Introduction

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The examination of sex distribution in human society constitutes a rather technical, if not abstruse investigation better left to demographers. A reason for the relative indifference of social scientists for these specific gender issues lies mainly in the biological character of the discussion related to the sex-wise proportion of births and deaths that determine, to a large extent, variations in sex ratio.[1] For instance, disparities observed in sex ratio at birth across ethnic groups or periods described in the literature seem to have only indirect links with actual variations in social arrangements and institutions. As a result, the voluminous research derived on the determinants of human sex ratio–a large body of literature that has remained on the whole rather inconclusive–[2] has only marginally contributed to gender studies. This explains why historical or demographic research on sex ratio trends and differentials is rather limited, including for industrialized countries where availability and quality of the statistics is not a main source of concern.[3]

The situation of several Asian countries is, however, slightly different because of the ancient prevalence of a specific gender pattern of mortality, characterized by excess mortality among women at various age spans and resulting in higher sex ratios. The predominantly masculine character of the Indian population was thus singled out from the very first census held by the British in the early 1870s. Over the scores of pages, colonial statisticians debated in census reports the possible

[1] Sex ratio in this volume refers to *the number of males per 100 females* for both births and live population. We follow the international usage that tends to stress *male surplus*, although the more intuitive Indian practice to compute sex ratio in an inverse manner (as females per 1000 males) corresponds to the extent of observed *female deficits*.

[2] A telling example of this situation is the literature on the recent decline in sex ratio at birth observed in the USA and other industrialized countries. In spite of long series of robust and often detailed data, available analyses fail to clearly identify the demographic or biological determinants of the observable trends. See Grech (2003), Mathew and Hamilton (2004), Davis *et al.* (in press).

[3] See however the valiant attempt by Brian and Jaisson (forthcoming) to explore trends in sex ratio in an historical perspective.

causes for this obvious demographic anomaly, which many simply saw as the mere consequence of female underenumeration. For lack of alternative sources for comparison, the census figures were subject to a lot of scrutiny and controversy, but in the absence of reliable measurements of sex specific demographic indicators such as birth or death rates, the debate on the causes of these unusually high population sex ratios remained alive for decades. But at the same time, observers couldn't fail to relate the apparent male surplus to local specific customs observed in colonial India such as child marriage, early pregnancy, female infanticide, *sati* (immolation of a widow on her husband's funeral pyre), low status of the widows, and so on. Although adequate statistical data are much more recent for China, a large body of historical evidence confirms the widespread practice of female infanticide and resulting skewed sex ratio in East Asian societies such as Japan during the Tokugawa period (Caldwell and Caldwell, 2005).

The traditional interest for gender imbalances in Asia meant that census reports routinely computed and examined sex ratio distributions. Ever since the emergence of gender issues in the 1970s, a decrease in the overall sex ratio in countries like India in the recent decades has often been interpreted somewhat mechanically as a testimony of improving women's status. But looking back to the 1980s and 1990s, it may seem surprising in retrospect that rising sex ratios observed in Asia had not attracted more attention when they were first detected. Surprisingly, it took an economist to bring to the fore the fact that what appeared to many as a local demographic curiosity was in fact the most blatant symptom of the intensity of gender discrimination observed in Asian countries. When Amartya Sen wrote its initial piece in the *New York Review of Books* (Sen, 1990), rather few social scientists–even among demographers or feminist scholars–had taken notice of the ongoing magnitude of the female deficit in Asia. Sen offered ways to measure the impact of discrimination using widely available data derived from the recently conducted censuses, including the 1982 Chinese census.[4] Interpreting men's demographic preponderance as an offshoot of their higher survival rates, he pointed out that the Asian experience showed that economic development did not invariably reduce women's disadvantages in survival.

Today, the number of "missing women" has definitely not reduced ever since Sen attempted to measure it, and recent estimates still

[4] The 1982 census came, in China, after a long period of almost complete statistical opacity following the absence of censuses during the first part of the 20th Century and the dissimulation of the results from the previous census taken in the People's Republic in 1964. Sen's paper in 1990 was soon followed by a more detailed paper by Coale and Banister (1994).

point to an unexpected gap of no less than 86 millions between Asian males and females (Klasen and Wink, 2002). This gap is made of female babies that were never born and women who died earlier than they should have. Suffice to compare the well-known number of cumulated aids-related deaths in the world till today–which is estimated at 25 millions people by UNAIDS/WHO–to the number of missing women–estimated to be four times higher, at around 100 millions–to gauge the relative lack of interest that the female deficit has attracted. While there have been individual studies for several countries or regions, attempts to delve into the issues in a comparative approach appear to have been limited. Thereby, this volume happens to be among the first to tackle more systematically the situation in several Asian countries, stretching from the Caucasus to East Asia.

There are many factors that may account for this scholarly neglect. Examining the reasons for this delayed realization of the magnitude and implications of the female deficit in Asia would probably take the reader too far away from our current objectives. One major factor for this late appreciation stems in part from the unexpectedness of the progressive increase in juvenile sex ratio. The nearly complete absence of similar experiences in documented population history had indeed left social scientists without the kind of comparative insights that can be derived for many other facets of demographic change such as fertility decline or migration upsurge observed in various contexts. But it may also be worthwhile to examine at least two additional factors that have also contributed to this relative delay in interest and initiative for the changing gender equation in Asia, factors likely to still afflict demographic research on masculinization in the coming years. One such factor is probably more conceptual while the other is rather technical.

1. The abortion-discrimination nexus

One challenge when investigating rising sex ratios in Asia has been the understanding of the role of abortion and of its pernicious consequences when misused as an instrument to eliminate girls to be born–or "gender cleansing" as some have put it. Abortion has indeed become in many cultural settings a terribly efficient tool for an unprecedented sexual engineering of the population. The nexus between abortion and rise in sex ratio at birth was recognized rather late, probably for want of adequate statistics, as will be illustrated further below. But questioning the impact of abortion may also raise concern as no less than a quarter of all women in the world reside today in countries where abortion is mostly prohibited and yet many more live in devel-

oping countries where the safety and accessibility to abortion are limited.[5] The perverse impact of sex-selective abortions risks underplaying the magnitude and the urgency of the efforts to be accomplished to make abortions less dangerous for women.

On a broader plane, we may easily recognize why the abortion-agency nexus is a source of perplexity to many observers. Till the mid-1990s, higher sex ratios had been associated not to termination of pregnancy, but to higher infant and child mortality among girls. Fighting against the underlying social context was then made easier. Female infanticide can be an illustration and many national laws were already in place to combat a practice classified as homicide. These legislations reflected the larger consensus on the value of human life and the "atrocious" character of deliberate killing of baby girls. Similarly, excess mortality caused by neglect could also be taken care of by improving information, health infrastructure and postnatal care. In addition, what made this battle easier was that the women concerned tend to originate by and large from the lower classes of society such as the rural destitute or the less educated. That these subaltern groups often constitute the first target for social or demographic campaigns, which emanate on the contrary from more urban, privileged classes and family planning is a prime illustration of this tendency. As a result, fighting against excess mortality or female infanticide could easily be recast as a mission to educate "ignorant" masses left out from the benefits of social and economic modernization. Repressive legislation when feasible (as in the case of infanticide) could be applied on resisting women with little political repercussions as they all belong to dominated, underprivileged sections of society. Irrespective of whether this was the result of campaigning or of broader social change, the incidence of these practices has reduced over the years and they play today a minor part in sex ratio discrepancies.

In spite of some initial resistance,[6] it was gradually acknowledged that the spread of the ultrasound–by allowing parents to learn of the sex of the foetus–was responsible for the largest share of the rise in child sex ratio. The recognition of abortion as the chief factor behind this increase has altered the perspective for numerous, intertwined reasons that are related in no small measure to women's autonomy and agency. Abortion is indeed firstly seen as an emergency solution for

[5] It is estimated that more than three fourths of the abortions in South Asia and nearly two thirds of the abortions in South-East Asia are illegal. Abortion-related deaths account in this region for about 15% of all maternal deaths (Ganatra, 2006).

[6] Guillot (2002: 52-54) and Riley (2003: 130-134) describe the relative resistance offered to the abortion explanation by prominent demographers or government authorities in China and India in the early 1990s.

women to avoid unwanted births and is, to various extents, part of a larger supply of family planning methods in Asian countries like China or India where laws allowing induced abortions were passed earlier than in industrialized countries. But in many other countries such as Pakistan or the Philippines, rights to abort remain extremely restricted, making abortion an illegal and therefore highly unsafe practice. The truth is that abortion was never thought of initially as a tool to sort out foetuses according to their desirability. It is only when the new technology to detect the sex of the foetus became more popular from the 1970s that abortion could become an instrument to eliminate unwanted female births. But as abortion is a women's right and a crucial ingredient of State-sponsored family planning, its relation to widespread gender discrimination became highly contentious. Some observers, including avowed feminists or prominent demographers, insist that abortion rights should be granted to women irrespective of the intention behind its use and that governments have no business regulating its practice among women except for health reasons.[7] As prenatal sex selection is merely a symptom of pervasive discrimination against women, suppressing the symptom alone may also not be sufficient and a more relevant challenge would be to improve women's status. There is also a growing literature on the ethical aspect of sex selection, be it through in vitro fertilization or abortion (Goodkind, 1999; Dickens *et al.*, 2005). Moreover, it gradually emerged that sex-selective abortion as a discriminatory practice against girls was often more common among urban middle and upper classes that had both better education levels and socioeconomic status. For various reasons such as higher information or access to health infrastructure, the upper layers of society acted as forerunners of this new trend towards sex-selective fertility, which also involves a large nexus of urban professionals such as clinic owners and physicians. Sex selection appears therefore as a reasonable behaviour for couples facing (among other) cultural and economic constraints and it is very different from the "archaic behaviour" exemplified by infanticide or female neglect. It is therefore a much more politically sensitive issue to tackle sex-selective abortion among the middle and upper classes than to combat female infanticide and neglect among the rural poor.

The potential contradiction was undoubtedly a source for some of the initial perplexity when it appeared that abortion had turned also into an instrument to implement rigorous sex discrimination against girls. The issue of women's agency remains at the crux of the debate as

[7] Witness for instance the debate on "Should couples have the right to choose the sex of their children?" held during the IUSSP international conference held in Tours, France, July 18-23, 2005.

it was in no way foreseen that autonomous, empowered women would deliberately enforce through abortion sex planning against their own gender group. There is no better illustration of this discrepancy than in the writings of Amartya Sen himself, whose advocacy contributed so widely to making female deficit in Asia an international issue since the 1990s. Sen has indeed also contributed a much larger theoretical literature concerning women's agency and capabilities and their contribution to social development. To him, women's agency plays a major role on the well-being and freedom of women, but also of the rest of society through lower infant mortality or fertility. But the misuse of abortion does not square well with such an optimistic theory of women's agency and its benefits. There is an obvious difficulty to interpret within his framework the deliberate attempts by women to eliminate girls. This recently led Sen to try to extend his original concept of agency beyond the "immediate control over decisions" to a "fuller sense of agency [involving] the freedom to question established values and traditional priorities" (Sen, 2005: 240). The contradiction is compounded by the usually positive association observed between on the one hand female empowerment and economic status and on the other the practice of sex selection–i.e. the fact that women opting for sex-selective abortions tend to be better educated or from somewhat privileged groups. This association may also sound like a dangerous harbinger of further potential deterioration in sex ratio figures in rapidly modernizing Asian societies where women's education and economic status is improving.

This situation has generated some confusion on the status of sex-selective abortion and its impact. Some observers were simply loath at pinpointing sex-selective abortions as a cause for growing sex imbalances at young ages for fear of fuelling the anti-abortion discourse and impinging on hard-gained women's reproductive rights. Governments offering abortion as part of their family planning supply felt also uneasy to recognize this specific linkage. Many resisted the hypothesis that termination of pregnancy was behind the surge in sex ratio at birth, even if their arguments stemmed from deficiencies of the available statistical sources. It is also true that Sen's seminal paper did not mention abortion anywhere and put instead the blame on excess mortality among girls.[8] Some analysts had even initially posited, employing a mechanical demand and supply framework, that rarefying women would in the end get a better deal in society as their social value as would ultimately rise in inverse proportion of their numbers. Today, even as analysis has now progressed by using various indirect sources

[8] Sen made no mention of abortion either in the more scholarly piece published two years later (Sen, 1992). He "revisited" the issue in 2003 in the same journal to identify abortion as the main cause.

to estimate the contribution of induced abortion and other factors in sex ratio disequilibria, the fight against the worsening discrimination towards girls remain fraught with interferences of these questions.

2. Data failure

Another set of factors may also be held responsible for the relative slow response to the challenge of changing sex ratios in Asia. Demographers would have no difficulty in confessing that many problems emanate from the available population statistics and the shaky estimates derived thereof. This volume offers a few examples of incomplete sources based on samples or of missing data that have to be indirectly estimated. Several factors behind the rise in sex ratio such as infanticide or sex determination are outlawed and are therefore almost impossible to assess through surveys. The estimated numbers of pregnancy terminations are also as elsewhere missing or seriously deficient, even more so in countries where induced abortion is illegal.[9] But other aspects may in theory be easily measured and monitored: a prime illustration among them is the sex ratio at birth, which provides a theoretically perfect indicator of pre-birth gender manipulations, i.e. when not statistically biased by underregistered female births and deaths such as infanticide cases. In developed countries, available series of live births classified by sex allow a close scrutiny of yearly trends and geographical variations. As long as numbers are big enough, sex ratio at birth provides a reliable measurement of the impact of all biological and social mechanisms accounting for sex ratio variability from conception (primary sex ratio) to birth (secondary sex ratio): age or parity of the mother, spontaneous or induced abortion, still births, etc. But in Asia, civil registration data in many countries from Pakistan to Indonesia are simply not dependable enough as a source to estimate sex ratio at birth. In particular, no one today is in a position to use reliable estimates of annual variations in the sex ratio at birth for either China or India, the two countries that are responsible for the largest bulk of missing women today.

In this connection, it is probably worthwhile to point out that estimates from the United Nations Population Division have long suffered from a relative ignorance of variations in sex ratio at birth across populations. Whereas this source provides the most and probably only reliable dataset of recent demographic trends in the world, published figures did not reflect a very reliable picture of the sex gap in Asia as

[9] See for example the recent study by Sathar *et al.* (2007) that puts the estimated annual number in Pakistan at 890,000.

late as in 2005, when the Population Division published its 2004 revision. In this series, the sex ratio at birth in China was for instance estimated to be 110 for 2005-2010 while that of the 0-4 population was of 111. The turning point occurred when the latest 2006 revision finally corrected these two figures to respectively 115 and 116, values that are much closer to estimates derived from census and other sources.[10] As a result of these rectifications, the estimated sex ratio at birth for the entire planet for the same period has also recorded a significant increase from 105 to 107 following the 2006 revision.

There are many other measurement issues related to distorted sex ratios observed in Asia. As this volume illustrates, it is often deemed more expedient to use age distribution from national censuses than to rely on specific indicators such as sex ratio at birth or sex differentials in infant and child mortality. This strategy offers indeed many advantages. For one, the samples used derive from the census and are therefore almost exhaustive. They correspond usually to large populations for which random fluctuations are almost insignificant. This is definitely not the case with survey-based estimates such as DHS (demographic and health surveys) figures, which happen to be much more sensitive to sample fluctuations. Census data allow also for lower-level disaggregation to identify variations across smaller administrative units such as regions or cities. As variations in sex ratio values across geographical areas are almost universal in Asia, the census offers an efficient instrument to delineate them. Another valuable point is that this measurement, usually performed on children below 5, combines the impact of all discriminatory practices while being almost unaffected by other factors such as sex differentials in migration. Moreover, census figures tend to follow the same format and are therefore readily comparable across countries.

But the frequent reliance on census sources entails at the same time a large number of drawbacks, of which we can only briefly enumerate here the three major ones. First, censuses are conducted at best every ten years or so and their data do not allow close monitoring of ongoing trends. We will have to wait till 2010 and 2011 to see how regions in China or India have been affected by changes in sex ratio during the present decade. In some countries such as Afghanistan, Burma or Pakistan, recent census data are in fact simply not available. Secondly, census data are susceptible to quality issues such as age misstatement or under-enumeration. For instance, age misstatement is

[10] Data derived from the *World Population Prospects: The 2004 Revision* and *World Population Prospects: The 2006 Revision* published by the Population Division of the United Nations.

a feature common among populations with low education levels such as in several South Asian countries. As age misstatement and sex are often covariant–age heaping being more frequent for girls than for boys–, age distribution is rarely a perfect reflection of reality. Under-registration in China is also a specific cause for concern when using data from the official census.[11] Thirdly, the age distributions deduced from census statistics combine the effects of various discriminatory practices as mentioned before. This proves in turn to be a serious limitation for the understanding of the respective role of various factors for higher sex ratio such as infanticide, female neglect or sex-selective abortions and has probably contributed to the lingering undervaluation of the actual sex ratio of births. Another limitation of census data derives from the fact that they provide only aggregate data according to geographical divisions.[12] As a result, household characteristics (such as standard of living) or individual factors related to parents (such as level of instruction) that may account for discriminatory behaviour have to be indirectly estimated through statistical analysis.

3. Counting missing women

An additional illustration of our statistical difficulties pertains to the notion of the "missing women". Ever since Sen wrote about it, estimates of the number of missing females in the world provide the most graphic evidence of the relative shortage of women. These estimates are based on the comparison between the actual number of women observed during a census and that of "expected women".[13] The "expected" number is a figure derived from the age distribution of males and standard mortality patterns by age and sex by assuming that mortality patterns among women can be deduced from those observed among male, a by and large reasonable hypothesis even if slightly sensitive to the mortality patterns chosen. But computations rely on estimated mortality levels for men, which are themselves rather fragile in the absence of a reliable civil registration system providing robust age- and sex-specific death rates. Countries like India where such estimates are based on sample data (such as the Sample Registration System) are especially prone to minor estimate errors or inconsistencies

[11] See however the recent study by Goodkind (2004) according to which sex differential in child under-reporting during the 2000 census was negligible.
[12] India has however provided in 2001 the 0-6 population details for religious groups as well as scheduled castes and tribes.
[13] Klasen and Wink (2002) provide the best international estimates following this method. Cai and Lavely (2003) provide more refined estimates for girls in China. However, both methods ignore migration and include girls not born as "missing".

that may easily translate into millions of additional missing–or surplus–people. Another source of potential problems is that these computations are often not based on actual age distributions, but on stylized distributions derived from stable populations (Klasen and Wink, 2002). While this choice may be understandable to process a large number of countries, Asian specialists have reason to feel uncomfortable when this method is applied to China and India, which are together supposed to account for about 80% of all missing women in the world. Both countries have specific age distributions that do not follow any longer the pattern of "stable populations" because of fertility decline and they would probably require individual demographic analysis.

There are of course many other hypotheses on which the expected number of women is based. One such hypothesis is the assumed sex ratio at birth, which has been shown to vary across countries around the usual 105-106 range and for which robust estimates in countries like China or India are plainly missing. Local differentials in sex ratio value would again result in significant variations in sex ratio all across the age pyramid. Oster (2005) has even recently claimed that large-scale biological variations related to hepatitis B account for a significant part of missing females in China and other Asian countries. In this view, the number of "missing women" due to discrimination could be largely exaggerated. The ultimate truth is that very few data are available today on sex ratio at birth in Asia to refute such a proposition, which most demographers have otherwise found highly speculative if not somewhat misleading (Das Gupta, 2006).

In addition to such misestimation of sex ratio at birth and death, other estimation issues mar the procedures followed to assess the potential national numbers of missing females in Asia. One additional drawback relates to the effects of international migrations, which are not factored in for want of proper data. But China and India provide today the largest number of international out-migrants in the world. Following recent estimates by the United Nations of international migration in 2006, the two countries taken together are losing 670,000 people a year, totalling 6.7 millions in a decade.[14] We have reasons to believe that omission of this factor is a further source of uncertainty as males may tend to preponderate in most international migration flows such as temporary Indian labour working in Gulf countries. As the number of "expected women" is computed from that of observed men, the absence from census figures of a predominantly male migrant population may mechanically lower down the number of expected

[14] The actual number of migrants born in China or India but residing abroad is not known, nor is its sex composition.

women and may in turn result in understating the extent of the gender bias by underestimating the number of missing women.

As a conclusion to this section, we may also stress that the very concept of "missing women" may also lose some of its validity over the coming years. As long as excess female mortality was the only instrument of discrimination, high sex ratios did reflect the fact that thousands of women had died too early and were indeed "missing" from demographic accounts. Had mortality rates among women in comparison to that of men been at the level found elsewhere, the censuses should have recorded millions more women. But issues get more complicated when sex-selective abortion interferes on the sex ratio at birth. So-called "missing girls" in Asia are nowadays, to a significant extent, girls that weren't born in the first place or, more precisely, children who weren't born of the expected sex. It is no more appropriate to label all of them as "missing" as we will illustrate with a simple simulation below.

Let's suppose that a census enumerates 104 boys as against 86 girls in a region in Asia. This corresponds to a total child population of 190 with a rather high, albeit not uncommon sex ratio of 121. A more likely juvenile ratio would be around 104 in the absence of gender discrimination. Applying such a sex ratio of 104 to the boy population, we would expect to find 100 girls instead, implying that 14 girls are missing. But this would also result in a child population larger by 14 girls. However this is probably an inappropriate assumption as we should not expect to have *more births* in the absence of pre-birth sex selection: to a large extent, the observed surplus of boys stems from pregnancies that followed an abortion and the overall number of children should actually remain rather similar, whatever the sex composition.[15] In the absence of gender discrimination, some female foetuses would have resulted in more baby girls, but also in fewer boys. Of the 104 boys in our imaginary sample, imagine 7 had been actually born girls yielding now a male child population of 97 (=104-7) and a female population of 93 (=86 +7). The resulting sex ratio is again of 104 and appears perfectly plausible. But the real number of "missing girls" is now only of 7, a value twice smaller than the apparent estimate derived earlier from the sole male population. Compared to estimates of missing women for older age groups, the estimation for the child population requires a different approach as abnormally high sex ratio at young ages implies not only a deficit of girls, but also a surplus of boys (Attané, 2006).

[15] More frequent abortions may in fact slightly lower down the total number of births as women may become less fertile after abortion for a variety of reasons (sterility, age, widowhood, changing circumstances, etc.). We ignored this factor in our simulation.

In Asian countries, excess mortality among girls does still take a heavy toll on the child population: this results in a large number of missing women that can be estimated from the number of observed males using several hypotheses based on model life tables or on concrete experience. But the impact of recent abnormal sex ratio at birth is of a distinct variety as it results not only in a lower number of female births due to induced abortions, but also in an inverse surplus number of male births resulting from additional pregnancies among women who had just aborted a female foetus. Consequently, the high level of sex ratio at birth is both due to missing girls and surplus boys. Since the higher sex ratio at birth has now been observed for at least twenty years, its impact on the age pyramid has already spread to older age groups and will continue to do so as cohorts grow older. Talking of "missing women" to account for distortions caused by abortions may be in this case slightly misleading as these women were never born in the first place.

We could easily underscore other data problems and measurement issues that plague the study of Asia's demographic masculinization. On the whole, this comes down to the fact that to be properly investigated such a new phenomenon calls for statistics, tools and concepts that are still somewhat inadequate or undeveloped. But after bringing together in Singapore, during our initial Conference in 2005, scholars with various experiences and interests on the current female deficit in Asia, we realized that the field had gradually matured by combining a large gamut of approaches. Although demographers remain to some extent at the forefront of the research being conducted today, the tools to examine the various aspects of masculinization and its impact borrow from methods and concepts from a variety of disciplines. As this book demonstrates, methods proceed from classical demographic analysis to econometric models, spatial analysis and field-based qualitative or quantitative surveys. Several major dimensions do, however, emerge and have been used to structure this book.

4. Presentation of the volume

The volume is divided into four parts that bring together essays of various contents and methodologies. Part 1 offers exhaustive descriptions of recent trends in female discriminations in four Asian countries and regions, each of them being at a specific stage in the masculinization process. This preliminary part responds to the need for a comparative analysis exploring both the historical and geographical variations observed in various regional settings from West to East Asia. In fact, several valuable papers originally presented to the conference and

covering other regions such as Indonesia or Vietnam could not be included in this volume for lack of space.

The first two chapters in this part describe trends and differentials in sex imbalance in the two Asian demographic giants, China and India where the masculinization process is already quite advanced. The two following chapters focus on two less typical but interesting cases, i.e. the Caucasus Region and Singapore. In chapter 1.1 entitled "Imbalanced Sex Ratio at Birth and Female Child Survival in China: Issues and Prospects", Li Shuzhuo, Wei Yan, Jiang Quanbao and Marcus W. Feldman analyse levels, trends, and regional variations in the sex ratio at birth and excess girl child mortality in China. They discuss proximate and indirect causes of the deteriorating survival environment for girls as well as some of its demographic and social implications. They also review the policy initiatives by the Chinese authorities to improve the situation of girls. A similar descriptive approach is followed by P. Arokiasamy in chapter 1.2: "Sex ratio at birth and excess female child mortality in India: Trends, Differential and Regional Patterns". The author provides a detailed overview of the current situation in India by combining both Census data and survey estimates from the National Family and Health Survey (NFHS). He investigates some of the causes and consequences of sex imbalance at young ages in India, taking into account in particular the wide regional variations in son preference and the changing patterns of female discrimination.

While discriminatory practices have intensified over the past decades in Asia's two most populous countries, they have also spread at the same time to other areas and social groups previously unaffected. This is the case for the three Caucasian countries–Azerbaijan, Georgia and Armenia–studied by France Meslé, Jacques Vallin and Irina Badurashvili in the chapter 1.3 "A sharp increase in sex ratio at birth in the Caucasus. Why? How?". The authors first document the deteriorating sex imbalance at birth in these countries that became apparent in the mid-1990s in these three countries. While these three countries are rather different in terms of ethnicity and religious traditions, their demographic regime do share many common features, including the high abortion rates characteristic of this region. It is worth stressing that neighbouring nations such as Iran or Russia seem unaffected by rising sex ratios at birth as the authors' detailed geographic analysis demonstrates. They also show that in Armenia and Georgia, most of the overall masculinization effect relates to the third birth, for which sex selection appears to be especially acute. In the following chapter 1.4–"Son Preference, Female Demographic Deficit and Singapore's Fertility Transition"–, Elspeth Graham examines whether the secular fertility decline in Singapore has been accompanied by an intensifica-

tion of active discrimination against daughters. Singapore is a particularly appropriate setting for such a study for two reasons, its statistical apparatus and its ethnic composition. Singapore's data are in fact extremely reliable as the availability of annual series of vital statistics show. While being mostly of Chinese ancestry, its population also includes large Malay and Indian minorities. Her analysis shows however that while Singapore meets two main preconditions for daughter discrimination–rapid fertility decline and strong son-preference–, the sex ratio at birth has varied far less over time than in countries such as China, India or South Korea. The author concludes that even if Singapore has not experienced a rise in sex ratio similar to that observed elsewhere, the question of deliberate daughter discrimination remains partly unresolved.

Sex imbalance varies widely across subpopulations within a country or between provinces and social groups and these differentials often point to the social, economic or cultural factors behind the process of gender discrimination. The fact that some groups–characterized by specific religious, socioeconomic or ethnic features–have clearly been at the forefront of rising sex ratios allows a better understanding of the factors behind the growing discrimination against girls. However, very few comprehensive analyses are available to understand the masculinization process and its determinants. Chapters brought together in part 2 of this book investigate more systematically the social, economic or cultural factors likely to influence female discrimination. They attempt to go beyond available data in their usual format to submit them to more intensive cartographic or statistical analysis.

In the first chapter included in this part–"The geography of deteriorating child sex ratio in China and India"–, Christophe Z Guilmoto and Isabelle Attané provide first a comparative analysis of fertility change and policies in both countries. They then examine the geographies of sex ratio differentials, which happen to be rather dissimilar in China and India, by drawing comparative maps of child sex ratio. The chapter ends with a discussion related to the nature of the mechanisms at work in the masculinization processes observed in both countries and also offers clues on some of the possible factors accounting for the spatial patterning of sex ratio observed in China and India. In the next chapter 2.2–"Factors influencing the use of prenatal diagnosis techniques and sex ratio at birth in India"–, P N Mari Bhat and Francis Zavier have chosen to focus on the use–and misuse–of prenatal diagnostic techniques. As it is well known that sex-selective abortions only follow sex determination through ultrasound or other techniques, their study offers a detailed analysis of a key "intervening variable" of sex

ratio at birth. Thanks to a rich logit analysis of the use of prenatal diagnostic technologies, they are able to identify several cultural, social, societal, economic and health characteristics closely associated with abnormal sex ratios in India.

Figure 1 Research locations in South Asia studied in this volume

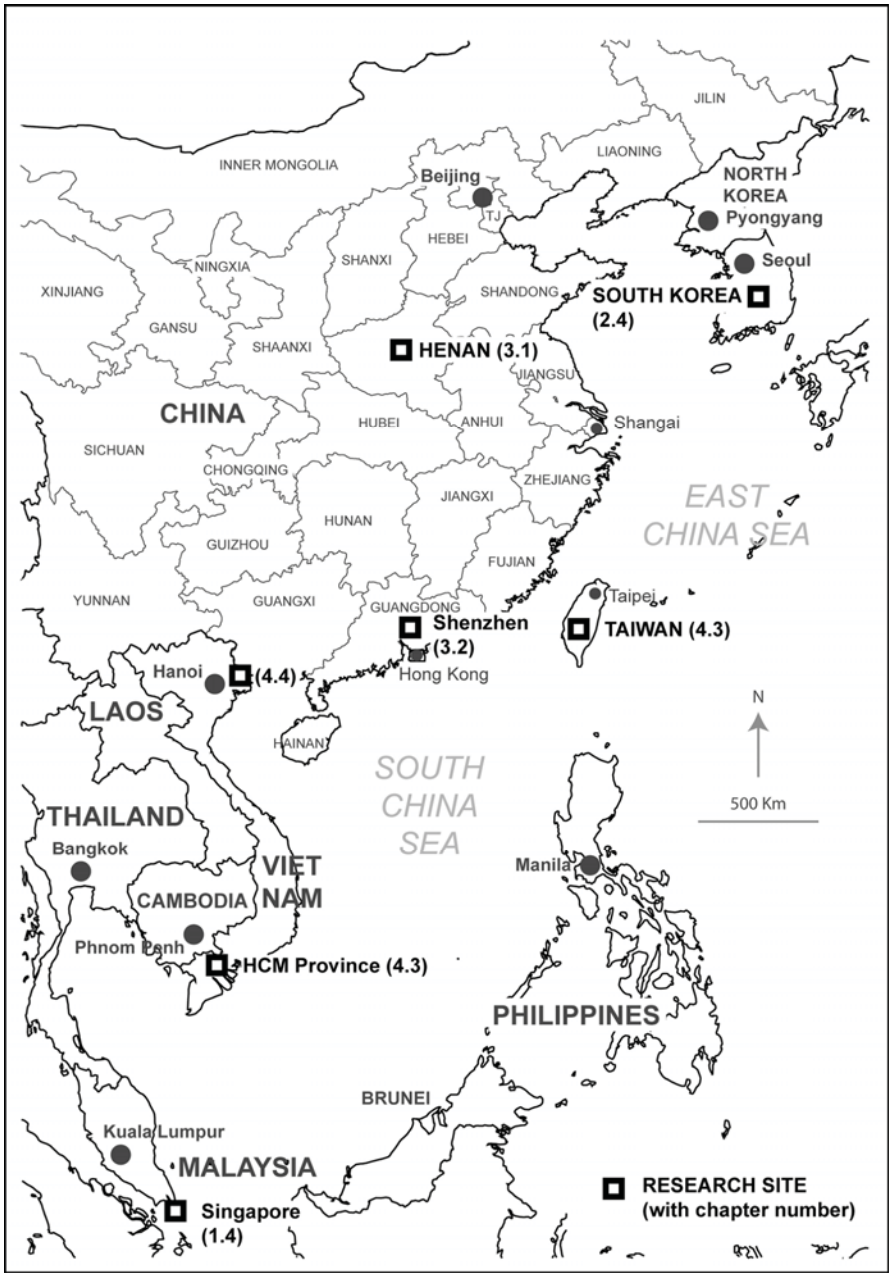
Chapter 2.3 entitled "Decreases in Male and Female Mortality and Missing Women in Bangladesh. The case of Matlab" by Alam Nurul, Jeroen Van Ginneken and Alinda Bosch examines the recent trends in gender gap in infant and child mortality in the rural Matlab region in Bangladesh. This region enjoys an exceptionally good demographic

surveillance system from where some of the first reliable data on gender discrimination among children emerged in the 1980s. The authors' objective is to examine whether postnatal discrimination against girls has shifted over time and to identify the behavioural mechanisms involved in these changes. Matlab data demonstrate in fact that the female-to-male disadvantages in survival have considerably reduced in Bangladesh over the past twenty-five years while sex ratio at birth does not appear to have increased during the same period. In chapter 2.4– "Does Religion Matter? A Study of Regional Variations in Sex Ratio at Birth in Korea"–, Kim Doo-Sub and Song Yoo-Jean come back to South Korea where vital statistics clearly indicate an important rise in sex ratio at birth starting from the mid 1980s. Using both spatial and statistical techniques, their chapter explores the specific effects of religious composition as well as of residential and socioeconomic factors on the regional level of sex ratio at birth. Beyond demographic and socioeconomic correlates of high sex ratio, the authors are able to demonstrate for South Korea a significant relationship between religious affiliation and discriminatory practices through abortion, which should also probably be worth investigating in other national settings.

Most of the research conducted by demographers tends to approach female discrimination at an aggregate level, using either census or quantitative survey data. While indispensable to establish the statistical basis of rising sex ratio values, these studies tend to miss the contextual details that locally determinate gender arrangements and discriminatory strategies. In part 3 of the book, contributors follow a more anthropological approach to investigate local conditions and determinants of female discrimination, combining at times both quantitative and qualitative data. Studies included in this part are based on original data collected during intensive fieldworks and offer the kind of sociological details that allow a better understanding of the actual processes and issues behind gender discrimination.

The location of the various field sites on which these chapters (as well as other chapters from this volume) are based is shown on two different maps, which also depict the regional boundaries of Chinese Provinces and Indian states. Figure 1 is the map of the South Asian regions and Figure 2, stretching from China and Korea to the North to Singapore to the South, covers East Asia.

Figure 2 Research locations in East Asia studied in this volume



In chapter 3.1 entitled "Missing Girls, Land and Population Controls in Rural China", Laurel Bossen investigates changes in family

planning and discriminatory practices toward girls in a rural village in Henan. She analyzes these transformations in relation to property rights and the ways households attempt to manage their land and labour resources. To do that, the author examines in particular the significance of lineage revival and its gender implications. In chapter 3.2–"Social networks and son preference among rural-urban migrants in China: A study in Shenzhen"–, Wu Haixia, Marcus W. Feldman, Jin Xiaoyi and Li Shuzhuo make use of sample data derived from a survey of temporary migrants conducted in 2005 in Shenzhen. Their objective is to study the attitudes and behaviours related to son preference among rural-urban migrants based on social network theory. The authors show that while migrants exhibit strong son preference, social network, migration history and individual factors have a real impact on the attitudes related to son preference.

Chapter 3.3 contributed by Sutapa Agrawal and Sayeed Unisa is entitled "Discrimination from Conception to Childhood: A Study of Girl Child in Rural Haryana, India". Here, the authors combine qualitative and quantitative data colleted in villages located in Jind district in Haryana, an area in India where child sex ratio is at its highest. They attempt to explore both passive (i.e. excess female deaths) and active (i.e. sex-selective abortions) female elimination processes and their correlates. In chapter 3.4–"Traditions in transformation: Gender bias among the Nayars of Kerala, India"–, Sudha S., Khanna S., Rajan Irudaya S. and Srivastava Roma analyse data collected during field surveys conducted in central Kerala, a region that has been so far little affected by the masculinization trends observed elsewhere in India. The authors, however, describe the emergence of gender discrimination at young ages among the formerly matrilineal Nayar caste in an ethnographic perspective. In chapter 3.5 entitled "Vulnerable Daughters in a Modernizing Society: From 'Son Preference' to 'Daughter Discrimination' in Rural South India", Sekher T. V. and Neelambar Hatti provide yet another field-based study of a regional setting in India. Here, the authors confront two study villages located in Karnataka and Tamil Nadu, including one in the Salem area notorious for widespread cases of female infanticide. They relate discriminatory practices to the economic and sociological profile of the two rural settings. They document in particular the role of dowry, which has recently emerged in rural South India as a new burden to parents of girls.

Part 4 covers the policy responses to female deficit and some of its potential demographic consequences. More papers were originally contributed to the conference than could be accommodated in this volume, including two presentations focusing on India's experience.

This is no doubt an emerging subfield as rising sex ratios raise new questions in terms of their potential consequences for society as a whole and the ways governments can intervene to correct these trends. At the same time, this represents mostly uncharted territory for policy makers or social scientists owing to the totally new character of this demographic turn.

In chapter 4.1, "Interventions to Balance Sex Ratio at Birth in Rural China", Zheng Zhenzhen first investigates three key determinants of gender discrimination in China, i.e. social and cultural environment, economic development and family needs and individual opinions. She also enumerates and discusses the interventions implemented in China to balance sex ratio at birth. It is, however, still too early to assess the exact impact of these campaigns on discriminatory practices towards girls. The three following chapters are specifically devoted to an expected demographic and social consequence of the rising female deficit, i.e. the marriage squeeze likely to affect young male adults and its links to marriage migration as a response. In chapter 4.2–entitled "Son Preference and the Marriage Squeeze in China: An Integrated Analysis of the First Marriage and Remarriage Market"–, Jiang Quanbao, Isabelle Attané, Li Shuzhuo and Marcus W. Feldman use population forecasts to estimate the potential excess number of Chinese men compared to that of women until 2050. Their analysis is based on various indicators measuring the extent of the marriage squeeze on males of marriageable age. In chapter 4.3–"Marriage migration between Vietnam and Taiwan: A view from Vietnam"–, Graeme Hugo and Nguyen Thi Hong Xoan use survey data and interviews to analyse various socioeconomic characteristics of Vietnamese women who migrated to Taiwan to marry. The chapter describes in particular their experience in Taiwan and its largely positive impact in terms of economic status. As is well-known, "foreign brides" account now for a sizeable share of marriages registered in Taiwan. The last chapter 4.4 has been written by Le Bach Duong, Danièle Bélanger and Khuat Thu Hong: "Transnational Migration, Marriage and Trafficking at the China-Vietnam border". It examines a specific region along an international boundary that has of late experienced intense female mobility. The study uses field-based data to describe some of the consequences of women shortage in China on cross-border migration and trafficking of Vietnamese women. Data collected in 2005 from Vietnamese women who have migrated or have been trafficked to China provide in-depth information on the circumstances of these migrations. In addition, the study describes the traffickers' strategies to recruit, transport as well as sell Vietnamese women as wives or sex workers in

China and discusses the way migration and trafficking are intertwined and to some extent difficult to disentangle conceptually.

These chapters cover a wide array of territories and issues and should help to map the priority issues for future research on masculinization processes in Asia. Obviously, lack of adequate data hampers any progress in both the understanding and the monitoring of current trends. But chapters included in this volume bring together a large amount of quantitative and qualitative data that should inspire scholars. What is probably still lacking is a unified theory accounting for the almost simultaneous rejection of girls expressed by Asian families in countries that otherwise have experienced rather different political and economic conditions over the last two decades. Without such a conceptual frame, it is difficult to foresee the demographic and sociological ramifications of rising sex ratios on Asian societies. With China and India accounting together for more than a third of the world's population, the consequences of this changing sex composition are likely to be significant and probably felt beyond their own borders.

At the same time, there is a real ignorance about the potential impact of the current demographic trends, leading observers to draw all kinds of conclusions. These range from rather optimistic views of future self-regulatory mechanisms bound to correct this imbalance to the benefit of women to more doomsday scenarios with hordes of unmarried males causing disorder in Asia. The more optimistic hypothesis posits that the rising proportion of boys in the child populations is obviously unsustainable in the long run: changing sex composition should therefore automatically lead parents to reverse their proson strategy once the deficit of women hits young male adults. A far less sanguine theory envisions somewhat dramatic consequences of the demographic masculinization on the very fabric of Asian societies torn by potentially rising conflict and violence (Hudson, den Boer, 2004). As the world has apparently never experienced any such type of crisis, there is precious little in terms of social and historical literature or documentation that may help to comprehend the ultimate consequences of this singular demographic development while historical experience is missing. We hope that bringing together these studies will help to put the growing Asian female deficit higher on the international population agenda.

References

ATTANÉ Isabelle, 2006, "The Demographic Impact of a Female Deficit in China, 2000-2050", *Population and Development Review*, vol. 32, n° 4, 755–770.

BRIAN Eric, JAISSON Marie, forthcoming, The Descent of Human Sex Ratio at Birth. A Dialogue between Mathematics, Biology and Sociology, Dordrecht, Springer Verlag.

CAI Yong, LAVELY William, 2003, "China's Missing Girls: Numerical Estimates and Effects on Population Growth", *The China Review*, 3, 2, 13–29.

CALDWELL Bruce K., CALDWELL John C., 2005, "Family Size Control by Infanticide in the Great Agrarian Societies of Asia", *Journal of Comparative Family Studies*, 36, 193–253.

COALE Ansley, BANISTER Judith, 1994, "Five Decades of Missing Females in China," *Demography* 31, 3, 459-86

DAS GUPTA Monica, 2006, "Cultural versus biological factors in explaining Asia's 'missing women': Response to Oster", *Population and Development Review*, 32, 2, 328–332.

DAVIS Devra Lee *et al.*, in press, "Declines in Sex Ratio at Birth and Fetal Deaths in Japan and U.S. Whites, but not in African Americans", *Environmental Health Perspectives,* accessed online, 9 April 2007.

DICKENS Bernard M., SEROUR Gamal I., COOK R.J., QIU Renzong, 2005, "Sex selection: Treating different cases differently", *International Journal of Gynecology & Obstetrics*, 90, 2, August, 171-177.

GANATRA Bela, 2006, "Unsafe abortion in South and South-East Asia: a review of the evidence", *in* WARRINER Ina K., SHAH Iqbal H. (Eds), *Preventing Unsafe abortion and its Consequences: Priorities for Research and Action*, New York: Guttmacher Institute, 151-186.

GOODKIND Daniel. 1999. "Should Prenatal Sex Selection be Restricted?: Ethical Questions and Their Implications for Research and Policy", *Population Studies*, 53 (1), 49-61.

GOODKIND Daniel, 2004. "China's missing children: The 2000 census underreporting surprise", *Population Studies*, 58, 3, 281-295.

GRECH V. *et al.*, 2003. "Secular trends in sex ratios at birth in North America and Europe over the second half of the 20th century", *Journal of Epidemiology and Community Health,* 57: 612-615

GUILLOT M., 2002, "The Dynamics of the Population Sex Ratio in India, 1971-96", *Population Studies*, 56(1), 56-63.

HUDSON Valerie, DEN BOER Andrea M., 2004, *Bare branches: security implications of Asia's surplus male population*, Cambridge, Mass.; London : MIT Press, 329 p.

KLASEN S., WINK C., 2002, "A turning-point in gender bias in mortality? An update on the number of missing women", *Population and Development Review*, 28, 285-312.

MATHEWS, T.J. and HAMILTON, Brady E., 2005. Trend Analysis of the Sex Ratio at Birth in the United States, *National Vital Statistics Reports*, 53, 20, 18 p.

OSTER Emily, 2005, "Hepatitis B and the Case of the Missing Women", *Journal of Political Economy*, 113(6), 1163-1216.

Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2004 Revision* and *World Population Prospects: The 2006 Revision*.

RILEY Nancy E., MCCARTHY James, 2003, *Demography in the Age of the Postmodern*, Cambridge: Cambridge University Press, 212 p.

SATHAR Zeba A., SINGH Susheela, FIKREE Faryal F., 2007, "Estimating the Incidence of Abortion in Pakistan", *Studies in Family Planning*, 38, 1, 11-22.

SEN Amartya, 1990. "More Than 100 Million Women Are Missing", *New York Review of Books*, 37, 20, December 20, 61-66.

SEN Amartya, 1992, "Missing Women," *British Medical Journal*, 304, 28-46.

SEN Amartya, 2003, "Missing women–revisited", *British Medical Journal*, 327, 1297-98.

SEN Amartya, 2005, The Argumentative Indian: Writings in Indian History, Culture and Identity, Farrar, Straus and Giroux, New York, 409 p.

Attané I., Guilmoto Christophe.

Introduction.

In : Attané I. (ed.), Guilmoto Christophe (ed.). Watering the neighbour's garden : the growing demographic female deficit in Asia.

Paris (FRA), Nogent-sur-Marne : CICRED, CEPED, 2007, p. 1-22.

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