

Why should prenatal sex selection ultimately decline?

CZ Guilmoto CPED/IRD, New Delhi

Laura Rahm, Universitat de Barcelona, laurarahm@ub.edu

This paper reviews the latest evidence on trends in the sex ratio at birth and their potential factors.

We will first show that downward trends of birth masculinity are now observed or anticipated in almost all countries affected by sex imbalances at birth. In many cases, the sex ratio at birth is clearly falling and may in fact reach soon biological level. Elsewhere, recent data point to a stalling in the sex ratio at birth at a plateau level, but signs of an impending decline can be already detected and confirmed by recent Bayesian projections of future SRB levels. We will highlight the numerous commonalities in the SRB trends and use them as clues to interpret the SRB transition.

This communication discusses the potential factors behind the rise and fall in SRB, starting with the exogenous changes that precipitated the onset in birth masculinity. We then explore the possibility of exogenous factors affecting the trajectory of SRB such as social, economic and policy change. Emphasis will be placed on public policies and their impact on SRB trajectories. We finally explore endogenous factors that would account for the self-correcting aspect of SRB evolution over the last three decades.

Why should prenatal sex selection ultimately decline?

This presentation will provide an overview of the entire sex ratio transition, from its onset in the 1980s and later to its gradual leveling off after a decade and its ultimate downturn. It will be based on the experience of all countries affected by prenatal sex selection, viz Albania, Kosovo, North Macedonia, Montenegro, Tunisia, India, Nepal, Vietnam, South Korea, China (including HK and Taiwan), and Singapore.

Country	SRB	Period	Source	Trend
<i>Asia</i>				
China	110.4	2019	NBS, 1% Population Sample Survey	↘
India	111,2	2016-18	Sample Registration System	→
Nepal	110,6	2012-16	DHS 2016	↗
South Korea	105.5	2019	Birth registration	↘→
Viet Nam	111.5	2018-19	2019 Census	→
<i>Caucasus</i>				
Azerbaijan	113.8	2019	Birth registration	↘
Armenia	110.4	2019	Birth registration	↘
Georgia	107,6	2019	Birth registration	↘→
<i>Southeast Europe</i>				
Albania	108.9	2019	Birth registration	↘
Kosovo	110.7	2019	Birth registration	→
Montenegro	108.8	2017-19	Birth registration	↘
North Macedonia*	110.4	2015-18	*Polog region Birth registration	→

Most recent estimates of the SRB

Current variations across countries (see table) show these patterns are not easy to interpret. They are in fact related both to 1) the quantum of sex selection, summarized by the plateau level at which birth masculinity stabilizes, and to 2) the tempo of its deployment and final disappearance, summarized by the new number of years involved in its three phases. This quantum factor simply represents the average level of met demand for sex selection in each country when the SRB peaks. The tempo effect stems from the combined pressure of low fertility and local emergence of sex selection methods, even if the timing of the onset of birth masculinization appears often unpredictable and may be linked to a contingent triggering event. A more diachronic perspective is in particular required to decipher these differences.

The sex ratio at birth has moved over the last fifty from one state of equilibrium to another one. The first equilibrium was purely biological with little social influence, at regional levels ranging from 103 to 106

male births per 100 female births. We may here exclude the statistically minor effects of all the phenomena that have long preoccupied the biology of the sex ratio at birth such as the short-term response of SRB to crises or to secular trends that have always remained too modest to carry any tangible social consequence. The natural SRB has therefore long been an invariant beyond human volition on which reproductive systems and family strategies were based.

The initial rise of the sex ratio at birth observed from the 1980s onwards was clearly caused by two distinct external mechanisms: the sustained reduction in family size and the emergence of accessible and effective sex-selective technologies. Among populations where son preference was rife, prenatal discrimination was simply an adaptation in reproductive behavior to these two historical transformations. This constitutes a clear example in which demography is simply a response to exogenous change—as is the case for example for mortality decline or sudden migratory moves. In addition, the third and major factor behind skewed SRB—son preference—was also sustained and revived at the same period by a host of historical circumstances such as political and economic transitions in Eastern Europe and East Asia.

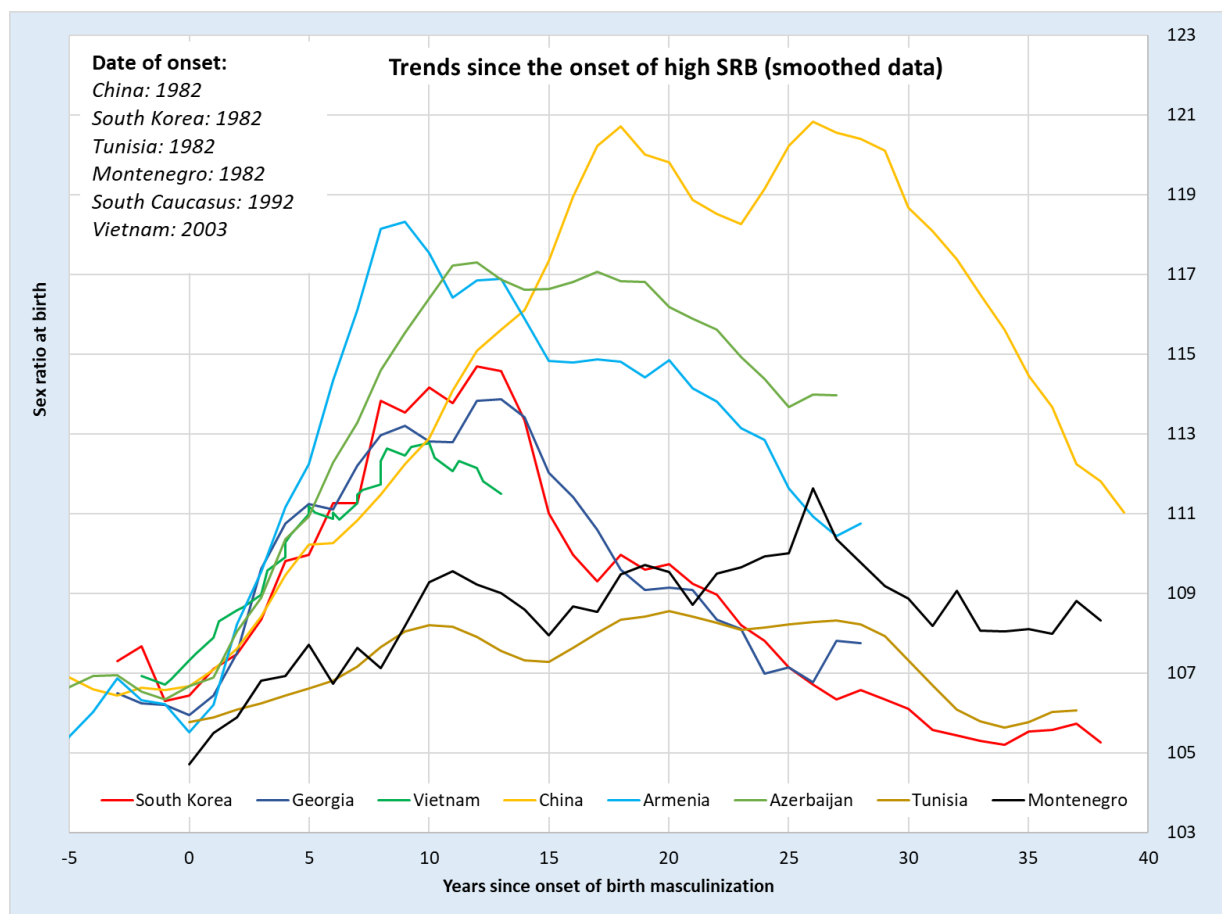
Within ten years or so, the propagation of this reproductive innovation lifted the SRB to a higher level. This peak level reflects the dissemination of sex selection, i.e. the local demand for gendered fertility. We observed a gradual top-down diffusion process in which sex-selective abortions spread from urban, elite groups with notably better access to technological innovations and lower fertility to the rest of the society and this explains why the transition towards higher SRB level is not instantaneous. But after a decade or so of gradual elevation of SRB across social groups, the average SRB level stabilized in each country at an average level ranging from 110 to 120 male births per 100 female births.

Today, there is almost no country displaying a sustained rise in their SRB, with the possible exception of Nepal where the sparsity of data prevents a close monitoring of annual trends. Everywhere else, birth masculinity has already plateaued or is showing distinct signs of a decline. The stabilization is notably visible in India, where it may conceal a sustained decline in some more advanced regions and a rise in regions where fertility is still fast declining. It is equally perceptible in Vietnam, where after an initially rapid rise, birth masculinity seems to oscillate around 112 over the last 5 years. The most important change relates to China, which has long reported the highest SRB levels in the world with values close to 120 male births per 100 female births and therefore the largest number of missing female births. The most recent SRB estimate put the SRB at 111, suggesting a sustained downward trend over the last ten days. Other countries displaying tangible signs of a decline includes Armenia, Azerbaijan, Albania or Montenegro.

There are in fact several countries where the SRB is already back to its natural levels after years of imbalances. The best-known case is that of South Korea, the first country where the rise and fall of the sex ratio at birth has been documented with ample statistical confirmation from rich and reliable birth registration series. Lesser-known examples of a full-fledged sex ratio transition include Georgia, Singapore, and Tunisia, reflecting the variety of political and economic contexts in which this turnaround occurred.

Incidentally, recent Bayesian estimates of future SRB course point to the decline of birth masculinity in all affected countries by 2040. According to these figures, it will occur sooner in Georgia (2020), Taiwan (2025), or Albania (2026), but later in China (2033) and India (2034), and finally in Vietnam (2039).

When plotted on a single chart by duration since the rise in the SRB (see chart below), the comparison of these trends points to a few interesting invariants of the phenomenon of sex ratio imbalances, which can be summed up into a few observations. To start with, we have observed only increases in the SRB and no case of marked decrease that would correspond to higher-than-expected proportions of female births. The second observation is twofold: the rise is sudden and clearly distinguishable, rather than gradual and diffuse; it is sustained over a decade or a few years more. A third observation echoes the previous by stressing the absence of endless increase in the proportion of male births. In all countries, the SRB reaches a plateau after about 10–15 years. A fourth observation is that there are no documented cases of rebound (i.e., a new increase in the SRB after previous stabilization or decline). A fifth and crucial observation is that after a few years at a plateau level, a sustained decline appears in most countries. Finally, we note that this ultimate decline proceeds often at a pace slower than that of the initial increase and appears to take the SRB back to its original natural level—even if the number of countries illustrating this last phase is still limited.



Sex ratio at birth in various since the beginning of the rise in birth masculinity

- computed from official annual estimates from the national statistical bureaus.
- Annual series missing for other countries (India, Kosovo, Nepal etc.)

This regularity points to the presence of three successive phases: initial rapid rise of the SRB, short stabilization period, and slower return to normalcy. In contrast, patterns observed over time in other

demographic indicators related to say mortality, fertility, or migration, are either simpler and reducible to monotonous change (e.g., long-term declines in infant mortality rates or fertility rates), or far more complex because of unpredictable fluctuations (e.g., oscillations and rebounds in fertility or migration rates). Based on the SRB trajectories observed in various countries from Europe to Asia, we can now contend that SRB imbalances due to sex selection follow a distinct non-linear profile that corroborates the initial hypothesis of a specific sex ratio transition advanced more than ten years ago.

There remain two obvious questions. The first is why sex imbalances at birth stalled after years of continuous rise and the second is why they ultimately seem bound to recede and disappear. The first question is relatively easy to answer. As indicated earlier, the sex ratio at birth has moved from one state of biological equilibrium to a new, gender-biased equilibrium. Among populations where son preference was rife, prenatal discrimination was simply an adaptation in reproductive behavior to these two historical transformations.

The SRB plateau indicates that the population has temporarily reached a new equilibrium in terms of gendered offspring production. This plateau level is the joint product of the heterogeneities across the country, primarily in the intensity of son preference, but also in average family size, policy constraints, and accessibility to sex selection techniques. All disaggregated analyses show that the maximum SRB greatly varies across regions and social groups within a country and that there is usually a sizable share of the population that remains perfectly indifferent to the lure of sex selection as maps of geographic SRB variations in China, India or Vietnam demonstrate.

While this plateau level may not remain perfectly immobile because of continuous changes in external factors such as fertility levels and accessibility of sex selection, it would, however, suggest that the SRB is should stay skewed for a long period once the demand for surplus male births is fully satisfied by existing sex selection technologies. This brings us to the more complex question about the cause of the final downturn. The experiences of countries examined earlier shows that this new equilibrium of high SRB gives way to an ultimate return to normalcy. This raises a somewhat unexpected question on the nature of the causal mechanisms accounting for the turnaround in birth masculinity. Should we look for another set of external factors explaining the ensuing decline in SRB? Should we investigate whether the continuous rise in women's autonomy, the introduction of gender equity laws or the weakening of family systems may account for the final downturn of the SRB transition in countries affected by sex imbalances at birth? In fact, it seems relatively improbable that a combination of external factors would systematically upend trends of elevated birth masculinity in all contexts where it had emerged. We have no established theory or concrete observations that would suggest that the initial factors behind the SRB rise (viz. fertility and modern reproductive technology) could account for this belated downturn.

Other external factors more broadly related to social change and especially to greater gender equity and family transformations may definitely have eroded son preference. But it sounds implausible to assume that such factors should affect simultaneously all countries after several years of high and stable SRB level. It is more reasonable to presume that mechanisms at play in this downturn are an internal, self-corrective response to years of sex imbalances at birth. In other words, the rise and fall of gender-biased sex selection may be parts of the same built-in logic of demographic change. We will probe this hypothesis by reviewing the public policies directly and indirectly affecting SRB and its drivers in the countries of investigation. We

draw from the World Population Policies database, the Women Business and the Law data catalog, the International Social Security Association database, complemented with country specific policy data.

The first candidate among phenomena potentially responsible for the SRB downturn could be the policy responses to surplus male births. It is indeed well documented that most countries hit by prenatal sex selection have introduced a cocktail of measures to fight against sex selection. These measures were diverse and fall into various categories. Some policies directly targeted sex selection itself, by outlawing for instance sex-selective abortions or prenatal sex diagnosis. Other initiatives relied strictly on advocacy and campaigning, highlighting the place of girls and women in society or the potential risks of surplus men in the future. Finally, other policies aimed at offsetting the gender bias by offering support to families with girls via cash or scholarships. We may add to the list broader measures towards greater gender equity or towards social protection that may have had indirect effects on son preference.

Because of the novelty of the issue and the pressing challenge posed by sex selection, these policies were designed in the absence of any evidence of past effectiveness and with no proper monitoring mechanisms to evaluate their impact. There is at times a temporal concomitance between the downturn of the SRB trends and policy implementation, but it may be difficult to tell actual causality from mere coincidence. For instance, Vietnam reacted forcefully to the deterioration of the SRB and the government introduced early on soft and hard measures to fight against, which might go some way towards explaining the stabilization during the 2010s. South Korea introduced a set of regulations in the 1990s to curb sex imbalances at birth, including sanctions targeting general practitioners delivering sex-selective abortions. Yet, abortion itself was officially illegal in South Korea during this entire period but the enforcement of this ban was almost nonexistent, casting a doubt on the health authorities' actual capacity to intervene on sex selection. There are also cases in which policies introduced by government to combat sex selection appear to have had no measurable impact as is the case for the different legislations in India rolled out as early as the 1990s and reinforced during the following decade. To this day, evidence of the actual impact of these different policies on SRB trends is still limited, anecdotal or contradictory. The impact of advocacy campaigns tends to be slow and difficult to evaluate, while the measurable impact of more aggressive policies towards sex selection regulation or subsidizing female births have rarely been established. When one ponders over the still ongoing debate on the efficacy of family planning policies implemented over the last fifty years, including the most drastic version of all introduced in China, it is not surprising to observe the lack of consensus on the exact influence of policies against prenatal sex selection on birth masculinity levels.

There are also distinct cases of SRB downturns that occurred in the absence of any policy targeting sex selection. We may take the case of Tunisia and Singapore, where a modest rise in SRB levels dissipated on its own after several years of skewed birth masculinity. But the most emblematic example of such a trajectory is that of Georgia, a country where the SRB started to increase immediately after Independence but started to dwindle after 2005. It was almost back to a normal level by the late 2010s. Georgia is also one country where the presence of sex imbalances at birth was officially acknowledged rather belatedly, partly because of the near collapse of the civil registration system during the years of political turmoil that preceded the Rose Revolution. No active initiative or campaigning against sex selection was in place at the time of the turnaround of the SRB and little has changed so far on the policy front. In fact, in South Caucasus as elsewhere, there seems to be little correlation between political mobilization and the final

onset of the SRB decline. Yet wider policy reforms linked to the expansion of social protection may be linked to the weakening of son preference in the long run.

Like for initial rise of the SRB, there are many potential local narratives to explain the downturn with the help of contextual factors. These may be as simple as policy successes for China, political stabilization for Georgia or Albania, or economic rebound for Azerbaijan. These are at best contributing factors and at worst possibly political illusion. We need to identify factors that have had almost the same effect irrespective of the social or economic contexts. If we review the initial factors fueling the demand for sex selection, we do not see any reversal in trends of fertility decline (such as fertility rebound) or access to improved sex selection technology (such as effective bans of prenatal diagnosis) that could account for the abandonment of sex-selective practices. The SRB downturn reversal is obviously the manifestation of diminishing son preference or of its implementation in prenatal selection. This change in gender preferences appears to be largely endogenous, linked to the recent rise in the SRB.