Son preference and prenatal sex selection: the impact of fertility decline on gender imbalances

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Background

Prenatal sex-selection against females (PNSSaF) has lead to more than 100 millions missing girls, mainly in Asia. Well documented in India (e.g. Das Gupta and Bhat, 1997) and China (e.g. Zeng et al. 1993), more recent research in Vietnam (Guilmoto et al., 2009) and the Caucasus (Mesle et al., 2007) reveals that PNSSaF is geographically more widespread than previously thought (UNFPA, 2012). In recent years, research on the sex-ratio at birth (SRB) has provided accumulated evidence of PNSSaF among Asian Diasporas in Western Countries, notably in the UK (Dubuc and Coleman, 2007, Dubuc, 2009); in the USA and Canada (e.g. Abreyvaya, 2009; Almond and Edlund, 2008, Almond et al. 2009). PNSSaF appears to add, or to some extend substitute other forms of gender discrimination, including girl neglect, abandonment and infanticide (Das Gupta, M. Bhat, 1997). Prenatal sex-selection against female (PNSSaF) is seen as a mean to increase the chance of having a son, especially when controlling for family size.

The conditions of prenatal sex-selection against females

1) **son-preference and its underlying factors**

   In traditional patriarchal societies such as India and China, a son is viewed as paramount to fulfil exclusively male family roles, including patrilinear inheritance practices and providing economic support and care to parents in old age – whereas a daughter is viewed as an economic burden for her parents. Bearing a son is the primary role of the young wife and a way to raise her status in her husband's family household (e.g. Das Gupta *et al*., 2003; Unnithan-Kumar, 2009). Women often resort to PNSSaF to escape abuse and multiple pregnancies, and to avoid having unwanted girls who are then at risk of being neglected (Goodkind, 1996). This strategy to improve their well-being and potentially that of their (wanted) children is, however, seen as a route to perpetuating female discrimination and the devaluation of girls.

   These factors underline the complexity of the ethical implications of PNSS as well as the political challenges.

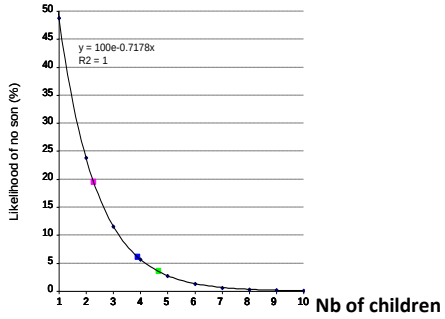
2) The development/availability of prenatal sex-determination techniques (PNSDT)

Until now, prenatal sex selection is thought to have been mainly achieved through sex determination of the foetus/embryo, followed by sex selective abortion. Ultrasound technology is the most commonly used method and now allow relatively accurate determination of the sex of the foetus at 12 weeks of pregnancy (20 weeks in 1980).

New medical technologies allow for new methods of prenatal sex-selection (for instance, pre-implantation genetic diagnosis) for which international regulations varies.

3) Fertility decline: factor of pressure

PNSSaF has developed in a context of fertility decline in India, even more pronounced in China and South Korea. The desire to have at least one son in the context of decreasing family sizes thus increases the pressure on parents to recourse to PNSSaF. Testimonials of women who have practiced female-selective abortion after having had only girls previously illustrate peer pressure on women to undergo PNSSaF. A decline in the fertility rate could therefore contribute positively to prenatal sex-selection when associated with son-preference. However, the impact of a decline in fertility rates to recourse to PNSSaF is unclear and no simple relationship may exist.



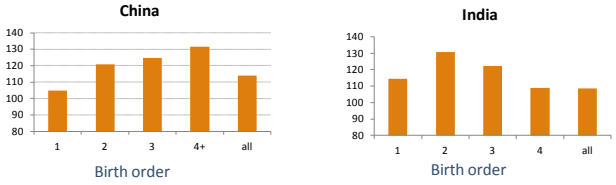
Probability curve for having no son depending on the number of children.

Source: Dubuc, 2009

Sex selection is most prevalent at higher birth orders

A number of studies have found that sex-selection against female is particularly practiced at higher mothers' parity when only girls were previously born, suggesting recourse to PNSSaF to ensure to

have at least one son. Therefore, in the context of fertility decline, the propensity of parents to revert to PNSSaF in order to ensure a male offspring may rise, increasing gender bias.



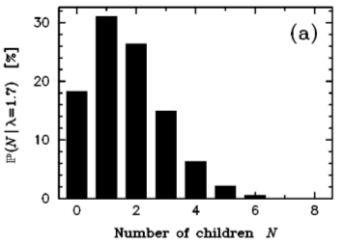
Sex-ratio at birth (SRB) , by birth order.
(boys per 100 girls)
China: 1989. Sources: table 1 in Zeng *et al.* 1993
India: 1998-99 Sources: NFHS-2 data, table 7 in Arnold *et al.* 2002

Results

Probabilistic modelling to investigate the non-trivial relationships between number of children, birth order and SRB

In order to explore the question of if and how a decline of the fertility among a population may impact on the sex ratio of birth we built a simple probabilistic model. Within a particular population, characterised by a specific total fertility (ie average number of children per family), in which all prospective or actual parents have an innate desire to have at least one son (but not necessarily more than one) and accordingly would revert to sex selection in dependence of the sex of the previous sibling. For any given average number of children in the population we assumed a Poisson distribution of the number of children per family in order to calculate the fraction of couples that would need to sex select since they have not had a son previously by chance.

We assume a Poisson distribution of the number of children per family (N)



Theoretical distribution of the number of children (N),
the average number of children in the population been 1.7.

How the birth order intervening threshold impact on the distortion of the sex-ratio at birth depending on the average number of children in the population is investigated. The parents' intervening ratio is also investigated under various scenarios.

Results demonstrate that when fertility is low, recourse to PNSSaF by a small proportion of parent suffice to significantly distort the sex-ratio at birth. Results of the theoretical model are compared to empirical findings in India and among the Indian Diaspora in the UK.

We propose a model to quantify the impact of family size and fertility reduction in distorting the sex-ratio at birth, taking into account the birth order at which parents would intervene to ensure a son and estimating the proportion of couples seeking intervention under various scenarios. We modelled the interdependencies of these demographic factors quantitatively to elucidate their relative and conditioned contributions influencing sex-selection against females. Strikingly while the proportion of couples reverting to sex selection against females may decrease, the sex ratio at birth imbalances may still increase in the context of smaller family sizes.

We discuss the non-trivial interdependencies between these parameters and their implications for understanding the past and likely future trends of prenatal sex-selection against females in India and China.

References (selected)

Abrevaya J.(2009) 'Are There Missing Girls in the United States? Evidence from Birth Data', *American Economic Journal 1:2: 1–34*.;

Almond D. and L. Edlund (2008) 'Son-biased sex ratios in the 2000 United States Census', *PNAS*, 105:15.

Arnold F, S. Kishor and T.K. Roy (2002) 'Sex-selective abortion in India' *Population and Development Review* 28(4):759-785

Das Gupta, M. and P.N.Mari Bhat (1997) 'Fertility decline and increased manifestation of sex bias in India', *Population Studies 51(3): 307-316.*

Dubuc, S. and Coleman D. (2007) 'An increase in the sex ratio of births to India-born mothers in England and Wales: evidence for sex-selective abortion.', *Population and Development Review*, 32:2, 328-332.

Dubuc S. (2009) 'Demographic manifestations of son-preference in the UK'. Paper at *PAA conference*: Session: Women, Power & reproductive behaviour, USA, Detroit (and other references therein).

UNFPA (2012) Sex imbalances at birth: current trends, consequences and policy. UN Report, August 20119

Zeng Yi et al. (1993) 'Causes and implications of the recent increase in the reported sex-ratio at birth in China' *Population and Development Review* 28(2):283-302