targeting the first birth, SRB could easily reach values beyond 130.

5.4.2 *Vertical diffusion*

A source of further deterioration of the sex-ratio situation could arise from the “diffusion” of discriminatory regions and social groups – a mechanism that could cause the situation to grow into real epidemic proportions. Diffusion processes can be distinguished as either “vertical” or “horizontal”. Vertical diffusion refers to the local spread of a practice from forerunner groups to other, previously unaffected groups. The potential of such a process is tremendous in the Indian context for several reasons. First, we have already noted that socio-economic status is positively associated with sex ratio, which means that the privileged sections of society follow a more discriminatory regime than do others. Secondly, we have many instances of demographic change spreading in a top-down fashion within local communities, as the upper classes (or castes, etc.) act initially as pioneers in the adoption of new attitudes and behaviours. Fertility decline has been a clear illustration of such top-down diffusion. Thirdly, the so-called “sanskritization” processes of social change, in which lower-status groups imitate the behaviour of the elite, are common in India. Lastly, the extent of the changes observed in Northwest India since 1991 clearly demonstrates that all communities and economic classes are now involved in this process, and not just specific privileged sections. Underprivileged groups, which had long refrained from any active discriminatory practices towards women, may thus start emulating higher-status groups.

5.4.3 *Horizontal diffusion*

What has been said previously can to a large extent be repeated about horizontal diffusion – i.e., the propagation of innovative behaviour towards new localities and areas. Demographic behaviour is, on the whole, extremely clustered in India, and examples abound of pockets or entire regions with specific social or demographic features (migration pockets, low- or high-fertility areas, etc.). In times of change, innovation tends to spill over adjacent areas, and the regular spatial distribution of sex ratio in India suggests precisely that modern discrimination has spread from core areas to surrounding zones. The immediate implication of this observation is that further sex-ratio degradation is likely to be influenced by the geographical position of localities. Already, regions close to Haryana and Punjab, such as Jammu, North Rajasthan, lower Himachal Pradesh or Western Uttar Pradesh, have recorded significant increases in sex ratio. This reinforces the feeling that the scope for geographical progression of imbalanced sex ratio is significant in India.

5.4.4 Structural changes, negative and positive

Many potential factors in the aggravation or improvement of the sex-ratio situation in the country also relate to structural change, such as the forceful economic and social development that has taken place at an accelerated pace since the 1990s. As we have seen, socio-economic status tends to be associated with more intense discriminatory practices, which means that economic development *per se* may be seen as a factor for further sex-ratio degradation. The same reasoning would also apply to the rapid progress in education, and to the trends towards increased urbanization and suburbanization in India.

Many of the briefly reviewed fundamentals of sex-selection behaviour point in the same direction: conditions are ripe for further rise in sex-ratio values in India. But there are other possible scenarios that are less pessimistic. The economic case of gender discrimination may in fact decrease over time, for a different set of reasons. First of all, norms of all type are not immutable in India, and many have been seen to change in the recent past. Some women have, for instance, recently insisted on lighting the pyre of a parent, a task traditionally reserved for sons. The growth of human capital among women in India may also, at some point, grant some of them increased autonomy and economic self-reliance, while undermining the foundations of a patriarchal system based on women's submission and exploitation. The joint family system at the basis of the patrilineal system is probably weakening, and improvements in inheritance legislations may undermine it even more. As mentioned before, new laws promulgated in India in recent years may prove to have a direct impact on both women's status and dowry in general. Furthermore, unexpected consequences, such as a possible shortage of brides, may eventually change several factors related to the relative value of girls, starting with dowry and, perhaps, a community's need to stop sex selection for its own sake.

There are also many aspects of government interventions that require closer examination. This is especially true for programmes that tend to correct some of the obvious economic bases of gender inequity through cash or other incentives. Increasing the "cost" of sex-selection (through repression and other steps) is obviously a strategy bound to yield results if implemented vigorously. But direct government intervention on the economic side of gender inequity may concern some of the issues reviewed here - the cost of raising a daughter, support for the aged population - and change the terms of this equation by making boys comparatively less "profitable".

5.5 Looking Forward: Possibilities and Needs

India finds itself today at a crossroad. On the one hand, the overall sex-ratio degradation in the country appears moderate in comparison to the experience of China or South Korea, where SRB has approached values as high as 120. India has also witnessed a real mobilization from civil-society organizations and government agencies, and the legal system has been strengthened to allow for stricter regulations over technology misuse and illegal abortions. But on the other hand, sex-ratio degradation has been concentrated in a few regions of India, and the possibility of wider diffusion to new states is very real. This appears especially worrying as the overall national context is characterized by rapid social and economic development and further fertility decline, factors that could exacerbate the demand for sex selection.

5.4.1 Comprehensive approach, two focuses

The strategy to fight sex selection is still an ambiguous mix of various and, at times, conflicting initiatives. At the moment, there is to be no unifying formula or slogan bringing together all efforts to combat the harmful effects of sex selection. A short message should be devised and directed towards the largest number of current and would-be users, as well as all providers and facilitators of sex selection. There are two main lines of argument against sex selection: one based on elementary gender-equity principles, while the other derives from the threat of future gender imbalances.

5.4.1.1 Fighting discrimination

The first option consists in fighting against gender violence or discrimination as expressed by sex selection. Other recent laws on gender-based violence may in fact reinforce the message, and contribute to changing mindsets and attitudes. The current increasing participation of women in processes of social and economic change, if sustained, could also undermine age-old images of women as dependent and home-centred. But combating gender discrimination remains challenging and

somewhat at odds with many other aspects of social life, in which gender discrimination is routinely practiced against girls and adult women, while their mobility is severely curtailed. Moreover, the message against illegal (and therefore unsafe) abortions needs to avoid contradicting the current efforts towards safer pre-natal care and legal abortion facilities. These are not easy tasks. But the idea that sex-selective abortions are a shameful discriminatory act towards girls seems to have left its mark on a broad cross-section of Indian society, and targeting offending groups or localities may be one way to capitalize on the existing Indian "moral economy" against the country's masculinization. There are many cultural environments within India where sex selection remains unthinkable, even in a context of fast social and economic progress.¹⁸

5.4.1.2 Publicize hardships being experienced

Another line of advocacy follows the more functional argument related to the implications of future demographic disequilibrium, such as increased gender-based violence. The public needs to realize exactly how individual decisions can generate a collective calamity. But it is fair to say that catastrophic predictions may not be convincing for people who today often believe they are witnessing a shortage of males, rather than a surplus. And, in general, parents' investments in their children are based on their own experiences, rather than on speculative considerations such as population forecasts. Therefore, there is probably an urgent need to document in greater detail and publicize more widely the hardships faced by the younger male generations in different parts of India, where past sex-ratio imbalances have already resulted in severe gender imbalances among young adults.

5.4.2 Prioritize sex selection now

Any mechanical transitional scenario, in which an excess masculinity of births corrects itself after a certain time span, seems overly optimistic. While there is no doubt that high SRBs are not demographically sustainable, families may not comprehend the full implications of their choices before the passage of several decades. In fact, the lag between skewed SRBs and their first tangible consequences on the marriage market and family structure is at least 25 years, during which time excess male births are going to significantly distort the age and sex pyramids. There is therefore no reason to be complacent about the current trends; the fight against pre-natal discrimination should be placed at the core of India's gender and demographic agenda.

¹⁸ An illustration may come from the fast-growing Chennai metropolis, where the sex ratio among the 84,156 registered births in 2004 was 105.4.

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7 Appendix: The Measurement of Sex Ratio

As this review makes intensive use of sex-ratio measurements, it may be useful to clarify a few of its related technical issues.

We use here the sex ratio computed as *males per 100 females*, following international usage; whereas sex ratio is usually computed in India in a reverse manner, as the number of women per 1000 men. The following table shows the corresponding values

Table 7: Sex ratio correspondences, F/M and M/F ratios

M/100F	F/1000M	F/1000M	M/100F
100.0	1000	1000	100.0
105.0	952	950	105.3
110.0	909	900	111.1
120.0	833	850	117.6
130.0	769	800	125.0
140.0	714	750	133.3
150.0	667	700	142.9

Sex ratio may be computed for an entire population (overall sex ratio) or for specific age groups. It is also computed for birth cohorts as sex ratio at birth (SRB). The overall sex ratio is influenced by so many different factors (such as sex differentials in net migration) that it is usually of limited use as an indicator of gender disparities.

In the absence of deliberate interference, SRB among all human populations is fluctuating around 104-106 male births per 100 female births, with 105-6 often used as the biological standard (Waldren, 1998). SRB values above 108, when measured on samples that are large enough (more than 10,000 observations), reveal active human intervention before or during pregnancies, altering the biological average.

After birth, the sex ratio declines gradually with age, for male mortality is systematically higher than is female mortality, except for high maternal mortality among young women. Depending on the mean life expectancy at birth, the sex ratio crosses the value of 100 among young or older adults, but the sex ratio is invariably below 100 among the elderly because of lower survival rates among old men. But in India, female mortality rates among children are often higher than observed elsewhere, pointing to the existence of excess infant or child mortality after birth. High maternal mortality rates among young adults tend also to leave a visible impact on mortality differentials by sex.

The impact of migration differentials also becomes significant among adults at the local or regional level, as men predominate in labour migrations. Hence, age-specific sex-ratio values, as indicators of gender discrimination, are preferably computed for the population below 15, reflecting only the impact of SRB and sex differentials in mortality among infants and children.