



# SEX IMBALANCES AT BIRTH IN VIET NAM 2014

Recent trends, factors and variations



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# Abbreviations

<b>CH</b>	Central Highlands
<b>DHS</b>	Demographic and Health Survey
<b>GBSS</b>	Gender-biased sex selection
<b>GOPFP</b>	General Office for Population and Family Planning
<b>GSO</b>	General Statistics Office
<b>ICRW</b>	International Center for Research on Women
<b>IPS</b>	Intercensal Population and Housing Survey
<b>MRD</b>	Mekong River Delta
<b>NMM</b>	Northern Midlands and Mountains
<b>NSCC</b>	North and South Central Coast
<b>PPR</b>	Parity Progression Ratio
<b>RRD</b>	Red River Delta
<b>SE</b>	Southeast
<b>SRB</b>	Sex ratio at birth
<b>UNFPA</b>	United Nations Population Fund
<b>WHO</b>	World Health Organization

# PREFACE

The Viet Nam Intercensal Population and Housing Survey, 1 April 2014 (2014 IPS), was conducted according to the Decision No. 1253/QĐ-TCTK, dated 22 November 2013, by the General Statistics Office (GSO) of Viet Nam. This is the first-ever sample population and housing survey carried out at the midpoint between the two national Population and Housing Censuses (2009 and 2019 censuses). The aim of this survey is to systematically collect basic population and housing data in order to provide the foundation for research, evaluation and formulation of policies and programs, and socio-economic development targets and plans in Viet Nam, especially related to population and housing issues.

In addition to the key indicators, disseminated in December 2014, and the Major Findings Report, published in October 2015, some priority population issues such as sex ratio imbalance at birth, fertility, migration and urbanization, and sex-age structure of the population have been analyzed to provide important information and policy recommendations related to these issues.

This monograph, “*Sex imbalances at birth in Viet Nam 2014: Recent trends, factors and variations*”, was developed using the data from the 2014 IPS and 2009 Census to provide the most updated information about an emerging issue that has received great attention from policymakers in Viet Nam.

Results from the data analysis show that sex ratio at birth has continued to rise for the last 5 years, yet at a slower rate, from 110.6 boys per 100 girls in 2009 to 112.2 boys per 100 girls in 2014. This analysis also illustrates the differences of this ratio among regions and population groups, the relationship between socio-economic and demographic factors and sex imbalance at birth in Viet Nam. More specifically, the results help us understand the extent of son preference reflected in reproductive behaviours, and the trend of its diffusion across different population groups.

The monograph also proposes some recommendations to address the sex imbalance at birth issue in Viet Nam, and emphasizes the necessity to have information on aspects of social changes and their impacts on son preference to identify factors relating to gender equality in Vietnamese families.

The GSO would like to express its special thanks to the UNFPA Country Office for its financial and technical support to the IPS 2014, especially for data analysis and preparation of this publication. We especially thank Dr. Christophe Z. Guilmoto, demographer at IRD/CEPED in Paris, UNFPA International Consultant, for his great work in analyzing the data and developing this monograph. In addition, we would like to express our sincere thanks to all UNFPA and GSO staff who provided valuable comments during preparation and finalization of this report.

In this light, it is our great pleasure to introduce this publication that provides an in-depth look into the issue of sex imbalance at birth in Viet Nam, the topic of interest among researchers, managers, policymakers and the broader society. We hope to receive your feedback and comments on this monograph to improve the quality of future GSO publications.

**General Statistics Office**

# EXECUTIVE SUMMARY

Sex imbalance at birth can be observed in a handful of countries, particularly in Asia, the Caucasus and Southeast Europe, as evidenced in sex ratios at birth (SRB) that rise above the natural biological level of 105 male births per 100 female births. The primary cause of high SRB levels is found in the practice of gender-biased sex selection, particularly, prenatal sex selection. The present study follows previous work on birth masculinity using the 2009 census results and provides a systematic review of recent SRB trends in Viet Nam based on analysis of the Intercensal Population and Housing Survey 2014 (IPS 2014), conducted by the General Statistics Office (GSO).

That survey led to a new estimate of the national SRB set at 112.2 male births per 100 female births in 2014. This figure, based on recent births recorded 12 months before 1 April 2014, is perfectly consistent with other estimates derived from the sex distribution of the population aged under one year, including the independent figures from the General Office for Population and Family Planning (GOPFP). The use of IPS data leads to a better understanding of the many social, economic and demographic correlates of the skewed sex ratio in Viet Nam. An in-depth analysis of reproductive behaviour reveals the complex interplay between reproductive decision-making and gender objectives.<sup>1</sup> This monograph shows, in particular, that the need for sons is the primary factor behind the parental decision to have a third or higher-order birth; many Vietnamese couples clearly adjust their fertility behaviour to their gender objectives, which means primarily, to ensure the birth of at least one son. The roles of family systems, economic and cultural constraints, and social pressure have already been documented by different studies, but the recent IPS has contributed towards a better estimation of the intensity of the son preference and its implementation through various reproductive decisions.

In addition, the recent diffusion of sex selection technology available throughout the country has allowed couples to avoid unwanted female births, while an overall fertility decline has exerted further pressure on parents. As a result, the birth masculinity level is higher than ever today: an estimated 52,900 excess male births during the past five years. Viet Nam's SRB level is significantly more skewed than ratios observed in neighbouring Thailand, Laos and Cambodia. As birth cohorts gradually age, this male surplus is here to stay and is likely to affect the sex distribution of young adults within the next fifteen years and potentially impact on the opportunities for marriage of young, scarce women and surplus men.

The mechanism of sex selection appears more complex in Viet Nam than elsewhere. Some of the major findings of this report are:

- In addition to skewed sex ratios among higher-order births following the births of successive girls, the presence of prenatal discrimination among first births has also been observed. High birth masculinity among first births accounts for no less than 40 per cent of the entire sex imbalance currently estimated in Viet Nam.

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1 *Gender objectives in this concept mean objectives about the gender composition.*

- Further data analysis confirms that social and economic differentials affect birth masculinity, with lower SRB levels among the poorest quintiles and other underprivileged groups, such as ethnic minorities and the less educated.
- The survey data have once again confirmed the presence of significant regional differentials across the country, with the Red River Delta emerging as a region with the highest SRB levels. In certain provinces where the SRB is especially skewed, the number of unborn girls corresponds to almost a fifth of all female births.
- Statistical analysis shows that the social, regional and demographic profiles of sex selection are quite different among first births and among higher-order births in the absence of male offspring, and therefore, these two categories can also be understood to relate differently to different populations.
- While the overall upward trend since 2005 is well established, 2014 estimates also demonstrate that Viet Nam's birth masculinity level has not diminished over the last five years. There has been an apparent increase in the SRB from 110.6 in 2009 to 112.2 recorded by the IPS 2014. In particular, this increase has taken place among lower income groups through a process of social diffusion and has affected almost all areas of Viet Nam, although the fastest regional intensification has taken place in the Red River Delta.
- In spite of the temporary spike observed in 2012, the increase also appears to have slowed down to the extent that it may not reach the 115 level postulated earlier.

While the IPS 2014 cannot provide any firm evidence of the impact of recent policy interventions, they may have contributed to the apparent stabilization observed after 2010.

The report ends with a few recommendations related to:

1. The continuous need for regular monitoring of SRB trends in the country through all statistical instruments available.
2. The increased call for research into understanding the dynamics of social change and its impact on son preference and to identify factors related to greater gender equity within Vietnamese families.
3. The additional efforts that are required from government and civil society organizations towards gender equity through sensitization campaigns, monitoring of sex-selective abortions and the fight against biased social practices and attitudes.
4. The research necessary for a better impact assessment of interventions in order to adjust or replicate initiatives already implemented in parts of the country.





## 1. Sex ratio imbalances across the world

**G**lobally, it is a well-established fact that more boys are born than girls. The natural sex ratio at birth (SRB) lies around 104-106 male per 100 female births. In Sub-Saharan Africa, using reliable statistical records such as those in South Africa, the surplus of male births measures even lower, with the SRB closer to 103. Elsewhere in that region, there are no other countries with a biological level of birth masculinity significantly different from 105.

Alongside SRB, observed variations in the sex distribution of the population are mostly caused by two demographic factors: mortality and migration. For instance, mortality is higher overall among men than among women, although this proportion tends to decrease gradually with age. Due to their advantage in longevity, women are almost invariably in the majority among older adults and the elderly. Spatial mobility is another factor likely to affect sex distribution, especially when women or men predominate in specific migratory streams. This can be the case for young adults or international migrants who more commonly migrate to more developed areas for purposes of study or labor. Less frequently, situations of conflict may also disrupt the sex ratio, as when male casualties exceed female. For instance, the impact of war conditions in Viet Nam, until 1975, reduced the percentage of men within the total adult population.

Gender discrimination may, however, also play a role in the sex composition of a population. Two forms of demographic discrimination have been observed: postnatal and prenatal. Postnatal discrimination takes place after birth, and corresponds to excess female mortality, i.e. unexpectedly high mortality among women from childhood to old age. In China and India, excess female mortality, most particularly among children, has long diminished the overall share of women in the population and raised the population's sex ratio. Since the 1980s, we have witnessed a new form of discrimination taking place before the birth of girls. Gender-biased sex selection (GBSS)<sup>2</sup> has allowed parents to choose fetuses based solely on their sex. Prenatal sex determination through ultrasound is key to the rise of this new demographic form of gender discrimination during pregnancy.<sup>3</sup> Such prenatal and postnatal discriminations against girls explain why today the world is predominantly masculine despite progress in health conditions that should, on the contrary, have benefited women and increased their proportion worldwide. Prenatal and postnatal sex selections are usually found in the same countries. China and India demonstrate particularly high SRB levels that rise well above 105 and show excess female mortality among children. Viet Nam is a less classical case with no documented evidence of substantial excess in female mortality, yet recording an SRB that has shot up significantly over the last decade (Le Pham et al., 2013; GSO, 2011a).

The present study aims to take stock of the current situation in Viet Nam with respect to sex imbalances at birth. It is chiefly based on the data from the Intercensal Population and Housing Survey, conducted in April 2014. Beginning with a discussion of the situation worldwide and of the specific geography of sex imbalances at birth, we have assembled recent figures from national statistical offices. The comparison is limited to countries affected by sex selection in Eastern Europe and Asia, along with estimates from selected countries in the world with normal SRB values. We have also added two important demographic indicators: the total population and the fertility rates measured by the average number of children per woman.

China and South Korea have the longest history of sex imbalances at birth. In the latter country, birth masculinity peaked in 1995 at 115 male births per 100 female births before returning to a normal level. In contrast, the SRB in China continued to increase to 120 after 2000 although may now be heading for a gradual decline. However, it is still the highest in the world, closely followed by Azerbaijan and Armenia in the South Caucasus with slightly lower levels.<sup>4</sup>

Viet Nam's SRB estimate for 2014 – discussed in more detail further in this report – is obviously abnormal. This is and has been the case for almost a decade. It is greater than in countries such as India and Albania where the SRB tends to fluctuate around 110 male births per 100 female births. It is also higher than in neighbouring countries of Southeast Asia such as Thailand, Cambodia and Laos, where birth masculinity is close to 105. In contrast, sex imbalances at birth in Viet Nam are less pronounced than in China. The comparison may be restricted to the three southern provinces of China closest to Viet Nam, with SRB levels above 123 in both Guangxi and Hainan, but similar to Viet Nam's at 112, in Yunnan (figures from China's 2010 census).

The SRB in Viet Nam begs the question of the origins that led to such an elevated level and how this is evolving now and into the future. The report first examines the factors behind this recent increase in the proportion of male births in Viet Nam. It then examines the lessons of the recent IPS 2014 by describing how the SRB and its recent trends can be estimated. In the next section, the original survey data are used for an in-depth analysis of some of the main demographic, regional and socio-economic correlates of high birth masculinity. The final sections conclude and discuss the demographic and policy implications for the current trends highlighted in this report.

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2 *The term "gender-biased sex selection" is used by the author to specify sex selection behaviour due to gender discrimination.*

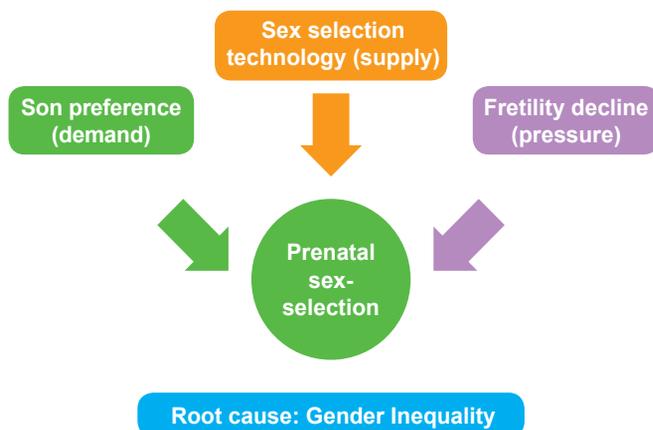
3 *This may happen even before pregnancy, considering the genetic pre-implantation diagnosis which, in theory, allows parents to select the sex of the embryo at time of fertilization.*

4 *See UNFPA (2012) for a longer discussion of sex imbalances at birth in Asia and Eastern Europe.*



## 2. The causes of prenatal sex selection

Three factors underlining SRB imbalance



Before examining the singularity of Viet Nam and its demographic evolution, it is first necessary to step back and reflect on the rising incidence of prenatal sex selection as observed in several countries since the 1980s. This unexpected demographic change has often been attributed to contextual factors specific to each country, such as the dowry system in India, the stringent family planning policies in China, the socio-political transition in Eastern Europe or the traditional Confucian family system in South Korea. But there are obvious commonalities across all these countries as birth masculinity rates started to rise at about the same time.

## 2.1. Preconditions for prenatal sex selection: fertility decline, supply and demand

Similar increases in the proportion of male births across regions, countries and territories have occurred despite obvious differences in political systems, religious and cultural traditions, and varying paces of economic progress. Using these measures, for example, Hong Kong and Montenegro could not be more different, and yet they both have similarly high SRB levels. What does seem to differ is the timing and intensity with which all of these countries and territories began to experience an increase in birth masculinity. Apart from these two variations, there are obvious and shared patterns observed within all of these contexts, and demographers have gradually unearthed some of their main dimensions. What has emerged from their work are three main preconditions for prenatal sex selection across the world (Guilmoto, 2009).

**Table 1: Sex ratio at birth and other demographic characteristics of various countries and territories 2008-2014**

Country or regions	SRB	Period	Source	Population (millions)	Fertility
<b>Asia</b>					
China	115.9	2014	National Bureau of Statistics	1401.6	1.7
South Korea	105.3	2013	Registration	49.7	1.3
Hong Kong	109.3	2013	Registration	7.3	1.1
India	110.0	2011-13	Sample registration System	1282.4	2.5
Japan	105.2	2012	Registration	126.8	1.4
Singapore	107.0	2013	Registration	5.6	1.3
Taiwan	107.4	2012	Registration	23.4	1.2
Viet Nam	112.2	2013-14	2014 survey	90.5	2.09
<b>Caucasus</b>					
Azerbaijan	115.6	2013	Registration	9.6	1.9
Armenia	114.0	2012-13	Registration	3.0	1.7
Georgia	111.8	2008-12	Registration	4.3	1.8
<b>Southeast Europe</b>					
Albania	109.0	2012-13	Registration	3.2	1.8
Kosovo	110.4	2011-13	Registration	1.8	2.3
Montenegro	109.0	2009-13	Registration	0.6	1.7
<b>Rest of the world</b>					
South Africa	101.7	2012	Registration	53.5	2.4
France	105.1	2012	Registration	65.0	2.0
USA	104.7	2012	Registration	325.1	2.0
Russia	105.8	2011	Registration	142.1	1.5
Turkey	105.8	2013	Registration	76.7	2.1
<ul style="list-style-type: none"> <li>• SRB estimates from national statistical offices</li> <li>• Population and fertility figures from United Nations estimates for 2015</li> </ul>					

The first and most important of these is the so-called “demand factor”, usually found in micro-economic analysis, which occurs primarily because parents want to have male children and therefore resort to different methods to avoid female births. Although expressed in different ways in these societies, the prenatal elimination of girls is undoubtedly one of the strongest manifestations of gender discrimination and preference for sons. The second precondition relates to the capacity of parents to implement their preferences. This constitutes the “supply factor”. In this case, rapid changes in reproductive technologies have made prenatal diagnosis part of the routine examination of pregnant women, thus playing a key role in allowing parents to learn the sex, and thereby, prevent the birth of daughters. The third precondition concerns “fertility decline”. When birth rates come down, parents with a smaller number of children invariably have a higher probability of remaining sonless. As Table 1 below illustrates, all affected countries indeed have fertility levels close to or below replacement level (i.e. 2.1 children per woman).

Prenatal sex selection requires all three preconditions to be met simultaneously. Let us first review the current situation in Viet Nam in reference to these factors before investigating the extent and characteristics of sex selection based on the 2014 survey data.

## 2.1a. Demand: Son preference

It is now useful to examine son preference, the most important factor explaining the presence of sex selection. Interestingly, the IPS 2014 data provides an indirect source that allows examination of the nature and intensity of son preferences across the country.

The preference for boys as opposed to girls is a social and cultural trait that can be understood primarily in relation to family systems and their role in society. It is because sons play a crucial role within families that the desire for sons translates into a pressing requirement, leading in turn to discrimination against girls before or after their birth. In many contexts across the world, sons and daughters are equally desired, and attempts to artificially influence the sex of children are extremely rare. However, in Viet Nam, as in several Asian countries, the desire for a son is deeply entrenched.

The phenomenon has already been the subject of several qualitative studies in Viet Nam. These studies describe the “patriarchal family system”, characterized by typical anthropological features such as patrilineality (the family identity resting on the male line) and patrilocality (post-nuptial residence within or close to the husband’s family). In addition, the family system is based on Confucian values such as filial piety, stressing the life-long obligations of sons towards their parents, even after their death (Bélanger, 2002; UNFPA, 2011; ICRW, 2012). The residence of newlywed couples either with or close to the husband’s family also corresponds to a social and economic solidarity that takes many forms: co-residence or regular social exchange, economic cooperation (farm, business, etc.), direct economic support or regular remittances, support during old age, land and property transmission, and religious duties (rituals, funerals etc). The main features of this system are already familiar, thanks to prior field research and need not be repeated here.

Our quantitative knowledge of son preference, including regional and other socio-economic variants, however, remains limited. First, our knowledge derives primarily from field surveys that have been conducted in only a few localities. There are virtually no surveys conducted in the south of the country, nor any exhaustive descriptions of son preference according to social class, ethnic groups or regions across Viet Nam. Second, qualitative surveys identify the presence of son preference in relation to family systems and the socio-economic environment, but they provide no precise measure of intensity. There is no information indicating to what extent son preference may be stronger or weaker in one subpopulation such as young people, residents of small towns, farmers, etc. In this regard, the lack of reliable indicators precludes a more systematic investigation into the actual intensity of gender bias across regions or social groups.

One way out of this quantitative predicament is to use indicators derived from sample surveys. The Population Change and Family Planning Survey of 2013 provides a useful indicator since it questions women about the preferred sex of their child. This survey corresponds to a measure of stated preferences and, as previously observed, is related to reproductive behaviour such as prenatal diagnosis through ultrasound. The following Table 2, summarizes the statements given by mothers in relation to their last pregnancy over the last two years.

**Table 2: Preference for a sex during the last pregnancy over the last two years according to birth order and gender composition, Viet Nam, Annual Population Survey, 2013**

Previous gender composition	Sex preference				Births
	Boy	Girl	None	Total	
<b>First birth</b>					
<b>Total</b>	24.1%	3.9%	71.9%	100%	28,316
<b>Second birth</b>					
<b>One girl</b>	63.7%	1.8%	34.6%	100%	13,160
<b>One boy</b>	8.0%	35.1%	56.9%	100%	13,654
<b>Total</b>	35.3%	18.7%	46.0%	100%	26,814
<b>Third birth</b>					
<b>Two girls</b>	82.0%	1.3%	16.7%	100%	2,607
<b>One boy and one girl</b>	19.3%	5.5%	75.3%	100%	2,556
<b>Two boys</b>	5%	60.1%	34.7%	100%	1,194
<b>Total</b>	42.4%	14.0%	43.6%	100%	6,357

In response to survey questions, it would seem that most respondents do not take the sex of the previous child into account when asked for the sex preference of their subsequent child, but when the data is examined more closely, gender bias becomes apparent. For the first birth, the preference for a boy is already 20 per cent more frequent than for a girl (25.1 per cent vs. 4.1 per cent) despite the fact that most mothers say that they are indifferent to the sex of their child. At higher parities, gender preference greatly increases as mothers want to try for the missing sex. After a female birth, 64 per cent want to have a boy as the second child compared to 35 per cent wanting a girl after a male birth. Again, this shows a stronger bias towards boys. This becomes even more visible in the case of a third birth; overall, 43 per cent of women desire a boy, against 14 per cent in favor of a girl. The proportion in favor of a son rises to 82 per cent among mothers who had only daughters, against 60 per cent of mothers of sons only preferring a daughter. In fact, it would appear that the main objective of Vietnamese families is to achieve a mixed gender composition of offspring with the desire for daughters almost on a par with that for sons.

But is this insight true? Part of the answer, evident in Table 2, shows that parents who finally had a third child after the birth of two daughters are in fact twice as numerous as parents after the birth of two sons (respectively 2607 vs. 1194). Perhaps this reflects the reality that many more sonless parents will have a third child if they have not already produced mixed gender offspring.

The truth is that opinions expressed during such a survey cannot be considered a perfect reflection of real preferences for future behaviour. Survey responses tend to be influenced by norms, and

many people in Viet Nam are expected to say that they want two children, namely one daughter and one son. This is in fact what emerges from the survey of preferences conducted in the DHS (Fuse, 2010). However, there is no assurance that stated preferences will translate into concrete reproductive decisions, such as subsequent births or even deliberate sex selection. It is therefore preferable to focus on observed demographic behaviour rather than simply relying on attitudes and opinions recorded in surveys.

## 2.1b. Supply: the emergence of new reproductive technologies

In the past, there were many traditional methods in Viet Nam for influencing the sex of a future child, however, they were not very reliable (UNFPA, 2011). But with the arrival of prenatal diagnosis, it has become possible for parents to know in advance the sex of their future child and, if need be, to terminate the pregnancy when the fetus is not of the desired sex. In fact, the emergence of the new reproductive technologies after 2000 has been interpreted as the tipping point in Viet Nam. Modern and affordable technologies were not common in the past or limited to a few affluent families, but they spread very rapidly in Viet Nam after 2000 (Gammeltoft, 2014; Gammeltoft and Nguyen, 2007). Parents began to seek repeated ultrasounds during pregnancy, far more often than recommended by health guidelines. The simultaneous development of private healthcare helped to cater to this new demand for instant access to technology.

According to the 2013 Population Survey, 96 per cent of women have antenatal checks during their last pregnancy. In 2013, women were declared to have had on average 4.7 antenatal visits, with 47 per cent having more than four visits. The highest frequency of antenatal checks is found among women with university education (6.1 checks), which shows their deep interest and involvement in the progression of their pregnancy. But it should be noted that even women of primary education level had on average more than three antenatal checks during their last pregnancy, a frequency that points to the availability of reproductive services for even the most vulnerable populations.

While not included in the 2013 survey, the use of ultrasonography during these antenatal checks appears very common. It is important to note that in spite of the legislation banning disclosure, most Vietnamese mothers were aware of the sex of their fetus. According to the 2013 survey, no less than 83 per cent of mothers in Viet Nam knew the sex of their child before delivery. The method used is always ultrasound (99 per cent), while traditional methods – such as using the pulses – are almost never reported. A more systematic examination of this figure indicates that the lowest proportion of women (37 per cent) who knew in advance the sex of their child, is found in Vietnamese women with no education at all. For other women, the percentage fluctuates between 83 per cent and 89 per cent. In view of the prohibition of disclosure, this figure is probably an underestimation of the true proportion of women who learned the sex of their child during pregnancy.

It is also of note that the percentage of mothers knowing the sex of their child is slightly higher for women without boys (84 per cent) than for those who already had male offspring (80 per cent) and that the difference is statistically significant at the 1 per cent level. Similarly, survey results show that women who reported wanting a child of a particular sex were significantly more likely than other women to know the sex of their fetus. The interaction between variables is complex since poor women may have less access to antenatal checks and, at the same time, demonstrate a higher degree of gender indifference. The impact of son preference has been re-examined, measured by the survey on the probability of knowing the sex of the fetus, while controlling for age, ethnicity, education, parity and birth of a previous son. This regression analysis shows that all things being equal, the desire for a child of a particular gender does increase the probability of knowing the sex of the fetus and that preference for a son increases it even further.<sup>5</sup> While the latter result confirms the association between son preference and prenatal sex diagnosis, it should not

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5 This result is based on a logistic regression applied to 63,708 pregnancies, reported in the years 2011-2013. All control and explanatory variables mentioned above are significant at 1 per cent.

be construed to suggest that antenatal care and regular ultrasound testing are the source of sex selection. On the contrary, regular antenatal checks are testimony to the accessibility and quality of reproductive health services that exist in Viet Nam today. The expansion and improvement of health supply and services are irreversible signs of progress. This aside, the important indication of the 2013 survey is that the desire for a son clearly constitutes an additional factor that leads a mother towards ultrasound testing and prenatal sex diagnosis.

### 2.1c. Fertility decline

One additional condition for sex selection is low fertility that in turn exerts pressure on parents. Fertility in Viet Nam has been at replacement level for almost a decade. In the more advanced provinces, it is even further below this level (GSO, 2011b). One of the implications of a replacement fertility level and biological SRB assumed to be 105, is that 22 per cent of parents are at a risk of having no son. In regions or social groups where fertility is closer to 1.8 children per woman, the risk of having only daughters rises to 27 per cent.<sup>6</sup>

Fertility decline corresponds to a decreasing flexibility in fertility behaviour. Fewer and fewer parents are prepared to have a third child in Viet Nam and even in the countryside, fourth births are becoming rare. While in the past, families would simply have more children in order to enhance the likelihood of giving birth to a son. This option is significantly less popular today since raising a child imposes a variety of socio-economic challenges to parents. In addition, the population policy discourages third and higher order births. This means that parents in need of male offspring tend to take action early against the risk of remaining sonless by seeking a technological solution.

## 2.2. Measuring son preference in 2014

Son preference can be better assessed indirectly, not by asking respondents direct questions but by examining how their actual behaviour reflects biased gender preference. The IPS 2014 provides recent data useful for this purpose, specifically, fertility behaviour as an indicator of gender preference. The idea is to monitor parental reproductive behaviour according to the gender composition of their families.

With this in mind, birth histories from mothers who have already had a first child, recorded during the 2014 Survey, are used to create a baseline snapshot. When the birth date of the first child is known, it is possible to estimate the respondent's likelihood of having a second child, simply by computing the probability. This is what demographers call the *parity progression ratio* (PPR), the proportion of women progressing from one child to the next. PPRs are themselves directly affected by the overall fertility level, since higher progression ratios correspond to higher average family size. The progression ratio can therefore be computed from parity 1 to parity 2, and this will correspond to the percentage of mothers who have a second child, varying from 0 to 100 per cent.<sup>7</sup> Ten years is used as a benchmark, since birth intervals are rarely longer. For the entire population, the PPR finally reaches 74.3 per cent, indicating that almost three-quarters of mothers with one child will have another one within ten years. (See Appendix II for detail on this computation strategy.)

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6 These values are computed by using the natural probability of a female birth and replacement fertility levels. The probability of having no son rises from 6 per cent with four children per woman to 24 per cent with 2 children and 49 per cent when fertility falls to 1.5 children.

7 A description of PPR can be found in Moultrie and Zaba (2013).

**Figure 1: Probability of having an additional child according to previous gender composition at parities 1, 2 and 3+, 2004-2014**

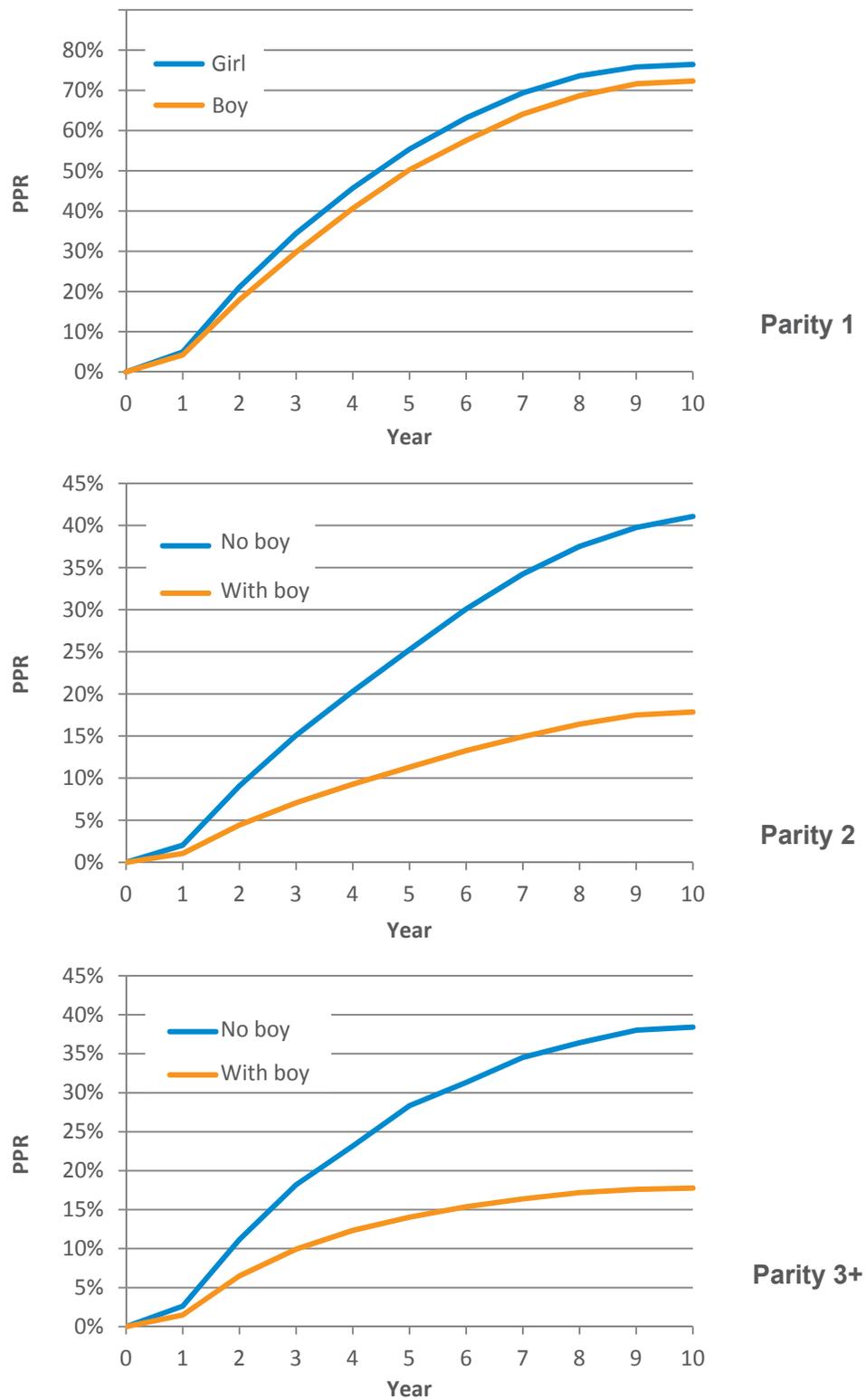


Figure 1 shows this parity progression in Viet Nam based on the IPS 2014 data. Most importantly, it distinguishes mothers of boys from mothers of daughters. The two curves shown here demonstrate

a small but notable trend starting to occur after the sex of the first child is known; parents with a first born daughter seem quicker to produce a second child to the extent that 76.4 per cent of parents with a firstborn girl have an additional child within the next ten years compared to 72.3 per cent of parents with a firstborn son. The difference of 4 per cent may appear modest, but it is nevertheless significant (at 1 per cent) when using the standard log-rank test.

Still, a large majority of Vietnamese couples will try to have a second child, regardless of the sex of the first child. A more sensitive reproductive decision can be seen during the progression from the second to third born child. The PPR computed at parity 2 indicates that the probability of having a third child is no more than 23.2 per cent, according to the IPS 2014. Once again, measuring the respective probability of having an additional child according to their previous gender composition, the gender bias appears extensive. The proportion of parents choosing to have a third child increases from 18 per cent (already one son) to 41.1 per cent (no male birth). Indeed, parents without a boy are twice as likely to produce a third child compared with the rest of population.

#### Pressure to have sons

- More than 2/3 of couples having one child, either a daughter or a son, continued to have a second child.
- About 1/5 of couples having two children with a son continued to have the third child. This number is double compared with the ones not having a son yet.
- For the Red River Delta region, it is estimated that 15% of parents having at least one boy will opt to have a third child while 55% of parents with two girls will have a third child in the next 10 years

Note also that parents without any girls do not exhibit subsequent fertility higher than parity 2; there is no visible difference between parents with a mixed composition (one boy and one girl) and parents with two boys. This somewhat contradicts results shown in previous Table 2, that record a large majority of parents with two boys stating their desire for a girl. However, according to the progression ratios, evidence suggests that few parents followed through with this desire. In fact, a large gap emerges between stated preferences and actual behaviour.

Upon re-examining the results for parity 2, one can assume that even with the best gender composition, 82.1 per cent (100-17.9) of parents will not have a third child. However, this proportion is reduced to 59.9 per cent (100-41.1) in the absence of any male offspring, which signifies that more than a quarter of parents who otherwise would not have had a third child, would opt to become pregnant if they have not already had a boy.<sup>8</sup> If taken as representative of the rest of the population, parents with two children also reflect the proportion of Vietnamese parents with a genuine desire for sons.

Using parity 3+, and combining parities above 2, it is clear that parents without a boy still have a PPR of 38.9 per cent. This is two times larger than parents with at least one boy (18.3 per cent).<sup>9</sup> In other words, about 82 per cent would stop childbearing at this parity if they already had a son, but almost half would change their mind if they had only daughters.

Further investigation shows the presence and intensity of son preference across various subpopulations. Contrasting regions within Viet Nam, for instance, offers a more nuanced picture. For simplicity's sake, this analysis is restricted to the difference observed when progressing from the second to the third child. Table 3 highlights some of the differences observed across the country.

8 The comparison here is between the number of parents who changed their mind (82.4%-59.9%=22.5%) and parents who have no third child in the best gender scenario (82.4 per cent). The ratio of these two percentages is 27.3 per cent, and it therefore represents the proportion of parents ready to increase their fertility due to need for a son.

9 At this parity level, parents with only boys do, however, have a higher PPR than parents with boys and girls (respectively, 24.4 per cent vs. 17 per cent).

**Table 3: Progression from 2nd to 3rd child according to previous gender composition, Viet Nam regions, 2009-2014**

Region	Sex composition			Births of parity 2
	1 or 2 boys	No boy	Difference	
Northern Midlands and Mountains (NMM)	17.2%	45.1%	28.0%	16,978
Red River Delta (RRD)	15.0%	54.5%	39.4%	16,382
North and South Central Coast (NSCC)	23.4%	47.4%	24.1%	16,432
Central Highlands (CH)	32.6%	50.2%	17.5%	6,224
Southeast (SE)	14.3%	26.8%	12.5%	9,181
Mekong River Delta (MRD)	11.7%	23.1%	11.3%	15,547
<b>Viet Nam</b>	<b>17.9%</b>	<b>41.1%</b>	<b>23.2%</b>	<b>80,744</b>

These results first indicate that in all regions of Viet Nam some level of son preferences is manifest; the probability of having a third child is higher in the absence of a male child everywhere. Yet, the intensity of son preference greatly varies across the country. Regional figures prove that the preference for a son appears much weaker in the southern regions. In both the Mekong River Delta and in the Southeast, the absence of a male child appears less likely to affect the probability of a third birth, than elsewhere in Viet Nam; the share of parents opting for another birth after two female children in the family is only 11-12 per cent. By contrast, the largest proportion of parents (39 per cent) responding to the absence of male offspring by resorting to further pregnancy, is found in the Red River Delta. This figure points to the fact that the absence of a male offspring is a decisive factor for pregnancy with a third child in the Red River Delta, compared to other regions.

**Figure 2: Probability of having a third child according to previous gender composition in two Viet Nam regions, 2004-2014**

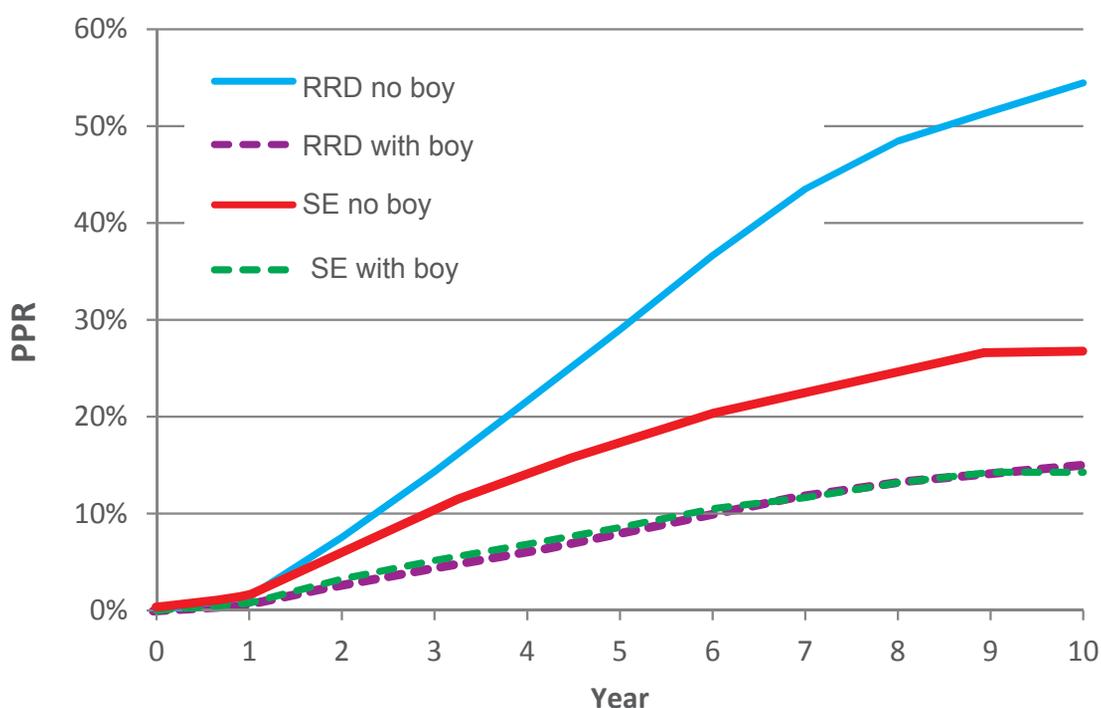


Figure 2 summarizes the difference in reproductive behaviour between the two most advanced and urbanized regions of Viet Nam, namely the Red River Delta and the Southeast region, which includes Ho Chi Minh City. In both regions, the probability of having a third child increases rather slowly among parents of at least one boy, reaching about 15 per cent of all parents after a decade. Looking at sonless parents, the parity progression is faster because of the perceived need for a male offspring, but the likelihood of having another birth is significantly higher in the Red River Delta compared to the Southeast region. In fact, twice the number of sonless women have an additional child in the North than in the South.

Spatial analysis, conducted in all 63 provinces, further disaggregates the overall picture. While figures are affected in a few cases by the small size of the sample, variations across Viet Nam appear even more pronounced at individual provincial levels than across macro-regions. One may, in particular, distinguish two poles. In a compact area centered in Ho Chi Minh City and straddling the border of the Southeast and Mekong Delta regions and comprising both rural and high urbanized provinces, the absence of a son causes only a modest rise in subsequent fertility and its net impact hovers around 6 per cent. In contrast, another area centered in Hanoi and made up of seven provinces that are both rural and metropolitan, is characterized by huge differences in fertility progressions. On average, subsequent fertility progression increases by 45 per cent for those parents who have had only daughters.<sup>10</sup>

Geography appears to be a major driver of son preference. Variations in son preference across social groups appear less sizeable, and their interpretation is often complicated by variations in fertility. In fact, similar analysis has been done using a range of socio-economic variables such as mother's education and socio-economic status, urban residence, ethnicity and declared religion, and found that across all these subpopulations, gender bias intensified fertility with about 15-25 per cent more parents opting for a third birth in the absence of prior male births. Although these figures are close to the average impact of being sonless in Viet Nam, these indicators have far less impact on PPR than regional variations.

By elaborating the causes of prenatal sex selection, this chapter has been able to show how gender bias can be made visible in today's Viet Nam when examining reproductive behaviour. Son preference is indeed considerable, even if regional variations are more pronounced. The next question is whether the conjunction of factors noted in Viet Nam (low fertility, son preference, and access to new technology) translates into prenatal discrimination against unborn girls. Reviewing the situation of the sex ratio at birth and its major correlates within Viet Nam may offer some answers.

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10 *The two regions identified by the analysis include, respectively, Tay Ninh, Ho Chi Minh City, Long An, Tien Giang, Ben Tre, Tra Vinh, Vinh Long, Can Tho, and Soc Trang in the South, and Bac Giang, Ha Noi, Vinh Phuc, Bac Ninh, Hung Yen, Ha Nam and Ninh Binh, in the North.*



### 3. Measuring sex imbalances at birth

Sex-selective abortions, the most common method for avoiding unwanted female births, generally go unrecorded, while figures on abortion are rarely dependable. Since there is no direct indication of the extent to which GBSS may be practiced, the presence of prenatal discrimination can be confirmed only by looking at the resulting sex ratio at birth. These skewed SRB levels remain the best indicator of prenatal bias.

In Viet Nam, the preference for male births was documented nearly two decades ago and even measured (Haughton and Haughton, 1997), raising fears that birth masculinity would rise in the future. As a result, attention was focused on the presence of sex imbalances at birth even though the 1999 census failed to confirm their emergence (Bélanger 2003). Since the last decade, statistical and field studies have identified a trend towards high SRB imbalance in Viet Nam using various demographic surveys.<sup>11</sup> The 2009 census provided the most reliable figure based on births taking place during the year preceding the census. At that time, the SRB in Viet Nam was 110.6 (GSO, 2011a). The IPS 2014 provides a new set of estimates for reviewing trends and differentials five years later.

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<sup>11</sup> *Studies on sex imbalances at birth in Viet Nam include Bang et al. (2008), Guilmoto et al. (2009) and UNFPA (2009, 2011).*

### 3.1. SRB estimates in 2014

The sex ratio at birth can be computed through different procedures according to the variables and the samples used. Since the IPS 2014 relied on two types of questionnaires, different sex ratio measurements are used here with sample size ranging from 22,600 to 289,000 (see Appendix I for more detail).

The first measurement is based on the birth history included in the long-form schedule, administered to the smaller sample of 22,599 births that occurred from April 2013 to end of March 2014. The second measurement is not based on births, but on the entire child population recorded during the IPS 2014. This population reflects the births that occurred in the past, but needs to be corrected for the effect of mortality since boys die in larger proportions than girls. The main advantage of this somewhat indirect measurement is that it is based on the entire IPS 2014 sample and, as a result, has 66,628 individuals aged less than one year. In some cases, the entire population born since 2010 is used, which includes 289,475 children. This sample is ten times larger than the number of births in 2014 and therefore, more appropriate for disaggregated analysis.

SRB estimates based on the 2014 survey results are shown in Table 4. The SRB estimate is 112.2 male births per 100 female births according to the recent births recorded by the IPS 2014. It is used as the official SRB estimate for 2014. The estimate based on the population aged less than one year is only slightly higher at 112.7. These two estimates concur and point to an SRB around 112.5 in 2014. The confidence intervals of these two estimates clearly overlap.

**Table 4: Two estimates of the sex ratio at birth in 2014 in Viet Nam**

	SRB	Confidence interval	Sample size
<b>Births during the last 12 months</b>	112.2	[109.3-115.2]	22,599
<b>Population below one (corrected for mortality)</b>	112.7	[110.0-114.4]	67,011
<ul style="list-style-type: none"> <li>• SRB: number of male births per 100 female births</li> <li>• 95% confidence interval</li> </ul>			

The reliability of these figures is corroborated by another available estimate. The General Office for Population and Family Planning (GOPFP) keeps a record of all births monitored by its population partners across the country. Based on the provisional GOPFP figures for 2013-14,<sup>12</sup> the estimate of the SRB for the one-year period prior to the IPS 2014 is 112.5 male births per 100 female births. While this figure derives from an entirely different source, it is worth noting that it lies exactly in between the two SRB estimates drawn from the IPS 2014. This triangulation method corroborates the quality of the IPS 2014 figures and confirms that the SRB was very close to 112.5 male births per 100 female births in 2014.

The number of births has been estimated at 1.57 million for 2014 with 830,000 and 740,000 male and female births respectively. It is now possible to compare this number of female births (based on the IPS) with the number of expected female births if the SRB in Viet Nam were at the natural level of 105. The latter figure is deduced simply by dividing the number of male births in 2014 (.83 million) by 1.05. The number of expected female births (.74 million) proves to be larger than the observed number of female births by 50,400 births. This figure corresponds therefore to the number of female births that went missing in Viet Nam in one year. It represents 6.9 per cent of

12 The GOPFP preliminary data corresponds to the period from January 2013 to August 2014 and closely coincides with the April 2013 to March 2014 period of the IPS estimate. Both periods are centered on October 2013.

all female births in 2014. In the absence of alternative explanations for the skewed SRB level, this number also corresponds to the number of cases of prenatal sex selection in 2014, mostly sex-selective abortions. A symmetrical computation yields a surplus of male births estimated at 52,900 in 2014.<sup>13</sup>

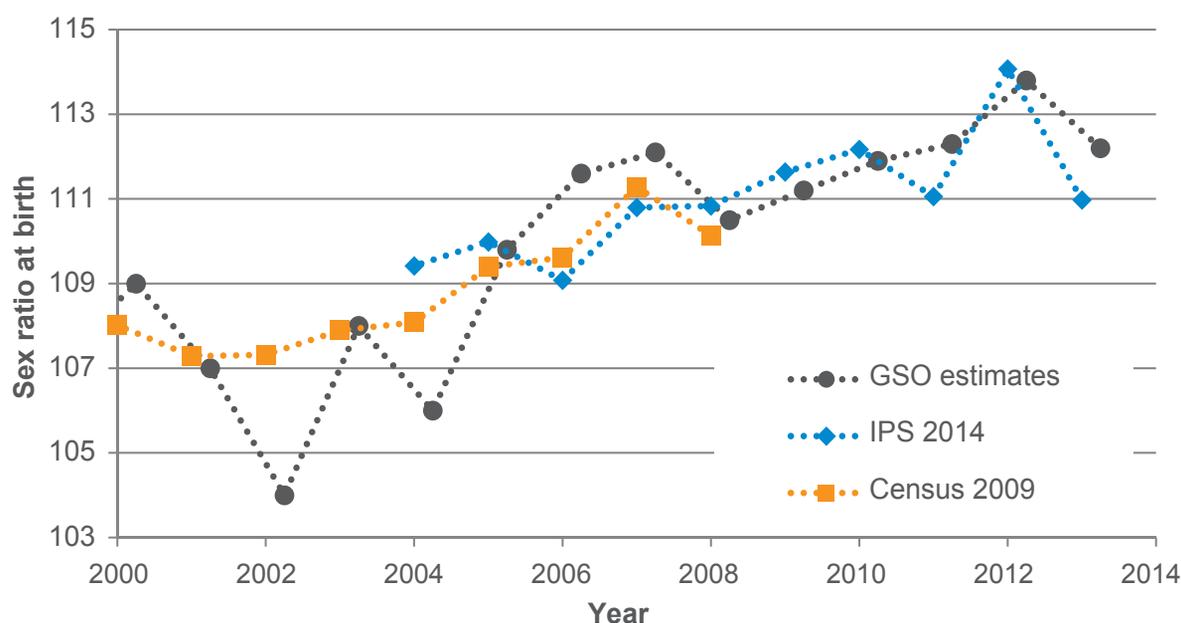
### 3.2. Trends in birth masculinity

Viet Nam's SRB level in 2014 is obviously skewed. It exceeds values observed in the neighbouring countries of Southeast Asia such as Thailand, Cambodia and Laos. But has it increased or decreased over the years? The direct comparison of the sex ratio at birth between the 2009 census and the IPS 2014 points to a relative increase in birth masculinity from 110.6 to 112.2 male births per 100 female births. The increase may appear to be insignificant if only the size of the birth sample and corresponding confidence interval are taken into consideration (Table 4). However, examining a larger set of estimates shows a more nuanced and definitive picture.

Different series of estimates are available to probe the nature of the trends over the past ten years. The following series of estimates help illuminate a larger picture:

- The first series, GSO annual estimates, is based on SRB estimates computed from the GSO's annual demographic surveys. Added to this series are estimates from the IPS 2014 as well as from those based on the 2009 census.
- Two more series are based on a back projection derived from age and sex distribution. Population sex ratios are corrected for sex differentials in mortality (see Appendix I). This computation is first calculated from the IPS 2014 age and sex distribution and then repeated with the age and sex distribution from the 2009 census.

**Figure 3: Estimated trends of the sex ratio at birth according to various sources, Viet Nam, 2000-2014**



13 In the conclusion, the estimation of excess boys is extended to the entire population below 15 years.

The SRB levels from these three series are plotted on Figure 3. Estimates derived from population-based samples tend to be more robust since they are bigger than birth history data. Annual GSO estimates may be affected by larger fluctuations, and this is especially visible for the period prior to 2005. The series do not perfectly coincide due to the oscillations caused by sample and estimation issues. Yet, a relatively clear picture over the last fifteen years emerges in which three distinct phases in the evolution of the SRB in Viet Nam can be distinguished: before 2004, 2004-2010 and after 2010.

During the first phase ending in 2004, the SRB remains low. It is close to the normal 105 level, though often higher. While prenatal sex selection may have already been present in some parts of the country during this period, its prevalence was modest, and it left almost no sizeable trace on the national SRB average which is rarely above 108. It is not possible to confirm whether birth masculinity was significantly above the normal level with limited data available covering this period. This phase ends around 2004, and SRB estimates tend to rise rapidly afterwards.

The second phase extends from 2004 to 2010. It is characterized by a sustained increase in birth masculinity. During that period, the SRB increased by about 6 per 100 according to various series. As observed earlier (Guilmoto et al., 2009), this corresponds to an extremely rapid augmentation. The annual rate of increase is close to 1 per 100 and is significantly faster than the increase observed in other countries such as China, South Korea, and the South Caucasus until the late 1980s. The analysis of SRB trends among parents without a son in previous births – a population especially vulnerable to the use of prenatal sex selection – clearly appears to rise from 2004 onwards, suggesting that this period was indeed a turning point in selective practices in the country (GSO, 2011a).

This phase clearly corresponds to a period of rapid diffusion of GBSS practices within the country; what was earlier known and practiced only by a minority had now spread across society, and the feasibility of using sex selection to avoid female births gradually became a reality for a larger proportion of the population.

The third phase, which may have started around 2010, is characterized by an obvious deceleration in SRB increase. The overall increase until 2014 appears modest and almost negligible. This may correspond to a slowing down of the SRB increase. A more optimistic interpretation would be that of a stabilization of the SRB level. Due to the limitations of the samples used here, it is in fact impossible to determine whether the SRB has still been on the increase during the last three years. Alternative annual estimates of the SRB by the GOPFP point to stabilization since 2009.

The interpretation of the recent trend is made even more difficult by the sudden jump from 112 to 114 observed in 2012. This isolated spike may be due to estimation issues, but it happens to be visible from annual GSO estimates and from the back projection of age and sex data of the IPS 2014. This brief increase may have been caused by the year of the Dragon, according to the traditional calendar. In fact, some authors consider superstition to be pervasive in Viet Nam and to have significantly affected the size of birth cohorts in the past (Do and Phung, 2010). Since the year 2012 was considered an especially auspicious year of the Dragon in Viet Nam (Nhâm Thìn), highly favorable to male births, it is possible that parents may have adjusted their reproductive behaviour to this occurrence. The year was first associated with a rise in the total number of births, demonstrating the real desire to have more children on that propitious year, but also by a light rise in the SRB. Also substantiating this theory, the SRB rise appears to have been more pronounced among the Kinh and among populations declaring a religion. The year 2012 was followed, however, by a plunge in 2013, and birth masculinity declined by 2-3 per 100 during that year. The SRB for year 2014 itself cannot be computed as the survey covers only the first trimester.

Here it is important to note outliers of this analysis. There are other sources available for outlining trends that may diverge from the previous figures. For instance, the GOPFP has produced yearly estimates of the sex ratio at birth across the country since 2009, but there is no SRB spike in 2012. Similarly, birth records from the IPS 2014, which are based on a smaller sample, suggest a rather rapid increase since 2008 from 108.4 (against the 2009 census figure of 111) towards 112, today. These estimates are not consistent with our interpretation of a slowdown. At this point there are no explanations for these discrepancies, but they highlight the fragility of sample-based datasets when it comes to monitoring SRB trends within Viet Nam.

In summary, while stressing that birth masculinity may have already been slightly skewed prior to 2004, it seems clear that its distinct rise began only in 2004. This increase was rather rapid in comparison with trends observed elsewhere. The increase also seems to have decelerated after the 2009 census. The SRB fell significantly after 2012 and reached 112 in 2014 – a level almost similar to what was observed in 2010-11. Setting aside the unusual year of the Dragon, there has been almost no increase in birth masculinity for the years since the census. This apparent stabilization is somewhat unexpected and contradicts the more rapid SRB increase in 2014 predicted earlier, on the basis of 2009 census data. A previous publication (GSO, 2011a) had forecasted an SRB level of 115 for 2015 in the so-called “no-intervention scenario”, but birth masculinity seems unlikely to have reached this level in 2015, assuming a continuation of recent trends depicted by the IPS 2014.



## 4. Regional and geographic variations

As suggested in chapter 2.1, the presence and intensity of gender-biased sex selection depends on several preconditions, and these factors usually vary significantly across the country. For instance, the fertility level may be lower in some areas and therefore, exerts a more powerful influence on affected couples that absolutely want a son. Modern sex selective technology may also be restricted to a minority for reasons of information, cost or location. As for son preference itself, there is no reason to believe that its intensity is uniform across regions or social groups. Consequently, sex selection tends to vary within countries, as documented in most countries affected by demographic masculinization (UNFPA, 2012). For instance, the extent of sex imbalances at birth varies within India or China; in some areas, the SRB is in fact almost indistinguishable from a natural SRB, while extreme SRB values above 125 are common in others.

The same degree of regional, geographic and social variations in SRB levels have already been documented for Viet Nam, most notably after the 2009 census (GSO 2011a). These variations are important for several reasons. On one hand, they help explain the factors at play in the decision to sex select, and to identify, for instance, the anthropological, economic and demographic underpinnings of skewed sex ratios. This may at times allow demographers to foresee future

trends in given regions or social groups. On the other hand, a better delineation of existing sex imbalances at birth within the country is a crucial tool for intervention.

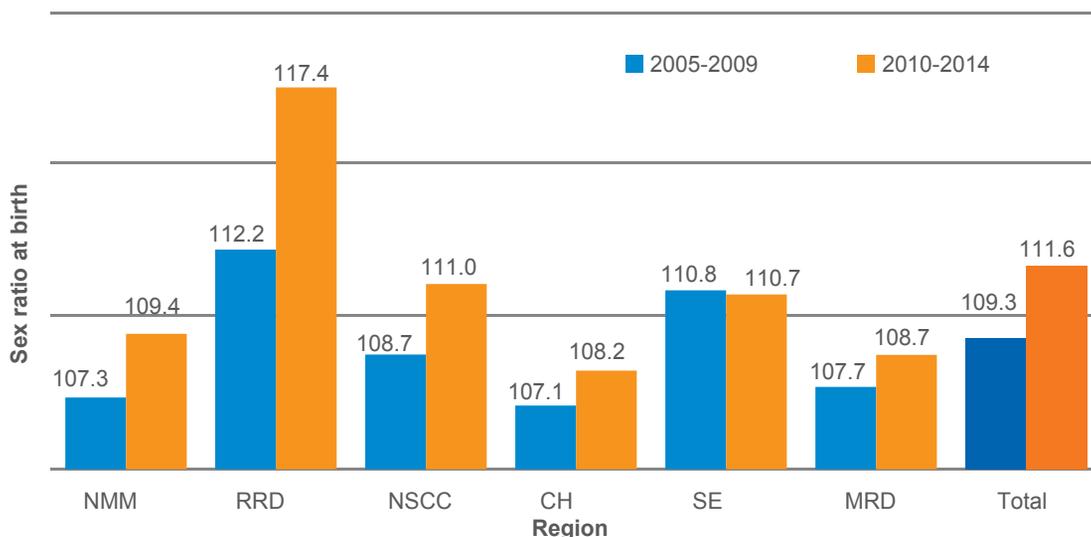
Challenges to this disaggregated analysis are both technical and interpretive. Data for an adequate socio-economic or demographic disaggregation may be missing, which then requires heavier reliance on careful interpretation. Another frequent issue is related to sampling; if analysis needs to be focused on small local units, birth or population numbers may fall short of what is required for producing significant estimates. This leads to random fluctuations in SRB computations that complicate meaningful analysis.

## 4.1 Geographic variations

The six macro-regions of the country provide a first summary of spatial variations across the country, even if these regions may themselves be rather large and heterogeneous (for instance, the central region is more than 1000 km long). The sex ratio at birth in 2014 varies from 106 to 118.

Since there are less than 4000 births in some of these regions, this estimate uses the population aged less than 5 years, after correcting for the effect of mortality on the observed sex ratio. The sample size per region ranges from 23,000 (Central Highlands) to 81,000 (Red River Delta) and provides far more reliable SRB estimates than birth records.

**Figure 4: Estimates of the sex ratio at birth in 2005-09 and 2010-2014, Viet Nam regions**



As shown in Figure 4, the mean SRB is 111.6 male births per 100 female births for the period 2010-14 in Viet Nam. The regional variations in SRB range from 108.2 to 117.4. The geographical divide is rather pronounced and has been already documented in previous research (GSO, 2011a; Guilмото, 2012). On one side, there are three regions in Viet Nam where the sex ratio at birth was very close to the normal level of 105. They include the Northern Midlands and Mountains, the Central Highlands and the Mekong Delta. In other words, half of the country displays SRB levels that are barely distinguishable from normal SRB levels as observed in the rest of Southeast Asia. It may be added that the first two regions are characterized by a lower level of social development, lower urbanization, higher fertility and a significant proportion of minority populations. These are conditions often unfavorable to prenatal sex selection. The third region with moderate SRB – the

Mekong River Delta – is, on the contrary, a more developed agricultural region with a rich urban network. It is also one of the regions in Viet Nam more influenced by Southeast Asian traditions than by Chinese culture and also shares some cultural and religious features with its western neighbours.

On the other side, the Red River Delta to the North has a distinctly higher SRB of 117.4 in 2010-2014. In comparison with international figures shown previously, the Red River Delta has a level of imbalances close to some of the highest levels observed in the world. Because of its common history with China and its proximity, it is also considered the part of Viet Nam where the impact of Confucian traditions has been the strongest. The intensity of son preference in this part of Viet Nam has already been pointed out in our previous analysis of reproductive behaviour. The other two regions – Southeast and the North and South Central Coast – have SRB values closer to the national average. They are characterized by a moderate level of prenatal sex selection, but they have a typically mixed population. Indeed, the South Central Coast includes provinces that are partly very close to the Mekong Delta region in the south and to the Red River Delta in the north. As for the Southeast region, it is part of South Viet Nam, but it has received a large influx of migrants from everywhere in the country over the last forty years, and its social composition is rather composite for that reason. This may explain why the SRB is higher than in the Mekong region to the South.

### Regional and geographic variations

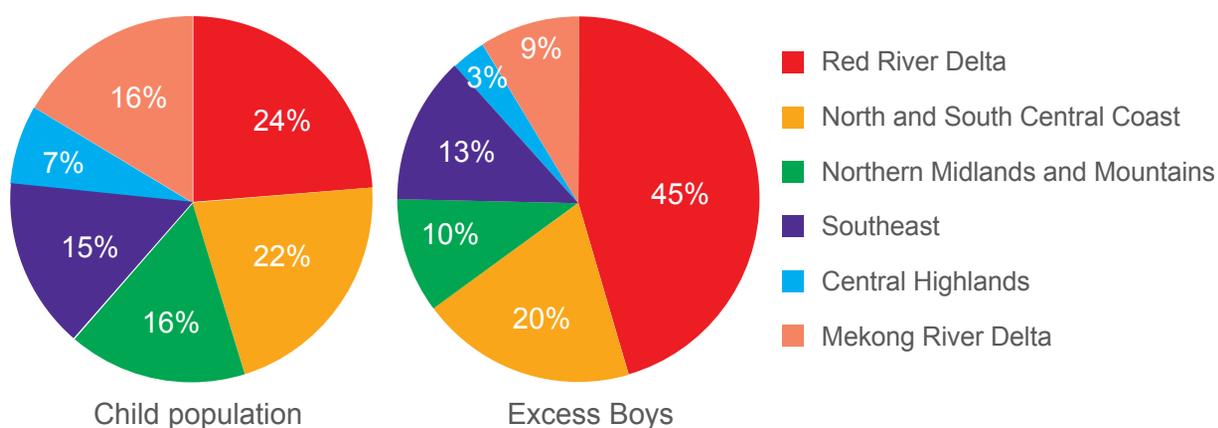
- SRBs in three regions, including Northern Midlands and Mountains, the Central Highlands and the Mekong Delta were close to the normal level of 105 in 2010-2014.
- The Red River Delta had a particular high SRB of 117.4 in 2010-2014, thus representing the only region in Viet Nam in which the SRB in rural areas is significantly higher in urban area.
- In provinces where the SRB is especially skewed, unborn girls account for almost 20 per cent of expected female births on the basis of a normal SRB.

Figure 4 also includes figures for the five years preceding the 2009 census. It is therefore feasible to compare the progression of the regional variations in SRB with the increase from 109.3 to 111.6 as observed in the country as a whole. What is observed is that the progression in SRB has taken place almost everywhere. As a result, the geography of prenatal discrimination in Viet Nam has not changed significantly during this period. The region around Hanoi already had the highest estimated level before 2009, while the Mekong River Delta and mountainous regions in both North and Central Viet Nam remained at the lowest values.

That said, a closer geographical analysis suggests that the rise in SRB since the 2009 census has been most pronounced in the Red River Delta. The average SRB level has expanded in this region by five percentage points. This constitutes undoubtedly a rapid increase, and the progression is significantly greater than that observed in other regions of Viet Nam. In comparison, changes in SRB levels have been less marked in the rest of the country, especially in the South. In particular, there is an apparent SRB stabilization in the Southeast region around 111 male births per 100 female births and only a moderate rise in the Mekong Delta and in the Central Highlands.

Differentials in birth masculinity across regions may also be converted into a surplus of boys, which in turn can be used to delineate the respective contribution of each region in Viet Nam to the number of excess boys. To do this, we follow the procedure used previously and compute the number of excess boys over the last five years by comparing the sex distribution of children aged less than five to what it would be with a normal sex ratio of 105 (after correcting for the effect of mortality). Surplus boys correspond to the difference between the observed number of boys and the number of boys expected if the sex ratio at birth had been normal. The regional distribution of these excess boys is shown in Figure 5 where it is contrasted with the regional distribution of children born from 2010-2014.

**Figure 5: Contribution of regions to the child population and to excess boys in Viet Nam, 2010-2014**

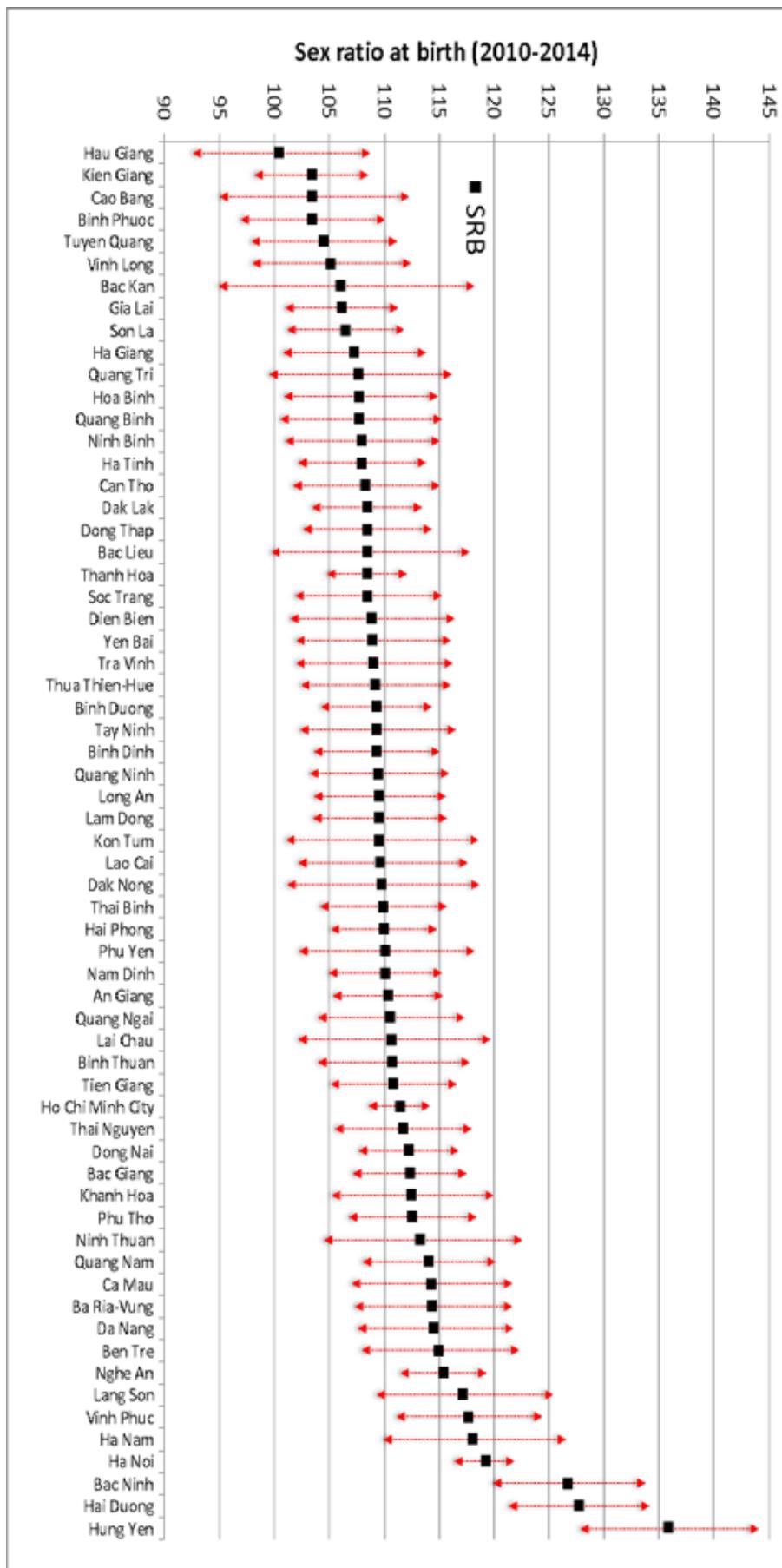


Unsurprisingly, the Red River Delta region takes the lion's share. While the region accounts for less than a quarter of all children in Viet Nam, it represents 45 per cent of the total number of surplus boys in the country. The northern and central regions account for another 30 per cent of the aggregated number of excess boys. By comparison, the three southern regions account for no more than a quarter of the national total of excess boys - whereas they represent more than 38 per cent of all children and 42 per cent of Viet Nam's total population.

It is more difficult to estimate the SRB variations for Viet Nam's 63 provinces. The IPS 2014 sample is insufficient since it is based on a few hundred births reported per province during the twelve months preceding the survey. It is therefore necessary to use the child population born between 2010-2014. The results are plotted in Figure 6. To provide a sense of the variability due to limited samples, confidence intervals have been added for each of these estimates.

The SRB estimates for 2010-2014 at provincial level are ranked by order of increasing magnitude. They are more pronounced than at the regional level since they range from the lowest estimate of 100 to the highest at 136. On one hand, there are half a dozen provinces with an estimated SRB level below 106. All are located either in South Viet Nam or in minority areas. With such low levels of birth masculinity, these provinces can be considered as almost free of prenatal selection. On the contrary, seven provinces of North Viet Nam display SRB values above 115. They include three provinces shown on the lower right of our chart with birth masculinity levels estimated above 125 – namely Bac Ninh, Hai Duong, and Hung Yen. While these estimates for individual units are far from perfect, there is no escaping the fact that these three adjacent provinces form a compact regional cluster of high birth masculinity in the middle of the Red River Valley. These figures reflect, once again, the extreme level of diversity in the country with regard to sex imbalances at birth.

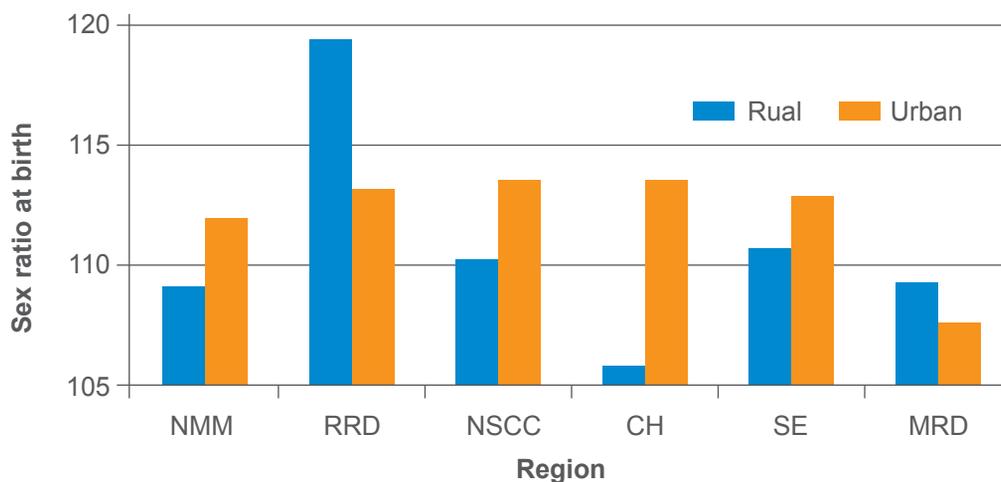
Figure 6: Estimates of the sex ratio at birth in 2010-2014, Viet Nam provinces



## 4.2. Rural-urban differentials

Another important dimension of SRB variations relates to rural-urban differentials. There is no general principle linking SRB to urban and rural areas. It is, for instance, higher in Indian cities but lower in Chinese cities. In Viet Nam, the difference between birth masculinity in the countryside and in towns has never been clearly pronounced. In 2014, the sex ratio at birth was lower in urban areas than in rural areas (110.1 vs. 113.1), but slightly higher when assessed for the period 2010-2014 (112.2 vs. 111.2). The variation between rural and urban areas also proved not significant five years earlier when computed with 2009 census data. This, however, does not mean that rural and urban Viet Nam are simply identical with respect to sex imbalances at birth. This apparent overlap stems from the interplay between regional and urban-rural zones, characteristic of the country as shown in Figure 7.

**Figure 7: SRB by region and rural/urban areas in Viet Nam, 2010-2014**



Data in Figure 7 are based on a regional disaggregation of rural-urban figures. They demonstrate that SRB is actually higher in towns and cities by several points in four different regions. Higher birth masculinity in urban areas can be explained by the role of lower fertility, better living standards and easier access to ultrasound testing that are typical of urban circumstances. The ethnic composition of urban areas is also different, with Kinh populations being the majority in towns and cities, as opposed to the countryside, including mountainous regions in the North or Center of the country.

This feature of higher urban SRB is, however, not true everywhere in Viet Nam. In fact, it is clear that in the two richest agricultural regions – the deltas of the Red River and the Mekong – the SRB is higher in the rural areas. Son preference is likely stronger in rural communities and among peasant families in view of the specific social and economic role sons play among rural families. For instance, a majority of the elderly in the rural areas has no pension benefits and rely primarily on their sons for support. Moreover, while the Mekong and Red River regions are mainly rural, they are characterized by a high population density and a tight network of towns and cities in contrast to other regions where rural populations tend to be more isolated. In such densely populated regions, access to healthcare facilities is rarely an issue, and fertility is rather low. These are the two dimensions known to be associated with sex selection.

The Red River Delta can be singled out as a region where the SRB climbs from 113 in urban areas to 119 in rural areas. It represents the only region in Viet Nam in which the difference in SRB between rural and urban areas is statistically significant. Incidentally, the same differential was observed in 2009 when the SRB in the Red River region was also higher in rural areas by 6 per 100 (GSO, 2011a). In the case of this region, son preference is clearly at the root of these

variations. If the fertility progression (PPR) at parity 2 is computed for this region – as done in the previous section – it is clear that the absence of a son in the first two births causes an increase in subsequent fertility of 29 per cent in urban areas, as compared to an increase of 45 per cent in rural areas. Obviously, the difference in son preference between urban and rural areas, measurable in fertility behaviour, also gets converted into increased prenatal selection in favor of male births.

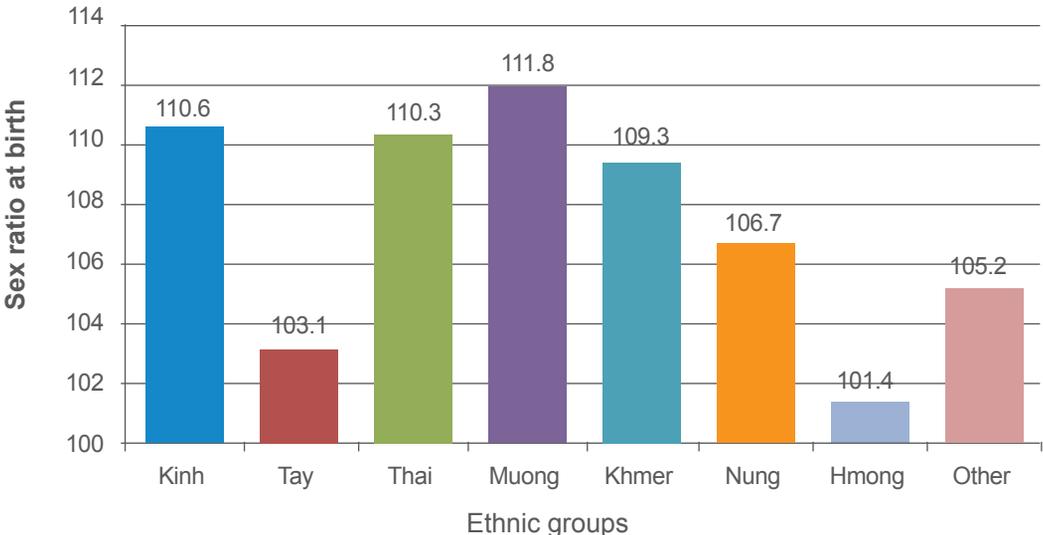
This brief analysis shows the complex way in which the rural and urban influence on birth masculinity plays out within Viet Nam and why the average difference is blurred at the national level, but pronounced at the regional level.



## 5. Social and economic variations

Besides geography, several cultural and socio-economic variables may also serve as predictors of GBSS. It is evident that the SRB varies across ethnic groups. Figure 8 computes the sex ratio at birth over the period 2010-2014 for eight ethnic categories. Three groups have an SRB level close or below 105: the Tay and the Mong (living in the mountainous parts of the North of the country), and the “other ethnic groups” including, in particular, the Cham and the ethnic Chinese. Samples are small, and the differences in SRB with the Kinh are significant only for the Mong, Tay and other ethnic groups. The SRB among Khmers is rather high, which is surprising in view of their more typical Southeast Asian social features.

**Figure 8: Sex ratio at birth in 2010-2014 by ethnicity, Viet Nam**

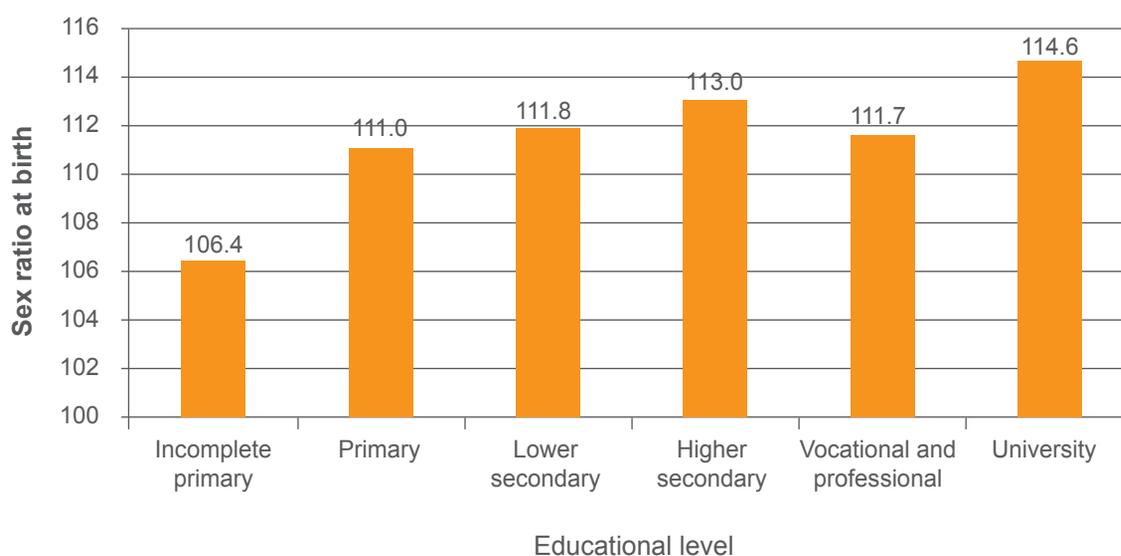


Another socio-cultural difference that can be addressed with IPS 2014 data is religious practice, which tends to cause a sizeable decrease in birth masculinity from 110.1 (no religious practice) to 105.3 (religious practice). The population declaring a religious practice represents a minority in the sample population (15 per cent of children) and includes an almost equal number of Buddhists and Catholics, with very few other faiths. However, religious practice corresponds to a cultural marker distinctly correlated to a lower SRB. Is it linked directly to weaker son preference or to avoidance of abortion, especially among Catholics? There is not enough information here to understand the linkage. However, it is considered that cultural characteristics ultimately reflect variations across Viet Nam in kinship systems and son preference that have a direct bearing on sex selection (Guilmoto, 2012).

Besides these “horizontal” variations across sociocultural groups and regions within the country, there are also “vertical” disparities across socio-economic groups. The major source of variation relates to the socio-economic status of individuals and families. Thus, it is expected that son preference may be stronger among peasant groups, while more prosperous groups may have both lower fertility and easier access to sex selection technology, all features likely to increase the proportion of boys. Unfortunately, the IPS 2014 provides no information on occupations of household members. It is, therefore, impossible to distinguish the strength of sex imbalances between say farmers and civil servants. The questionnaire also has no detail on the sector of employment (primary, industries or services), and it is, therefore, impossible to assess whether economic sectors influence prenatal discrimination. There are, nevertheless, several indicators on individual educational attainment, as well as household-level variables on housing and amenities, which will be used as proxies for socio-economic status.

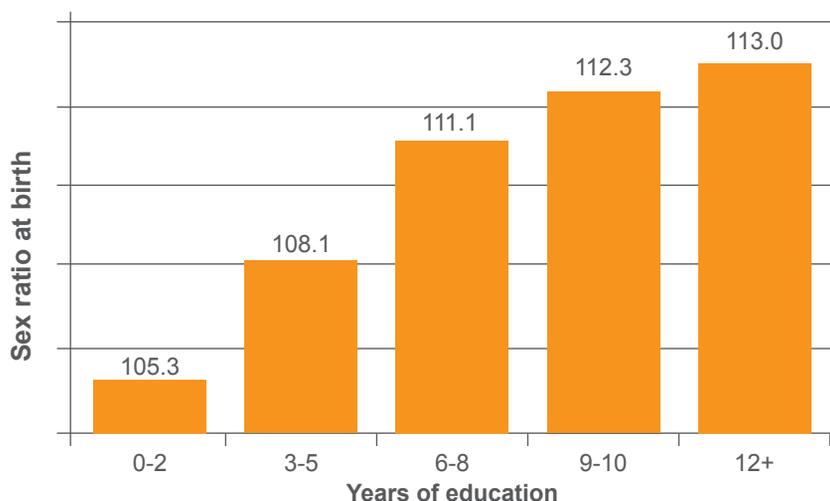
Using birth records, it is possible to relate the SRB of births during 2010-2014 to the education level of the mothers. Here, the original education variables are simplified by regrouping all vocational training and professional education into a single category. Data plotted in Figure 9 illustrates the strong relationship between education and sex selection. SRB figures start with the lowest education level – including the illiterate population – which displays the lowest SRB at 106. This typically corresponds to poorer populations living in isolated rural locations with little access to schooling or modern infrastructure. Not only is fertility higher among them, but their access to modern healthcare and reproductive technologies is restricted by distance to towns and poor living standards. Among the poorer populations, sex imbalances at birth are marginal, therefore prenatal sex selection seems to be almost non-existent.

**Figure 9: Sex ratio at birth by educational level of mothers in Viet Nam, 2010-2014**



When the educational attainment of women increases, so does the SRB. It climbs from 106 to 111 for primary level, to 113 for upper secondary and finally to 115 for university education. Educational attainment causes an increase in birth masculinity from 106 to 115 male births per 100 female births. This range of variation is as large as the variations in SRB observed across the six regions of Viet Nam (see Figure 4).

**Figure 10: Sex ratio at birth by number of years of education of mothers in Viet Nam, 2010-2014**



A similar analysis can be repeated with the equivalent number of years of education (Figure 10). Years are clubbed together to reduce random fluctuations due to sample size. The picture from this analysis leads to a comparable gradient linking higher education to more biased birth masculinity in Viet Nam. Starting again with the most underprivileged mothers having less than 3 years of schooling, the SRB is identical to the natural biological level of 105. However, birth masculinity rises fast with increased years of schooling to 108, 111 and 112 in the next educational groups. It plateaus at 113 among mothers with 12 years or more of education. The range of variation (8 per 100) is similar to that measured with educational levels.

#### Social and economic variations

- Normal SRB at low educational levels; higher SRB at higher educational levels.
- SRB lowest, at 107, for the poorest group and highest, at 113, for the richest group.
- Improvement in economic situation of households and/or social diffusion may have led to the increase of SRB among poorest and poor groups during 2009-2014.

How to interpret this educational gradient? On one side, educational attainment is a proxy for socio-economic status, a dimension that will be explored in more detail below. On the other, girls' and women's education is the best indicator of social development and empowerment. It is therefore unexpected to find it so closely associated with high SRB and thus gender bias, since it should be education precisely that helps women withstand patriarchal values and the accompanying social pressure. Clearly, this is not the case. It is possible that educational achievement is in fact linked with some of the other predictors of prenatal sex selection such as low fertility and access to modern selective technology. According to such reasoning, better educated women would tend to reside more often in urban areas, have lower fertility and easier access to prenatal diagnosis, and hence, are more susceptible to resort to sex selection. However, this should be taken only as a hypothesis to be tested later, in a more systematic way.

Apart from educational attainment, a synthetic indicator is also used to determine socio-economic status. This indicator of living standards is designed to categorize households by defining them into five socio-economic quintiles, from the poorest to the richest category (see Appendix II). These quintiles are computed using data on housing quality and available household equipment, but they reflect income groups and socio-economic status for which data are missing from the GSO annual demographic surveys. Quintiles are also associated with the educational achievements of adult household members.

**Figure 11: SRB by socio-economic quintile in Viet Nam, 2009 and 2010-2014**

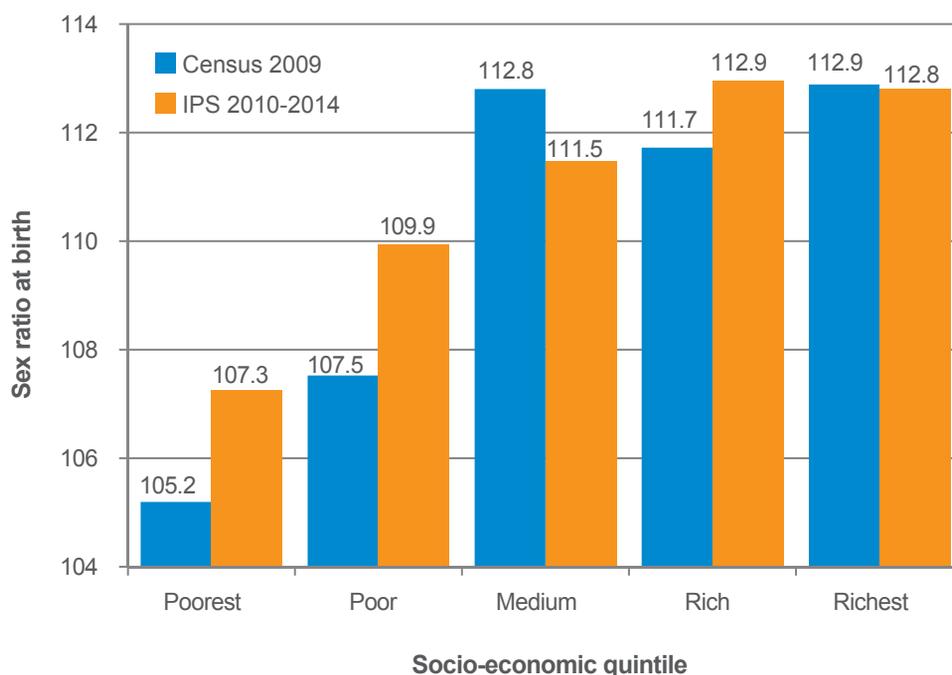


Figure 11 illustrates the relationship between socio-economic status and SRB. It is somewhat parallel to the differentials previously observed across educational levels, especially when computed in five educational groups shown previously. The poorest quintile in 2014 displays an SRB level of 107, almost similar to the natural biological level. The less prosperous classes in the country have remained partly immune to the recent spread of sex selection. But the SRB rises significantly moving up the social ladder from 107 to 110 and 111.5, reaching a peak of 113 for the fourth and fifth quintiles. In fact, the two highest quintiles (fourth and fifth quintiles) – which correspond to the 40 per cent more prosperous sections of Vietnamese society – exhibit the highest levels of birth masculinity. As with variables based on the mother’s education, one can differentiate a steep increase in SRB from an almost normal level among underprivileged groups to the highest SRB among the richest, with a plateau among the highest categories.

Estimates from the previous census have also been added to Figure 11, and a comparison shows that this socio-economic gradient is not entirely new. The same relationship between living standards and SRB was observed at the time of the 2009 census (GSO, 2011a). When these results are compared with data from the 2009 census, the overall picture is indeed similar. The main difference between 2009 and 2014 lies in the observed increase in SRB by more than two points in the two poorest socio-economic quintiles. Among more affluent populations, the SRB has remained more or less stable during this period and appears to have leveled off. This suggests that economic mobility or social diffusion has had some impact on the first two socio-economic quintiles. They have benefited from the rapid economic growth, which oscillated between 5 per cent and 7 per cent during the period following the 2009 census. The poorest sections now have demographic features more in line with the rest of the population, including prenatal sex selection.

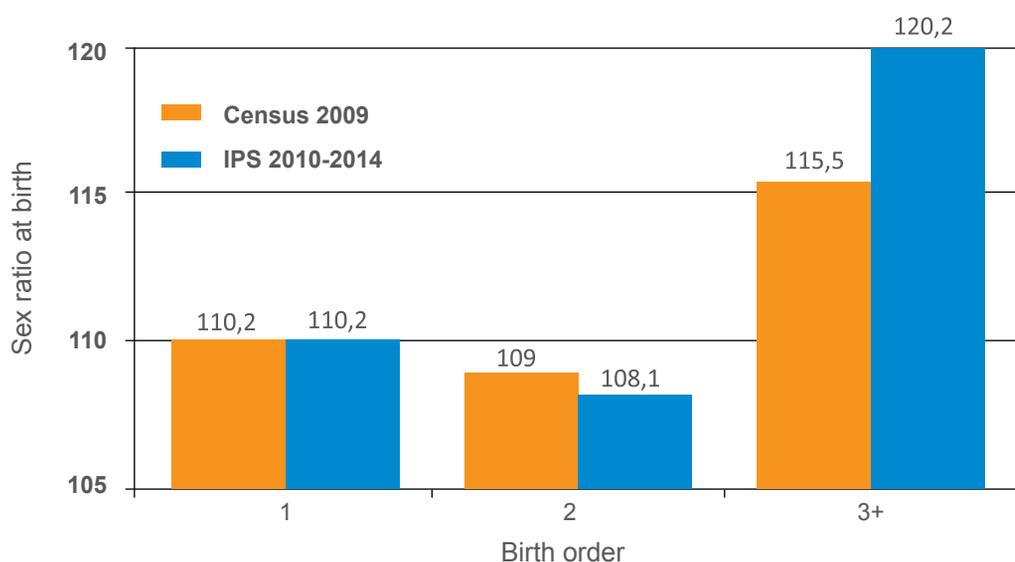
## 5.1. Masculinity, birth order and gender composition

One distinctive feature of the SRB is the variation observed across parities (birth order). In most countries with elevated SRB, birth masculinity is higher among later births. Initially, parents are relatively indifferent to the sex of their children and the sex ratio is often normal for the first two births. The situation may, however, change drastically after the first two births in the absence of a boy. At this higher parity, more parents will resort to prenatal sex selection to ensure a male birth. In countries like China or Armenia, the SRB among third and higher order births may, as a result, be higher than 150 male births per 100 female births.

Viet Nam follows this general pattern to some extent. As the preceding PPR examination suggests, the birth of two successive girls is a turning point for many parents when they realize that they may end up without a boy. Not only will they be far more likely to have a third child than parents who already have a boy, but the sex of this new birth may also be especially skewed as we will see. However, the sex ratio at birth does not increase regularly with birth order as in other countries.

To explore Viet Nam's case, data on the 93,000 births that took place during 2010-2014 are used to compute variations in SRB, according to birth order. These estimates are plotted in Figure 12. The SRB among higher-order births is indeed very high in Viet Nam. It crosses the 120 threshold, a level well above the average SRB or even values observed in the Red River Delta region. Nevertheless, the SRB of high-order births is below figures observed in the aforementioned countries. In fact, the sex ratio at birth hardly increases from parity 3, since it is 119 for third births, 123 for fourth births and 122 for fifth births.<sup>14</sup> Another unusual feature is that the SRB for first births is 110 in Viet Nam, a level distinctly above the biological 105 standard. As a matter of fact, the SRB does not increase for births of birth order 2 and rises only for higher-order births.

**Figure 12: SRB by birth order in Viet Nam, 2009 and 2010-2014**



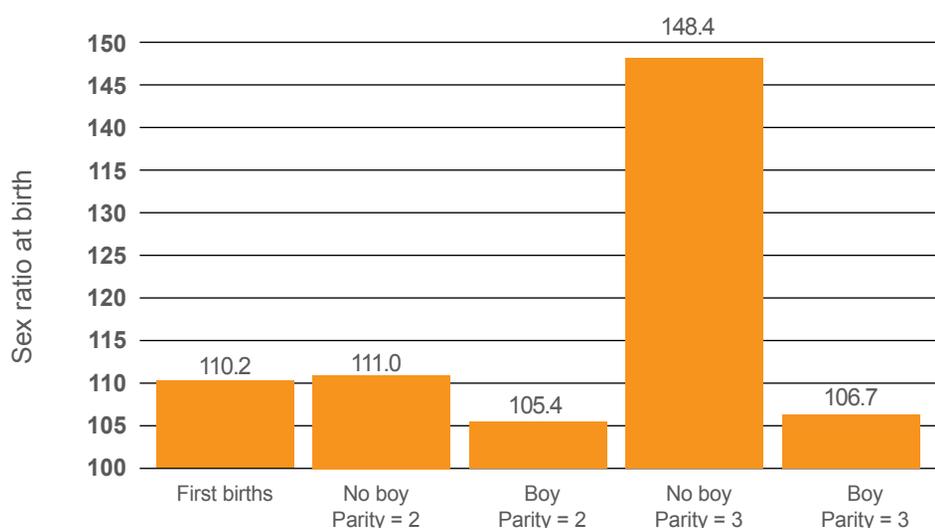
This distribution of conditional sex ratio at birth is not new in Viet Nam. Results from the 2009 census, also plotted in Figure 12, display similar features. The initial SRB study had already detected the unusually high sex ratio of first births prior to the 2009 census (UNFPA, 2009). When comparing findings from the 2009 census with those from IPS 2014, it is apparent, however, that there is a distinct increase in the SRB at higher parities from 2009 to today; the SRB for birth order 3+ appears to have risen by five points in a few years, with other parity-specific SRBs remaining stable. This suggests that the increase in SRB from 2009 to today has been primarily caused in Viet Nam by an increase among later births.

<sup>14</sup> Some of these estimates are, however, based on rather limited samples, since high order births are very rare in today's Viet Nam.

Even when the SRB of higher-order births increased in Viet Nam, their contribution to the overall sex imbalances at birth observed in the country remained smaller than that of first and second births. Keeping in mind that third and higher-order births are uncommon in the country, their weight is modest. First-order births represent the largest share of all births – 47 per cent from 2009-2014. More precisely, the contributions of each birth order to the overall number of excess male births in 2010-2014 can be computed by comparing the results with a hypothetical SRB of 105. This analysis demonstrates that the excess boys among first births account for 42 per cent of all excess boys. Second births contribute to 20 per cent of the deficit of female births, while the much higher SRB for birth order 3+ explains only 38 per cent of the deficit. In other words, birth masculinity among the first and second births might not appear especially skewed, but these births contribute 62 per cent of the total number of excess male births in the country.

Birth history data collected during the IPS 2014 also allow us to reconstruct the gender composition of siblings according to time and parity. As was done with fertility behaviour, in particular, it is useful to differentiate births that followed male births from those that followed successive female births in 2009-2014. Results are shown in Figure 13. This analysis stresses that the need for a boy is crucial in the reproductive strategy of Vietnamese couples. It is, perhaps, more useful to consider the situation of second births, given that the SRB of first births is, by definition, not influenced by the previous gender composition. Second births after the birth of a boy have a perfectly normal SRB of 105. In contrast, the SRB of second births following the previous birth of a girl rises to 111 male births per 100 female births. Interestingly, this level is almost the same level as for first births.

**Figure 13: SRB by birth order and previous gender composition in Viet Nam, 2010-2014**



This selective behaviour can be explored in more detail by looking at higher-order births and the effect of gender composition. By restricting the analysis to births at birth order 3 or higher, it is easy to distinguish between the two situations. Among parents with one boy or more, the SRB remains almost normal at 107. Sex selection in favor of boys appears very limited, if not negligible.

However, for the parents with no male offspring among their first and second births, the SRB of the next births shoots up to 148. This is the highest SRB level ever encountered in our analysis. In such a situation, boys are in excess by almost 50 per cent compared to the natural sex distribution. The figure of 148.4 boys can also be related to the expected number of girls ( $141.3 = 148.4/1.05$ ) if the sex ratio at birth were normal. In this category, 41.3 girls out of 100 are missing. This signifies that missing girls correspond only to sonless parents. The IPS data allow us to go further, even if sample sizes tend to weaken the quality of these estimates. It is possible, for instance, to investigate

whether this high level of discrimination, after two female births, is similar across Viet Nam. There is, for example, no difference between urban and rural areas, in this regard. Regional variations, however, are once again pronounced. In the southern provinces, the absence of a male offspring has almost no impact on birth masculinity of third and higher-order births. But in the Red River Delta, the SRB of sonless families jumps to 215. This ratio is based on only 1700 births, and its 5 per cent confidence interval ranges from 195 to 238 male births per 100 female births. This record SRB level points to a deficit of female births ( $215/1.05 - 100 = 105$ ) that is in fact larger than the actual number of female births (100).

The variation of SRB in families with no male offspring has also been tested against socio economic status by computing the sex ratio after two or more female births for each of our socio-economic quintiles. It turns out that the sex ratio increases regularly with economic status, from 119 among the poorest category, to 125, 160, 175 and finally 187 male births per 100 female births, among the most privileged group. While confidence intervals are once again large due to the size of these subsamples, the socio-economic gradient is manifest and as strong as the regional differentials. The previous PPR analysis suggests that the need for a son, already expressed in fertility behaviour, probably outweighs all other factors (low fertility, access to technology) among these subpopulations. In conclusion, this analysis has achieved an improved outline of how sex selection proceeds in Viet Nam in demographic terms. As fertility is below replacement level, parents worry about the exact number and composition of their future family early on. A small percentage of couples – about 5 per cent – opt for prenatal sex selection right from the first pregnancy. Their strategy is to ensure immediately the birth of a son as the elder child. Some of the parents may in fact not have any more children, and their share has been shown to be higher among parents of a first son (see the PPR analysis). While birth masculinity is not especially high among first births, the overall impact of this early form of gender discrimination is considerable because they represent most of the births recorded in Viet Nam.

#### SRB variation by birth order

- For the parents with no male offspring among their first and second births, the SRB of the next births shoots up to 148.
- In these situations, boys are in excess by almost 50 per cent compared to natural sex distribution, in other words, 41.3 girls out of 100 are missing. This means that missing girls correspond to sonless parents only.

The most visible feature of sex selection becomes apparent after the second birth. The decision to have a third child is often constrained by socio-economic considerations, as well as by local political pressure. However, a large proportion of parents who failed to have a boy among their first two children may finally decide to have a third child. In this case, the SRB climbs to 148, and the ratio may even be more skewed in some specific subpopulations. The third child appears frequently as a matter of gender needs.

## 5.2. A synthetic analysis of sex selection in Viet Nam

In the course of this examination of SRB differentials, a wide range of factors have been examined, spatial, social, economic or otherwise. Many of these tend to overlap while some may even complement one another. This last section presents the result of a comparative analysis bringing together most of the variables used thus far. The objective is to clarify the respective effects of these various factors and to try to rank them in declining order of importance.

This analysis relies on a standard log-linear regression based on a logit model. The multivariate regression takes the (logit of) sex of births as the dependent variable, using social and demographic explanatory variables. By using the entire sample of births (based on birth history details) since 2004, the period during which SRB was based is covered. In a nutshell, the aim is to identify

variables that increase the masculinity of births and to see whether they combine with or nullify each other. Variables used are the same as those presented earlier in the SRB analysis and refer either to individual births, mothers or households. They are briefly described here:

- Parity (1, 2 and 3+)
- Year of birth (reflecting trends)
- Relationship of the mother to household head (four categories)
- Mother's marital status (four categories)
- Mother's current age, age at marriage and time between marriage and birth
- Ethnic minority (dichotomous) and religious practice (dichotomous)
- Whether the mother has been a migrant during the last 5 years (dichotomous)
- Number of years of education completed by the mother
- Household's socio-economic quintile
- Urban residence (dichotomous)
- Region of residence (six regions)

A caveat is required at the outset; the sex at birth is mostly a random biological phenomenon with excess male births representing only 2.5 per cent of the entire volume of births.<sup>15</sup> As a result, there can be no expectation of strong regression coefficients with the logistic model used here since the sex of most births remains purely random. The regression results are, however, stronger when restricted to subsamples—such as third and higher-order births—in which the SRB is significantly more skewed and the proportion of excess male births larger. Presented here are three sets of results based on three different subsamples. It is indeed more illuminating to distinguish births by parity, keeping aside first births (Model 1) from births at higher parities, in families with no son (Model 2). The last analysis is further restricted to births at parity 3 and higher with no previous son (Model 3), as the subsample corresponding to the highest level of sex imbalances at birth. The results indicate that in spite of large samples, ranging from 11,000 to 93,000 births, most of these variables are not significantly related to birth masculinity. This is also true for some variables that previous binomial analysis had shown to be correlated with birth masculinity.

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15 With an average SRB of 110, there are presumably 5 excess male births out of a total of 205 births (105 male +100 female births). This represents less than 2.5 per cent of the number of births.

**Table 5: Logit regression models of the probability of male births according to parity and gender composition, Viet Nam, 2004-2014**

	Model 1			Model 2			Model 3		
	Parity One			Parity>1 without previous male child			Parity>2 without previous male child		
	Odds ratio	z	P>z	Odds ratio	z	P>z	Odds ratio	z	P>z
<b>CHILD</b>									
<b>Parity&gt;1</b>				1.17	5.92	0.00			
<b>Year of birth</b>	1.00	0.30	0.76	1.01	0.37	0.71	1.01	0.27	0.79
<b>MOTHER</b>									
<b>Relationship to household head (spouse is reference)</b>									
Household head	0.94*	-2.37	0.02	1.02	0.64	0.52	0.96	-0.40	0.69
Child	0.98	-0.56	0.58	1.13**	2.50	0.01	1.36	1.73	0.08
Other relative	1.00	0.51	0.61	1.04	1.73	0.54	1.11	1.52	0.13
Unrelated	1.28	1.72	0.08	1.37	0.93	0.35	1.75	0.46	0.65
<b>Marital status (married is reference)</b>									
Widowed	1.13	1.71	0.09	0.93	-0.85	0.40	1.12	0.62	0.54
Divorced	0.96	-0.94	0.35	0.93	-0.83	0.41	1.28	1.01	0.31
Separated	1.21*	2.22	0.03	0.71*	-1.96	0.05	0.60	-1.03	0.30
<b>Age</b>	1.00	0.20	0.84	1.00	0.00	1.00	0.99	-0.25	0.80
<b>Age at marriage</b>	1.00	0.08	0.94	1.00	-0.15	0.88	1.00	0.06	0.95
<b>Time since marriage</b>	1.00	-0.28	0.78	1.01	0.68	0.50	1.04	0.74	0.46
<b>Ethnic minority</b>	1.00	-0.16	0.88	0.95	-1.49	0.14	0.82**	-2.78	0.01
<b>Religious practice</b>	0.98	-1.11	0.27	0.94*	-2.18	0.03	0.96	-0.69	0.49
<b>Migrant (5 years)</b>	1.00	0.07	0.94	0.98	-0.45	0.65	1.03	0.20	0.84
<b>Years of education</b>	1.01*	2.18	0.03	1.00	0.95	0.34	1.00	-0.38	0.70
<b>HOUSEHOLD</b>									
<b>Quintile (poorest quintile is reference)</b>									
Poor	1.00	0.20	0.84	0.96	-1.39	0.17	0.95	-0.73	0.47
Medium	1.01	0.36	0.72	1.03	0.76	0.45	1.05	0.68	0.50
Rich	1.00	-0.03	0.98	1.01	0.28	0.78	1.23**	2.63	0.01
Richest	0.99	-0.42	0.67	1.02	0.39	0.70	1.25**	2.55	0.01
<b>Urban</b>	0.99	-0.45	0.66	0.97	-1.35	0.18	0.94	-1.16	0.25
<b>Region (North and Central Coast is reference)</b>									
Central Highlands	1.02	0.80	0.42	0.99	-0.32	0.75	1.02	0.23	0.82
Mekong Delta	1.03	1.16	0.25	0.97	-0.97	0.33	0.99	-0.14	0.89
Northern Midlands and mountains	0.99	-0.53	0.59	1.09**	2.69	0.01	1.51**	5.75	0.00
Red River Delta	1.00	0.17	0.86	1.11**	3.75	0.00	1.42**	6.13	0.00
Southeast	1.04	1.47	0.14	1.01	0.20	0.84	0.90	-1.28	0.20
<b>Constant</b>	.0000	-0.31	0.76	.000	-0.37	0.71	.000	-0.26	0.79
<b>n</b>	93901			48958			10882		
<b>Log likelihood</b>	-64981.1			-33693.8			-7292.01		

Significance levels: \*\*=1%; \*=5% (computed with Probability > z )

High male sex ratios among first births in Viet Nam remain somewhat of an enigma. The results of the analysis of Model 1 help shed new light on this issue by identifying a few variables statistically associated with the masculinity of first births. The strongest association is with mothers who are household heads, among whom the SRB of first birth is distinctly lower. In fact, the average SRB of first births of these women is not statistically different from 105, and the low SRB persists in the multivariate model. A vast majority of female heads of household are currently married. Does this mean an association between stronger gender equity values within the family with both normal

SRB and women taking up headship? On the contrary, the SRB is statistically higher among separated women. Interpretation of these two associations requires additional hypotheses, which then require more systematic analysis based on other sources. One possible hypothesis is that separated women have suffered in their marriages and pressure to have sons, reflected in high SRB, can be one of the reasons.

The only other significant correlation in Model 1 refers to educational achievement, since the SRB of first births tends to become more skewed as the number of years of schooling increases. If there were a strong socio-economic gradient, some correlation with socio-economic status or urban residence would be expected, but this is not the case. It is only possible to suggest that better education relates to greater information on prenatal technology, higher anticipation of birth outcomes and lower fertility. Also, there appear to be no clear regional trends, which is rather striking in view of the pervasive influence of geography on gender bias encountered in our analysis.

The analysis of parents with only daughters in Model 2 leads to a more typical situation of sex selection. First, the strong association between higher SRB and higher parity becomes evident, corresponding to the role played by the need for sons in fertility progression. It is also possible to distinguish in Model 2 the impact of the regional patterning of high birth masculinity, with the Northern provinces emerging with distinctly higher SRB. The Red River Delta clearly dominates the rest of Viet Nam. The logit analysis demonstrates that even after accounting for many important variables such as residence, ethnicity, socio-economic status or other demographic characteristics, birth masculinity in Viet Nam is still significantly affected by the region of residence.

Birth masculinity is also higher among mothers who are classified as “children” of the household head, a rather uncommon situation in Viet Nam where patrilocal residence – staying within or close to the husband’s family after marriage – predominates. The association is therefore rather counter-intuitive, although visible in Model 3.

The lower SRB among minorities is visible but without clear significance. This is probably due to variations in son preference across ethnic minority groups in Viet Nam. Religious practice, mostly Buddhist and Catholic, remains clearly associated with a lower level of birth masculinity as described earlier, even after controlling for regional and socio-economic characteristics. Interestingly, education and socio-economic status play no further role when combined with other social variables. Yet, when the analysis is restricted to parities higher than two (Model 3), the socio-economic differentials are brought into stark relief and the SRB is shown to be especially high among the two richest quintiles. The regional gradient also remains quite pronounced in this last model, with odds ratios close to 1.5 in two regions. Some of the main features of high SRB have already been covered in the previous analysis, with regions and social class acting as major independent factors of high birth masculinity in Viet Nam. In addition, the difference is also visible according to ethnicity, since being Kinh tends to further intensify the sex ratio in this subsample.

It should also be noted that a few variables included in this analysis are devoid of any statistical significance. This is not surprising for a characteristic such as urban residence, which has already been shown to have a complex interaction with regional distribution (Figure 7). Also noteworthy is the absence of any correlation with age, age at marriage or duration of marriage. There seems to be no clear trend by applying the year of childbirth. The status of migrants, likewise, appears to have no impact on birth outcome.

In conclusion, our analysis demonstrates that the characteristics of “sex selectors” vary considerably according to the birth order of affected children. Parents with more boys than expected among first births are quite different from those who have an excess of male births among higher-order births. Marital status, region of residence, education and socio-economic status tend to play quite distinct roles in determining higher sex ratio at birth among first or later births. This suggests that when it comes to prenatal sex selection, two different subpopulations can be distinguished in terms of geography and sociological profile: people who practice sex selection early and people who wait until they have two daughters.



## 6. Summary of the research and findings

**M**onitoring the evolution of birth masculinity in Viet Nam is of considerable importance. Not only has the sex ratio at birth recorded a steady rise since the mid 2000s, it has now reached a level closer to the highest SRB measured in the world (China). In spite of the registration systems existing in the country (Bang et al, 2010), there is no perfectly reliable series of annual SRB estimates in the country, and regular population surveys conducted by the GSO are therefore crucial.

The IPS 2014 provides fresh data for assessment of the situation five years after the 2009 census. In particular, there is now a new estimate of the national sex ratio at birth set at 112.2 male births per 100 female births, at the beginning of 2014. This figure has been shown, based on recent births recorded by the IPS 2014, to be perfectly consistent with other figures derived from the sex distribution of the population below one year and from the independent estimate by the GOPFP.

Interpretation of IPS data leads to a better understanding of the many social, economic and demographic correlates relating to the skewed sex ratio in Viet Nam. An in-depth analysis of reproductive behaviour reveals the complex interplay between the number of children couples want and their sex composition. In particular, this analysis has shown that the need for sons is the primary factor behind the decision to have a third or higher-order birth. Many Vietnamese couples clearly adjust their fertility behaviour to their gender objectives, which basically means ensuring the birth of at least one son. Now that the sex selection technology has spread widely in the country, differential fertility is no longer the only way to facilitate the birth of a son, and

couples may avoid the birth of additional daughters through sex-selective abortions. Fertility progression from one birth to the next and birth masculinity are two signs of the ingrained gender bias that characterize many parts of the country. The role of family systems, economic and cultural constraints, and social pressure has already been documented by different studies. However, the IPS 2014 has contributed towards improved estimation of the intensity of son preference and the various reproductive decisions that facilitate implementation.

The skewed sex ratio at birth is a highly visible manifestation of this gender bias and will have a long-term impact on the country's population structures. This analysis indicates that the recent sex ratio at birth corresponds to an excess of 52,900 male births during the last five years. It is useful to compare the sex ratio by age with that observed in neighbouring Thailand, where sex selection has never been observed.<sup>16</sup> The sex ratio among the population aged less than 15 is 105.5 in Thailand as against 108.6 in Viet Nam. When computed over five-year age groups, this difference in sex ratio between both countries corresponds to an excess of 309,800 boys aged 0-14 in Viet Nam, compared to Thailand, i.e. 3 per cent of the corresponding male population below 15. Even if minor factors related to enumeration or mortality were also at play, this demographic gap is mostly due to the skewed sex ratio at birth observed recently in Viet Nam. As birth cohorts gradually age, this male surplus will not vanish. It is therefore likely to distort the sex distribution of young adults within the next fifteen years and potentially affect the marriage prospects of young men.

The mechanism of sex selection appears more complex in Viet Nam than elsewhere. Skewed sex ratios are typical of higher-order births because of the number of couples opting for an additional child due to births of successive daughters. The sex ratio at birth has been measured, for instance, at close to 150 after two successive female births, which confirms that third and higher-order births are often motivated by the absence of a son. Yet, the analysis of the data corroborates the presence of prenatal discrimination among first births. This had been previously observed by the first study of sex selection in Viet Nam (UNFPA, 2009) and confirmed by the analysis of the 2009 census data (GSO, 2011a). The IPS 2014 puts the sex ratio of first births at 110, a level significantly above the natural sex ratio at birth. While the figure appears less skewed than for third and later births, gender discrimination among first births accounts for no less than 40 per cent of the entire sex imbalance currently estimated in the country.

Further data analysis indicates that social and economic differentials are also affecting birth masculinity, with lower SRB levels among the poorest quintiles and other underprivileged groups such as ethnic minorities and the less educated. The survey data have once again confirmed the presence of significant regional differentials across the country, with the Red River Delta emerging as a region with the highest SRB levels. In provinces where the SRB is especially skewed, unborn girls may account for almost 20 per cent of all female births. By contrast, the SRB appears to have remained nearly normal in most provinces located in the south of the country. The regression analysis shows that these regional disparities are not due to differences in rural-urban distribution, education attainment, fertility levels, socio-economic status or other social characteristics. These differentials call for a better understanding of the variety of family systems existing across the country and for improved focus on policy intervention and campaigns, particularly in the most affected regions.

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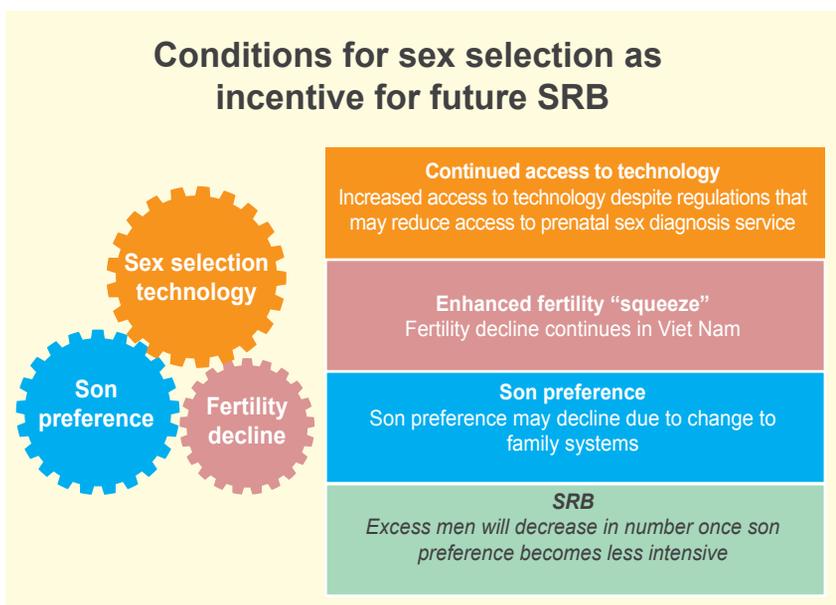
16 *Thailand is chosen here because of the cultural and demographic similarities with Vietnam. While Thailand has never experienced sex imbalances at birth, its mortality and fertility levels are comparable with Viet Nam. The data used here regarding Thailand's sex and age distribution are drawn from the last census in 2010.*



## 7. Prospects and recommendations

While the overall upward trend since 2005 is well established, 2014 estimates also demonstrate that Viet Nam’s birth masculinity level has not diminished over the last five years. In fact, there has been an apparent increase in the SRB from 110.6 in 2009 to 112.2, as recorded by the IPS 2014. The analysis of socio-economic and regional differentials suggests that this increase has taken place especially among the lower socio-economic quintile and has affected almost all areas

of Viet Nam. The single fastest increase in SRB has been documented in the red River Delta region where the figure has risen from 112 to 117. There is both a phenomenon of intensification



in already affected areas and of diffusion across new social groups, and this is a real cause for concern. On one hand, the SRB in the most vulnerable Red River region has now reached a level above some of the most distorted SRB levels in the world. On the other, there is now a gradual increase in previously unaffected populations such as the poorest economic categories and many provinces located in mountainous areas or in the South.

Yet, there is also room for guarded optimism. In spite of the temporary spike observed in 2012, the increase appears to have slowed down over the last five years. The SRB has not reached 115 as forecasted earlier, based on SRB trends up to 2009 (GSO, 2011a), nor is it likely to reach this level in the next few years. It is too early to say whether this relative deceleration will persist and lead to an actual stabilization of the SRB in the country. A further increase in sex imbalances at birth cannot be ruled out, since the necessary statistical instruments are not available – such as birth registration estimates – for a proper monitoring of annual trends. But, the recent slowing down of the SRB increase may be seen as a hopeful sign of gradual leveling off. This may also be proof that political mobilization has had some impact and that the penchant for sex selection may soon peak. This survey does not offer a firm conclusion as to how far policy interventions and the gradual process of social change and economic uplift have affected the SRB in Viet Nam. Only further research can identify social groups where the progress of sex selection has indeed slowed down and where son preference may be on the decline.

Finally, in terms of recommendations, several studies have already assembled rich documentation on sex imbalances at birth in Viet Nam and proposed valuable suggestions for combating prenatal discrimination (see in particular, UNFPA, 2014). In addition, there are a few lessons that can be drawn from the analysis of the IPS 2014 statistics.

- At the outset, it may be said that the efforts towards close monitoring of SRB trends have clearly borne fruit and should continue. Although this analysis has stressed the significant variations in the frequency of sex selection across subpopulations, the survey data are often insufficient to disaggregate estimates because of the sensitivity of SRB estimation to small sample size. This indicates the need to harness all available data in order to depict trends and differentials in birth masculinity levels. The ultimate objective would be to instigate an annual birth registration series that provides the most efficient tool for monitoring SRB trends as observed in countries such as Japan, South Korea and Malaysia. Meanwhile, only regular surveys are available to provide the necessary data.
- Research on patriarchal family systems and son preference – the apparent root cause of observed birth imbalances – is still incomplete, particularly when these systems, beliefs and values are continuously adapting to rapidly changing social and economic environments. Despite having a general understanding of the main features of the Vietnamese family system, there is little information on how family dynamics change and to what incentives parents might respond. It is expected that social change will gradually weaken this bias towards boys, as observed in South Korea, however, more information is needed regarding the specific transformations that accelerated that change. To date, extended female education, improved access to employment opportunities and raised socio-economic status may have lowered fertility rates but, at the same time, have resulted in a rise in birth masculinity among the middle class. It has yet to be understood which factors will ultimately break the gender bias within Vietnamese families, and in this regard, SRB results from provinces in the South, where sex selection seems almost absent, should be taken into account.
- The government has intervened earlier in Viet Nam than in any other affected countries in the world. Awareness and sensitization campaigns have been introduced, and most of the population is familiar with the current issue of sex imbalance. With the relatively moderate and stable fertility level now being observed, efforts focusing on access to reproductive

health services should be broadened to ensure strengthened mobilization of gender equity. Vietnamese family culture and values are an important key to gender bias as illustrated by skewed SRBs; it is only through working towards gender equality that discrimination against girls will diminish and eventually lose its rationale. Initiatives for greater gender equity should aim towards removing the perceived disadvantages of girls in families by targeting biased patriarchal marriage patterns, unequal inheritance practices, employment and wage discrimination, and traditional prejudice. On the positive side, their contributions to the economy as well as the home, in the form of housework, care of elders, etc., should be noted and possibly assessed in more formal ways.

- It is critical to better understand the impact of local initiatives aimed at fighting gender-biased prenatal selection. Many policies have ushered in changes throughout Viet Nam, from awareness campaigns to girl promotion, regulation of sex-selective abortions and support schemes to family with girls. In combination with relevant statistical data and surveys, these interventions should be properly monitored and frequently assessed to evaluate more precisely their impact on attitudes and behaviour. This is a challenging task, as experienced by other affected countries also at pains to assess the effectiveness of their various policy interventions (regulation of sex selection, awareness campaigns, support extended to girl children, etc.). Likewise, in Viet Nam an impact assessment would no doubt provide crucial information to policymakers and assist in the identification of the best policy mix to reduce prenatal sex selection.

## 8. References

- Bélanger, Danièle, 2002. "Son Preference in a Rural Village in North Viet Nam", *Studies in Family Planning*, 33, 4, 321-34.
- Bélanger, D., et al., 2003, Are sex ratios at birth increasing in Vietnam? *Population*, 58, 2, 231-250.
- Do, Quy-Toan and Phung, Tung Duc, 2010. The Importance of Being Wanted, *American Economic Journal: Applied Economics*, 2, 4, 236-53.
- Fuse, K., 2010, Variations in attitudinal gender preferences for children across 50 less-developed countries. *Demographic Research*, vol. 23, Article 36, pp. 1031-1048.
- Gammeltoft T., and H.T.T. Nguyen 2007, "The Commodification of Obstetric Ultrasound Scanning in Hanoi, Viet Nam". *Reproductive Health Matters* 29, 163–171.
- Gammeltoft, T. M., 2014. *Haunting Images: A Cultural Account of Selective Reproduction in Vietnam*. California University Press, Berkeley.
- GSO 2011a. *Sex Ratio at Birth in Viet Nam. New Evidence on Patterns, Trends and Differentials*, Viet Nam Population and Housing Census 2009, General Statistics Office, Ha Noi.
- GSO 2011b. *Fertility and mortality in Viet Nam: Patterns, Trends and Differentials*, Viet Nam Population and Housing Census 2009, General Statistics Office, Ha Noi.
- Guilmoto, C. Z. et al., 2009. "Recent increase in sex ratio at birth in Viet Nam". *PLoS ONE* 4, 2, p. e4624.
- Guilmoto, C. Z., 2009. "The sex ratio transition in Asia". *Population and Development Review* 35, 3, 519-49.
- Guilmoto, Christophe Z., 2012. Son preference and kinship structures in Viet Nam", *Population and Development Review*, 38, 1, 31-54
- Haughton, J., and Haughton, D. 1995. *Son preference in Vietnam*. *Studies in Family Planning*: 325-337.
- ICRW, 2012. *Study on Gender, Masculinity and Son Preference in Nepal and Viet Nam*. New Delhi: International Center for Research on Women.
- Le Pham, T., et al, 2013. Gender patterns in Vietnam's child mortality. *Journal of Population Economics*, 261, 303-22.
- Moultrie Tom A, and Basia Zaba, 2013, Parity progression ratios, in Moultrie TA, RE Dorrington, AG Hill, K Hill, IM Timæus and B Zaba (eds), *Tools for Demographic Estimation*. Paris: International Union for the Scientific Study of Population. [demographicestimation.iussp.org](http://demographicestimation.iussp.org)
- Pham, B. N., Rao, C., Adair, T., Hill, P. S., & Hall, W. (2010). Assessing the quality of data for analysing the sex ratio at birth in Viet Nam. *Asian Population Studies*, 6(3), 263-287.

Pham, Bang Nguyen, et al, 2008. "Analysis of socio-political and health practices influencing Sex Ratio at Birth in Viet Nam", *Reproductive Health Matters*, 16, 32, 176-84.

UNFPA, 2009. *Recent Change in the Sex Ratio at Birth in Viet Nam. A Review of Evidence*, UNFPA, Ha Noi.

UNFPA, 2011. *Son preference in Viet Nam: Ancient desires, advancing technologies*, UNFPA, Ha Noi.

UNFPA, 2012. *Sex imbalances at birth: Current trends, consequences and policy implications*. UNFPA, Bangkok.

UNFPA, 2014. *The Imbalanced Sex Ratio at Birth in Viet Nam: Connecting Research and Policy for Change*, Policy Brief, UNFPA, Ha Noi.

## 9. Appendix I: The IPS 2014 and measurement issues

The Intercensal Population and Housing Survey of 2014 (IPS 2014) was conducted in 1.1 million households (4.2 million persons) in April 2014. The survey follows the format of the previous population surveys conducted every year by the GSO. It includes both social and demographic information on individuals as well as information on household amenities and housing quality. All computations here are weighted according to survey weights prepared by the GSO.

The IPS 2014 includes individual and household questionnaires. These questionnaires come in two formats. The short-form questionnaire includes standard demographic and household questions and is used across the entire sample. The long-form questionnaire includes several additional variables such as social, demographic and educational details of individuals, the detailed birth history of women aged 15-49 years and detailed information about housing quality and household equipment. This long-form questionnaire is used only for a subsample representing about a third of the entire IPS 2014 sample.

The long-form sample contains all births for women aged 15-49, from which information on all births during the prior 12 months have been extracted. This subset was then used to compute the SRB without bias. This is the usual procedure followed by the GSO, based on its annual demographic surveys. Note that births that took place during the prior 12 months are referred to as “2014 births” and “2014 SRB” in keeping with GSO usage even if the corresponding time period starts, in fact, in 2013. The sample of births recorded by the survey is much larger since it includes births that took place earlier, as part of an individual’s complete birth history, and that entire birth history is used to compute PPRs (see below).

The larger short-form sample has provided data on the complete population by age and sex. The sex ratio of the child population is therefore a reflection of their original SRB. The main issue is that from birth to survey, this population has been subject to mortality and possibly, to migration. This means that any use of population-based data must be corrected. Since the focus here is on sex ratios, the main issue is sex differentials; if male babies survive in lower proportions than female babies, it should be expected that population-based sex ratio in 2014 would be lower than the original sex ratio at birth. Therefore, the sex ratio observed in the IPS 2014 population must be corrected for the sex ratio of survival from birth to census. Using the WHO life tables for Viet Nam in 2010, it is possible to deduce the male-to-female survival ratio to correct the effect of mortality differentials. These are applied to the population below one year old, below five or for each age, as required by the birth cohorts used. The impact of migration on the sex distribution is considered to be negligible at these ages.

The variation in size between the large and small samples has important implications for the quality of these estimates. Sex ratio estimates are extremely sensitive to sample size and the confidence interval of estimation increases significantly with a smaller sample. For instance, the confidence interval of an SRB of 112 male births per 100 female births reduces from [106-118] for 5,000 births to [108-116] for 10,000 births and [110.6-113.4] for 100,000 births.

# 10. Appendix II:

## Socio-economic quintile and son preference

New indicators, based on IPS 2014 data, were developed for this analysis, taking advantage of additional variables available in the smaller long-form sample. These indicators are briefly described in the following sections.

### 10.1. Son preference and parity progression

For this analysis, fertility behaviour is used as an indicator of gender preference. The primary data source is the birth history of women, collected by the survey, with sex and year of birth for their first five births. Based on these histories, we examine the behaviour of parents according to birth order and the gender composition of their offspring. The probability of having another child at various parity levels is called a parity progression ratio (PPR).  $PPR_n$  is computed here as the proportion of women with  $n$  children who had an additional ( $n+1^{th}$ ) child ten years after the birth of the  $n^{th}$  child.

PPRs are given as percentages of parents with an additional child, ranging from 0 per cent to 100 per cent. The data are truncated, as it is unknown whether individual women will have an additional birth in the future, i.e. after the IPS 2014. For this reason, the PPRs are computed by using a Kaplan-Meier procedure. The most important advantage of the Kaplan–Meier estimator is precisely that the method takes care of right-censored data, when births after 2014 cannot be observed. The Kaplan-Meier estimates correspond to the probability of an additional birth as a function of time since the previous births. They are computed over the period 2004-2014.

### 10.2. Socio-economic quintile

The analysis of socio-economic differentials would ideally require data on individual income or occupations that are not available from the IPS 2014. It is, however, possible to develop a household-level socio-economic indicator, based on available information on housing quality, household amenities and equipment, canvassed in the long-form sample. A subset of household-level IPS variables has been submitted to a factor analysis for computing a synthetic index of living standards. Here, a multiple correspondence analysis is used since there are only categorical indicators.

After eliminating variables poorly correlated to the first axis, the factor analysis yields a first axis accounting for 78 per cent of the overall variance. This dimension is then used as synthetic indicator of socio-economic standard at household level. Households were then divided into five quintiles, from the poorest to the richest households. The 17 variables retained for the final factor analysis includes ten appliances owned by the household (from television to car), four types of amenities (lighting, cooking fuel, source of drinking water, toilets), and three types of construction materials used for building.

SEX IMBALANCES AT BIRTH IN VIET NAM 2014 -  
RECENT TRENDS, FACTORS AND VARIATIONS

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