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Christophe Z. Guilmoto

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**Sex selection,
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Christophe Z. Guilmoto

Centre Population et Développement

UMR 196 CEPED, Université Paris Descartes, INED, IRD

<http://www.ceped.org/wp>

Contact • Corresponding Author: Christophe Z. Guilmoto

Christophe Z. Guilmoto is demographer at IRD.
CEPED – UMR 196 Université Paris Descartes, INED, IRD
christophe.guilmoto@ird.fr

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UMR 196 CEPED, Université Paris Descartes, INED, IRD
19 rue Jacob, 75006 PARIS, France
<http://www.ceped.org/> • contact@ceped.org

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Sex selection, son preference, and kinship structures in Viet Nam

*Christophe Z. Guilmoto**

Abstract

This paper examines the puzzle of the recent rise in the sex ratio at birth in Viet Nam and relates its emergence to existing kinship systems and ethnic composition using 2009 census micro-data. We start with a presentation of the main socioeconomic and ethnic differentials in birth masculinity and stress the extent of regional variations. We then review the three intermediate factors leading to increases in birth masculinity: prenatal technology, declining fertility and gender bias. We use an indirect measurement of fertility behavior to demonstrate the close association between levels of sex ratio at birth and the intensity of son preference. Data on household composition indicate that Viet Nam is characterized by the co-existence of kinship patterns typical of East and Southeast Asia. We can then relate son preference in Viet Nam to the prevalence of more traditional patrilineal systems. The paper concludes with the implications of the cultural dimensions of prenatal sex selection on policy responses and the future change in the sex ratio at birth.

Keywords

India, demography, population.

Introduction

Viet Nam is a latecomer among countries in Asia recording an excess of male births.¹ At the beginning of the 21st century, there was still no tangible deterioration in the sex ratio at birth (SRB) in the country, in spite of the many social and demographic features pointing to latent son preference. Since 2005, the increase in birth masculinity has however been rapid and the proportion of male births has now become higher in Viet Nam than in India, a country where the SRB increased more than twenty years ago.

Viet Nam's case raises several important questions such as the specific factors that sparked off this sudden change, the social context that makes sex selection desirable, and the anthropological structures that may account for the heterogeneity in gender preferences across the country. This paper intends more specifically to re-examine the nature of the observed regional differentials in birth masculinity observed in Viet Nam and to document in a more systematic manner the influence of gender bias and local kinship systems, following the lessons

* Institut de Recherche pour le Développement (IRD), CEPED, France.

¹ On the rise of birth masculinity in Asia, see Croll (2000), Miller (2001) and Attané and Guilmoto (2007).

drawn by Monica Das Gupta from the experience of China, India and South Korea (Das Gupta et al., 2003). Our objective is to follow the trail of prenatal sex selection first by testing more systematically the role played by son preference at province level and then by relating it to specific dimensions of local kinship systems. Ultimately, this exploration will take us to the regional ethnic composition and its impact on gender and family arrangements, casting a new light on the cultural patterning of demographic behavior in Viet Nam.

The paper starts with a description of some of the main characteristics of the recent increase in birth masculinity observed in Viet Nam, including its main apparent social and geographical correlates. The next part of the paper discusses the role played by specific factors associated with prenatal sex selection, using regional differentials as a mirror for the recent masculinization of births observed in the country. We examine the supply dimension of the SRB rise, but the intensity in son preference, estimated here by sex differentials in fertility progression, emerges as the major determinant of variations in the sex ratio at birth. In the following section, we highlight the lesser-known role of household structures and relate patrilineal kinships patterns to gender preference in Viet Nam. We then summarize our analysis in the final part of the paper with an overall statistical model. The paper ends with a discussion of the demographic and policy-related implications of our findings.

The social and geographical features of birth masculinity in Viet Nam

The shared past and recently parallel course of Viet Nam's and China's demography had long suggested that the gradual rise in birth masculinity observed in China during the 1980s would be also observed in Viet Nam. In her global review of discrimination against girls across Asia written at the end of the 1990s, Croll had for instance pointed out that the emergence of sex selection in Viet Nam was only a matter of years (2000: 49). Several studies had indeed documented the presence of staunch preference for boys in the country drawing on various surveys conducted in the 1990s (Haughton and Haughton 1995; Bélanger 2002). But results from the 1999 census, the subsequent Demographic and Health Survey conducted in 2002, and the annual population surveys conducted by the country's General Statistics Office (GSO) failed to establish any substantial increase in the sex ratio at birth.

The situation, however, changed noticeably after 2005 with the publication of findings of the annual population surveys, which showed the sex ratio at birth rising suddenly to 110 male births per 100 female births. This change in birth masculinity levels was then confirmed by different sources (Pham et al. 2008, Guilmoto et al. 2009, UNFPA 2009, Pham et al. 2010b). The 2009 census puts the sex ratio at birth during the previous 12 months at 110.6.² According to the most recent demographic survey, the sex ratio at birth reached 111.2 in 2010 (GSO 2011a). But as is common with sudden changes in a demographic system, transformations are rarely uniform across families, social categories and regions. Census data provide already some of the main differentials in birth masculinity.

² Unless otherwise mentioned, estimates used in this section are drawn from the 2009 census and are found in UNFPA (2010a) and GSO (2010, 2011b).

Firstly, 2009 data confirmed the unusual SRB distribution by parity that had been already detected from survey estimates (UNFPA 2009: 30-31; Pham et al. 2010b). Census data based on the 247,600 births during the previous year indicate that not only is the SRB among first births relatively high (110.2), but it fails to increase at parity 2 (109.0). The sex ratio at birth increases only moderately among higher-order births (115.5).

Secondly, census estimates demonstrate that the proportion of male births tends to higher among better-off or more educated women, while there is almost no birth imbalance among children born in destitute households. The sex ratio at birth is at its highest among families with higher-quality housing and access to more expensive equipment such as computer, washing machine or air-conditioning. These household-level indicators have been used to devise a synthetic index of socioeconomic status that strongly correlates with sex ratio, rising gradually from 105.2 in the poorest quintile to 107.5 and 112.8 in the second and third quintile respectively, with no further increase in SRB among the remaining two quintiles. The same picture emerges when considering the positive correlation of the SRB with the mother's level of education: birth masculinity is at its normal biological level among illiterates and increases with the schooling duration to finally reach 113 among women who have studied ten years or more at school.

Thirdly, sizeable variations in SRB levels emerge when comparing populations by ethnic group, using the Kinh (ethnic Vietnamese) as a reference with a sex ratio of 111 among children below 1.³ The sex ratio of all other major groups happens to be distinctly below that level, starting with the two largest minorities, the Tay and the Thai, who have a sex ratio of 104. Among minority groups, the highest SRB at 108.9 is found among the Hoa (ethnic Chinese), who also happen to be more prosperous than other populations.

Finally, regional variations, which had already been noticed by previous analysis (Guilmoto et al. 2009), tend to be more pronounced according to census estimates by province.⁴ The map plotted on Figure 1 is based on the sex ratio of children below one year.⁵ It confirms the concentration of high-SRB provinces in the North of the country. The areas with sex ratios above 120 belong to a distinct regional cluster consisting of the three contiguous provinces of Bac Ninh, Hai Duong and Hung Yen that lie at the heart of the Red River Delta to the East of Hanoi. The highest sex ratio level is found in Hung Yen (125). This "hot spot" is surrounded by another ten adjacent provinces where the SRB is above the national average, encompassing almost the entire delta of the Red River. Elsewhere in the central and southern parts of the country, there are fewer than ten provinces with a SRB above 110, including three provinces to the south of Da Nang (Quang Nam, Quang Ngai, Binh Dinh) and the southern metropolis of Ho Chi Minh City. In contrast, provinces with sex ratio below the 105 biological average are mostly

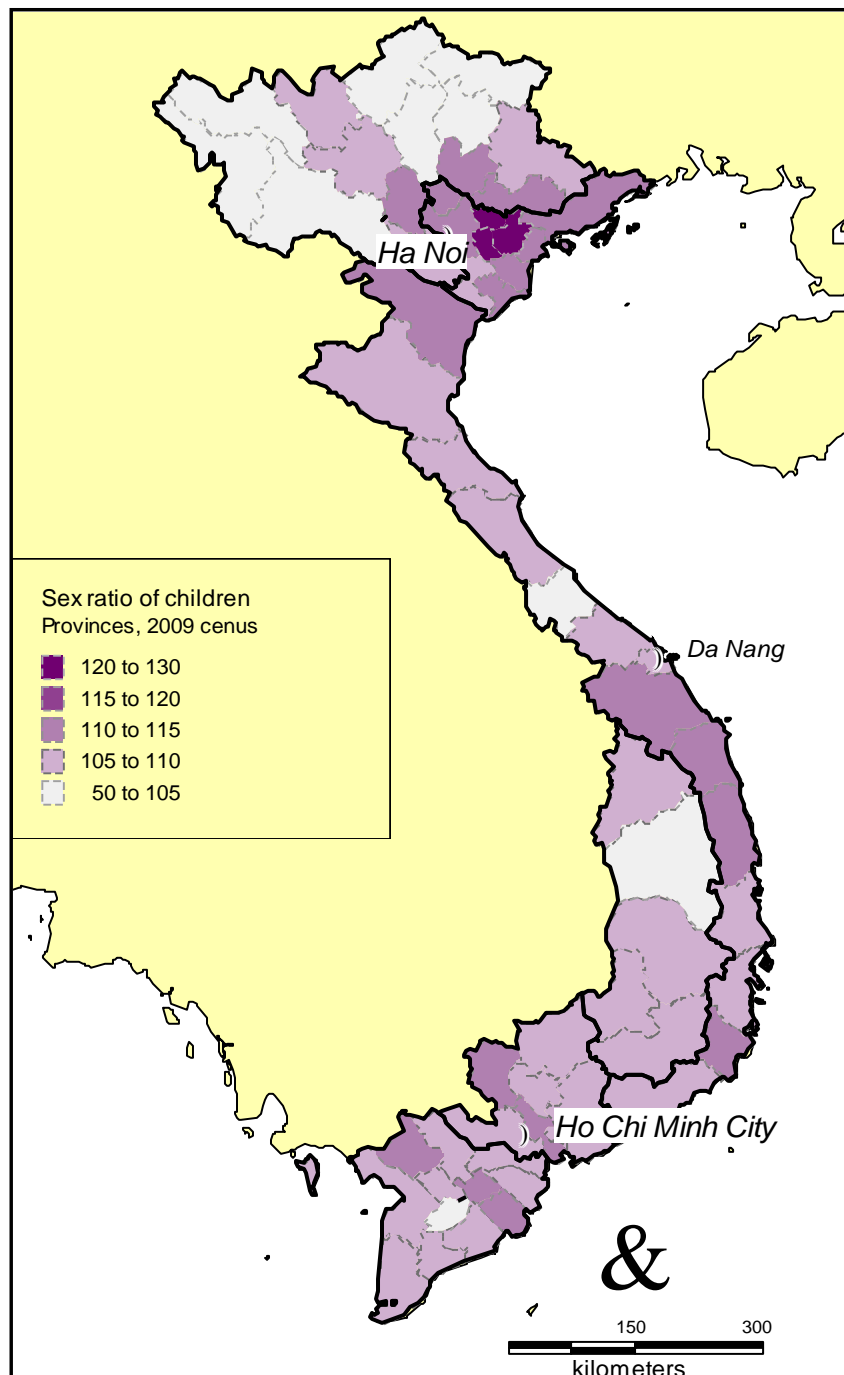
³ The Kinh accounted for 85% of the total population in 2009. Khong (2002) provides an overview on ethnic diversity in Viet Nam.

⁴ Viet Nam is comprised of 63 provinces, which are also part of six macro-regions used for statistical purposes: Northern Midlands and Mountain areas, Red River Delta, North Central and South Coastal Areas, Central Highlands, Southeast, and Mekong River Delta.

⁵ Data shown here are based on the full counts of the population below 1—rather than on births during the last 12 months that are only available from the 20% sample. As a result of higher male infant mortality, these province-level estimates tend to slightly understate the real SRB level.

in the mountainous, minority-inhabited areas of Viet Nam located along the border with China, Laos and Cambodia.

Figure 1: Sex ratio of children below one year by province, Viet Nam, 2009 census



Sources: GSO (2010)

As observed in countries like China and India, geographical differentials in birth masculinity levels across Viet Nam largely exceed variations associated to individual or household socioeconomic features such as ethnicity, socioeconomic status or education level. Girls seem

more at risk for being conceived in particular regions than in families with specific social or economic characteristics. This spatial concentration of high SRB levels constitutes a recurrent trait of prenatal gender discrimination, which calls for two different types of explanations: either we are missing some important explanatory variables that happen to be spatially clustered or the rise in SRB follows typical spatial diffusion mechanisms accounting for this strong geographical concentration. The lack of time series for a recent phenomenon such as the increase in birth masculinity in Viet Nam prevents us from testing the latter hypothesis, but we will now go back to a more theory-grounded perspective on prenatal selection to identify the possible factors behind this distinct spatial patterning.

Understanding observed variations in birth masculinity

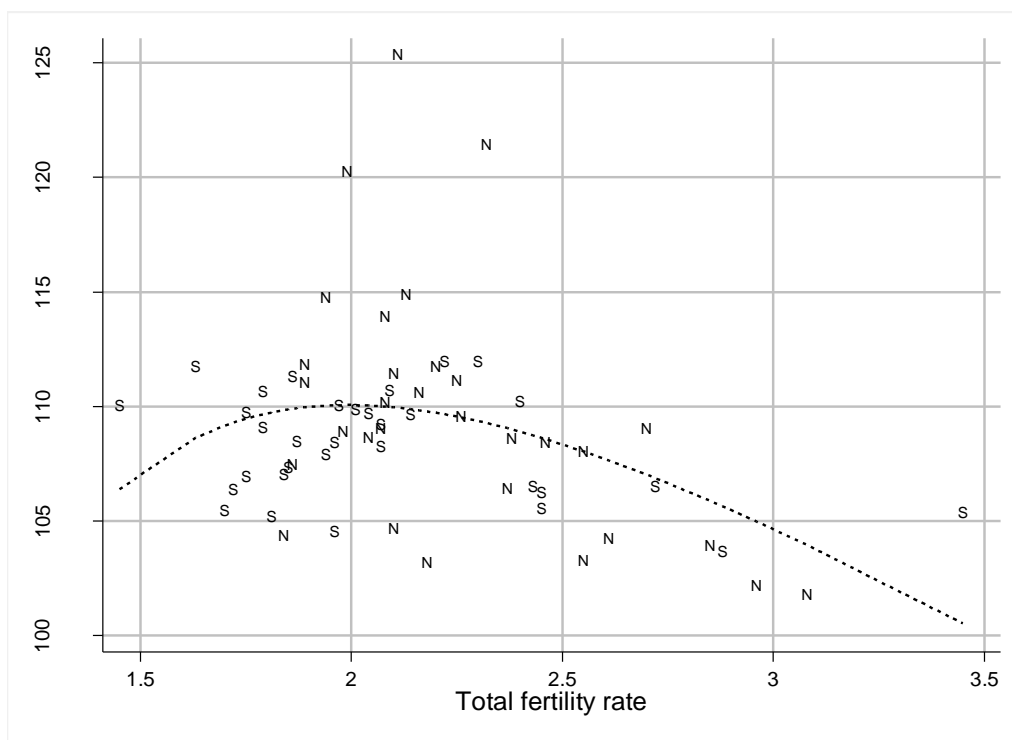
Prenatal gender bias as analyzed across Asia can be associated with a large gamut of factors ranging from family planning policies (China) or unequal marriage exchanges (India), to patriarchal family systems (South Korea) and economic downturn (Caucasus). Each analysis stemming from a given local or national environment gives rise to a specific narrative summing up the specific context and the presumed factors behind the emergence and diffusion of prenatal sex selection. But these explanations are often context-specific and from an analytical viewpoint, it is probably more adequate to refer to a single explanatory framework built around three necessary factors of prenatal sex selection, which can be summed up as the ready-able-squeezed preconditions (Guilmoto 2009). The readiness captures the perceived “need” for sons expressed from a variety of social, economic or cultural perspectives. This pure “demand” factor is complemented by a parallel “supply” dimension capturing the actual accessibility of modern prenatal sex selection (abortion legislation, ultrasound technology). The last precondition corresponds to the “squeeze effect” of low fertility, when the reduction in the number of children automatically raises the risk of remaining sonless. We will now examine these three preconditions for Viet Nam.

The role of fertility decline

Women in Viet Nam had on average more than 6 children in 1970 on the eve of the fertility decline. The gradual reduction in birth rates that took place over the following four decades brought the national average to replacement level during the mid-2000s and the most recent estimate put the total fertility rate at two during the year preceding the 2009 census. Compared to other countries, the fall in fertility rates has been in Viet Nam both sustained and steady, with neither brutal decrease nor any significant downturn. This gradual process has been facilitated by a moderate family planning policy that has avoided many of the pitfalls of the earlier Chinese experience.⁶ During the last ten years, the reduction in fertility has been relatively slow from 2.6 in 1999 to 2.0 in 2010, as if fertility was about to reach a plateau below two children per woman.

⁶ The relative flexibility of Viet Nam’s fertility policy has been illustrated by the recent relaxation of the two-child norm by allowing a third birth in several cases. For a more general view of fertility decline in Viet Nam, see Scornet (2009) and Pham et al. (2008).

Figure 2: Average fertility (TFR) and sex ratio below one year by province, Viet Nam, 2009 census



Notes: N=North Viet Nam ; S = South Viet Nam

Sources: GSO (2010)

The fact remains that the reduction in family size in Viet Nam has resulted in an increasing proportion of parents with no son, as long as biology acted as the only determinant of birth masculinity. Moreover, differentials in average family size across the country may result in different levels of “fertility squeeze” among regions and social groups. Variations in TFR levels are not negligible in the country, with estimated levels, ranging from less than 1.5 (Ho Chi Minh City and the adjacent province of Binh Duong) to more than 3 children in four minority-inhabited provinces in Northwest Viet Nam and in the Central Plateaus. However, four-fifths of provinces report a moderate fertility level between 1.5 and 2.5 children per woman and it can be said that the fertility transition is almost over in Viet Nam, except for the less developed provinces characterized by remoteness, low urbanization, higher poverty levels and unfavorable mortality conditions.

The potential relationship between birth rates and SRBs can be assessed by comparing province-level total fertility rates (TFR) in 2009 with census-based birth masculinity estimates (estimated here as the sex ratio below 1). In the figures, we have also distinguished North and South Viet Nam to examine whether a distinct spatial patterning was observable in the

interrelationship between social and demographic variables.⁷ Figure 2 sums up the complex relation between these two dimensions. We first observe the overall curvilinear relation linking SRB and TFR. As fertility decreases, birth masculinity gradually increases from below 105 to levels averaging at 110. With further fertility decline below replacement level, there is a slight decrease in SRB levels. But the link between fertility levels and SRB remains somewhat fragile, as illustrated by a few extreme SRB values: many Northern provinces tend to be above the trend line and this is especially conspicuous for the six provinces where the SRB is above 113. These provinces stand out as outliers in the smoother profile of the SRB-fertility curve. It may also be added that the SRB in North Viet Nam tends to increase monotonically as fertility declines, with no clear sign of downturn towards normal SRB in provinces with below-replacement fertility as can be distinguished in Southern provinces.

Supply factors

The supply dimension refers to the second necessary precondition of prenatal sex selection, i.e. accessibility to sex selection technology based on prenatal sex identification and abortion. In Viet Nam, abortion has been authorized since the 1960s and abortion rights are confirmed by the 1989 health law. Menstrual extraction and induced abortion are widespread in Viet Nam and have been estimated at 46% of all pregnancies, even if recent reliable are not available. Late second-trimester abortions are not uncommon.⁸ Several studies have also shown that women resorting to abortion tend to be Kinh and of higher educational or socioeconomic status, even when abortion costs rarely exceed US\$ 10. The same variations between socioeconomic groups are observed in the use of antenatal care (Knowles et al., 2008).

Apart from socioeconomic characteristics of the population, the ability to resort to sex selection depends crucially on the presence of health services offering affordable prenatal ultrasound services. In this regard, the private healthcare sector in Viet Nam has recorded a formidable development during the last two decades since the *Doi Moi* reforms that made privatization possible. Today, it successfully competes with the public sector (Tran et al. 2005, Ha et al. 2002). Ultrasound tests have in particular become extremely common. According to the MICS survey conducted in 2006, it was performed by no less than 74% of pregnant women, with the percentage reaching 90% of women in the Red River region or among the two most prosperous quintiles (GSO 2006). The annual 2007 population survey conducted by the General Statistics Office also indicated that 63.5 % of recent mothers knew the sex of their child in advance. This proportion exceeded 80% among graduates and urban residents, while a majority among women who are illiterates, who delivered at home or who wanted more children stated that they were unaware of the sex of their baby prior to its birth (UNFPA 2009: 37-40).

⁷ The Hai Van Pass located between Hue and Da Nang that used to separate the Vietnamese and Champa kingdoms is taken as the boundary between North and South Viet Nam. It may be noted that the new statistical macro-region of "North Central and South Coastal areas", stretched along a 1500 km long land littoral strip, now includes both Northern and Southern provinces.

⁸ On abortion in Viet Nam, see for instance ADB (2005), Le (2006), and Wolf et al. (2010). On second-trimester abortions, see Hoang et al. (2008), and Gallo and Nghia (2007). Abortion costs are given by PATH (2006).

The supply factor is therefore a dimension of key importance to understand the belated, but sudden rise in SRB levels in Viet Nam. The other preconditions for prenatal sex selection—rapidly declining fertility and son preference—had already been met before 2003. It is suspected that the country has long lacked the required facilities to inform women of the sex of their future children for two reasons, one being the absence of modern ultrasound machines and the other the predominance of the public sector where access to prenatal sex identification was limited. The change in this context has probably been extremely rapid after 2000. It has been amply documented by the qualitative work conducted in 2003-06 describing in different papers the various aspects of the mounting “craze for ultrasound” in Viet Nam (Gammeltoft and Nguyen 2007a, 2007b; Gammeltoft 2007). According to a recent survey, pregnant women received on average 6 ultrasound examinations in urban areas and 3.5 in the countryside (Toan et al. 2011). The transformations in ultrasound practices are indeed recent and date back to the last ten years, starting probably a few years after 2000 with the import of new equipment such as 3-D scan and color machines.⁹ It has been estimated that Viet Nam has “about 5000 doctors working as sonologists with 3000 machines [...] from 3D-4D imaging to portable ultrasound” and the cost of a quality ultrasound has plummeted to US\$ 2-10 by 2008 (Gammeltoft and Nguyen 2007a; Phan 2009a, 2009b). We have no time series detailing the spread of this modern ultrasonography through the expanding network of private healthcare facilities in the country described in the aforementioned literature, nor do we have statistics describing the increasing frequency of prenatal sex identification over the years. Similarly, we do not have province-level statistics on ultrasound facilities that could be related to observed SRB variations.¹⁰ The only indicator available refers to the spectacular increase in the number of ultrasound examinations performed in public facilities (Guilmoto et al. 2009) and is probably a serious underestimate of the actual rise in ultrasound tests if we include the private sector. We also previously quoted the high number of women who reported the use of prenatal ultrasonography according to surveys conducted in 2006. Interestingly, the study based on the MICS findings expressed its surprise at finding that the use of ultrasound was more equally distributed across income groups than having a blood test, a urine test or HIV counseling, an additional testimony of the swift diffusion of ultrasound practices in the country by 2006 (Knowles et al. 2008: 72). It is therefore perfectly reasonable to assume at this point that supply factors were the prime mover behind the rapid rise in birth masculinity across the country from 2003 onwards.

⁹ Gammeltoft (2007: 156) reported in 2007 that 3D scans had spread in urban areas “over the past five years”, a period corresponding exactly to the onset of the rise in birth masculinity identified on Figure 1. Anecdotal information collected in 2010 from Hanoi’s Central Obstetrics Hospital confirms this timing. Based on their fieldwork in 2003, Bélanger and Khuat (2009: 165) suggest that 3D scans were only found in hospitals in the largest cities up to then.

¹⁰ It is not feasible to use indirect indicators of regional development (urbanization, poverty, etc.) as a proxy for infrastructural level, as such indicators would inevitably conflate both potential supply and demand factors of prenatal sex selection.

Assessing son preference

The last crucial dimension for our analysis is the demand for sons, a feature widely described in previous studies of gender studies conducted in Viet Nam since the 1990s.¹¹ A large volume of scholarship has indeed documented the marginal position and low value of women in Vietnamese society and the ensuing preference accorded to male children for social, cultural and economic reasons. For instance, male children in traditional family settings have an essential role in old age support, household business and agricultural production, ancestors' worship, and family reputation and lineage perpetuation. Their role is closely articulated to the institution of the patrilineage (*ho*, sometime rendered as "clan") built around the male ancestors, in which women are included only by marriage. In spite of the long promotion of gender equity by the socialist State, the resulting preference for male offspring appears widely endorsed by women, couples, families and communities, at least in the North of the country where all studies have been conducted.¹²

The fertility decline has exacerbated the need for sons and many strategies have been devised to ensure a male child, such as adoption, remarriage, and repeated pregnancies. Though of uncertain effectiveness, folk methods favoring the birth of male offspring—such as specific diets at time of conception favoring male fetuses—have been largely disseminated through booklets and websites in the recent past (ISDS 2007). The government has recently confiscated thousands of such publications (Associated Press, July 2 2009).¹³ But before the appearance of the new technology, the most common method in son targeting fertility behavior has long been based on the "stopping rule", when the sex composition of previous children determines the subsequent fertility behavior of women (Basu and de Jong 2010). In Viet Nam, the use of contraception or abortion proved more common among women who already had a boy and as a result, the sex ratio of the final births of older women tends to be heavily biased towards boys (UNFPA 2009).¹⁴ Prenatal sex selection appears therefore as an effective response to a latent demand for masculine births, especially among women who want both to limit their offspring and to ensure the birth of a male descendant.

What has long been missing from the description of son preference is an assessment of its intensity across social groups and regions. Most field studies have described the gender situation pertaining to the Red River region, with only limited knowledge on the variety of social and cultural contexts elsewhere in the country. Moreover, it is usually unfeasible from purely qualitative, local studies describing gender practices to evaluate the actual strength of the bias against girls, which determines in particular the extent to which couples are ready to

¹¹ A first detailed study was conducted by Houghton and Houghton (1995). For a recent summary of available research see UNFPA (2010b).

¹² The richer studies of the gender context in North Viet Nam are Gammeltoft (1999), Pham (1999), and Werner (2009). On son preference in the North, see also Bélanger (2002) and Rydstrom (2003). For a regional perspective, see UNFPA (2011).

¹³ Even fortune-telling figures among the prohibited methods of prenatal sex identification mentioned in the 2006 Decree reiterating the prohibition of sex selection (UNFPA 2010b: 81).

¹⁴ It may however be noted that excess female child mortality—including sex-selective infanticide—of the type observed in North-West India and in China has never been documented for Viet Nam. There has never been any discernible excess infant and child mortality among female children (Nguyen 2002).

take different steps—including selective abortions—to prevent the birth of daughters. Quantitative indicators are mostly limited to the ideal number of children by sex, a measure referring to opinions and attitudes rather than to actual behaviors. The preference for sons expressed through the ideal number of daughters and sons and recorded during the Demographic and Health Surveys in Viet Nam appears in fact somewhat moderate (Fuse 2010).

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Fertility behavior provides a more suggestive indicator of the depth of gender preference.¹⁶ The stopping rule described earlier is one such mechanism, illustrated by the fact that family progression usually ends with a boy because of son preference. This can be explored more systematically by using parity progression ratios (PPR)—the proportions of women who have had a given number of children who have one additional child later on—with or without previous son. Recently, Filmer et al. (2009) have used gaps in parity progression according to the sex of previous births as a measure of sex bias in fertility progression. Unsurprisingly, their indicator takes high values in countries of South Asia and in Viet Nam where the absence of previous male births distinctly enhances the frequency of an additional birth. This confirms the influence of the sex composition of the siblings on PPRs already highlighted from limited survey data in Viet Nam (Haughton and Haughton 1999; UNFPA 2009; Pham et al. 2010a).

Using the reconstructed sibling population from sample census data, we have developed a similar indicator of son preference in fertility progression. This indicator is initially computed for each parity, from which an average overall indicator is ultimately derived (see description of the indicator in Appendix). Our indicator of son preference remains close to unity when the prior sex composition of the family is of no consequence on the probability of a later birth, but it may rise to two if the frequency of an additional birth is twice as large among daughter-only families as among families with a son. It should be stressed that in the absence of prenatal sex selection, the overall sex ratio at birth is in no way affected by the son preference in fertility progression.¹⁷

Table 1 presents results of our parity-specific estimation of son preference for Viet Nam. Estimates are further disaggregated by regions. We first notice from the aggregate estimates for Viet Nam that the gender bias seems limited (a net effect of 11%) from the first to the second birth, a result almost uniform across regions and quintiles. This concurs with the rather moderate SRB value observed for second births. However, two successive female births have a powerful effect on the probability of a third pregnancy: the indicator jumps to 2.1 in Viet Nam,

¹⁵ The ambiguity in estimating and interpreting gender preferences based on the ideal sex composition of the family are illustrated by the recent comparative study by Eu et al. (2011) on different East Asian countries including Viet Nam.

¹⁶ The narrower notion of “son preference” used here corresponds to Eklund refers to as the “outcome approach” to gender preference (Eklund 2011). The alternative “causal approach” offers wider perspectives for understanding the gender system underlying son preference, but provides no effective tool to estimate its intensity across cultural regions or social groups.

¹⁷ The sex ratio at birth remains determined by purely random biological factor irrespective of the previous sex composition—except if women that are more fertile happen to belong to a subpopulation with a SRB different from the rest of the population. The son preference in fertility progression, however, influences the sex composition of the family, with girls being on average older and having more siblings than their brothers (Basu and de Jong 2010).

showing that the absence of a boy tends to double the frequency of third births. Interestingly, while the absence of a son remains a major driver in fertility decision, the measure of son preference slightly decreases to 1.9 and 1.6 for higher-order births. The overall indicator of son preference over all parities is estimated at 1.6.

Table 1: Son preference in fertility progression by parity, regions and SES quintiles, Viet Nam, 2009

			Son preference in fertility progression at different parities				Average son preference	Number of children
			1	2	3	4		
<i>Region</i>								
Northern	Midlands	and	1.16	2.42	1.60	1.42	1.69	327 759
Mountains								
Red River Delta			1.13	3.70	4.70	3.79	2.61	494 914
North and South Central Coast			1.09	1.94	1.97	1.94	1.60	497 923
Central Highlands			1.05	1.58	1.35	1.25	1.30	179 826
Southeast			1.08	1.68	1.54	1.78	1.38	323 757
Mekong River Delta			1.09	1.73	1.74	1.73	1.43	421 221
Total			1.11	2.14	1.91	1.62	1.62	2 245 399

Son preference in fertility progression is the ratio of parity progression without to parity progression with son (1=no difference; 1.5= 50% higher probability of having an additional child in the absence of previous male birth). Average son preference is the parity-weighted average of parity specific son preference.

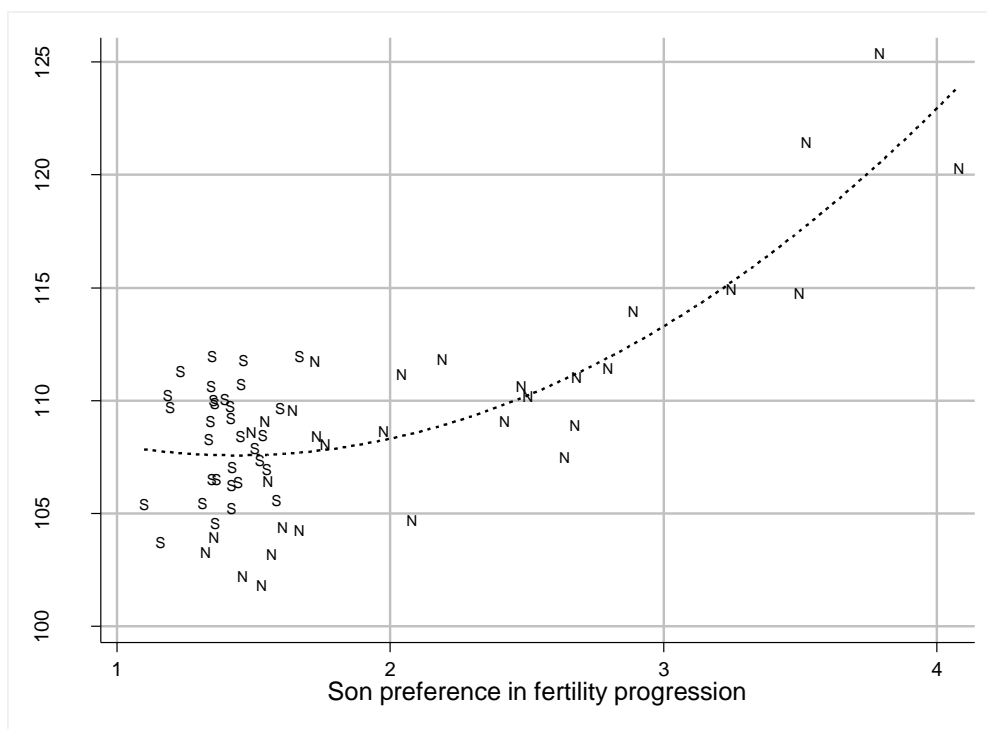
Restricted to parities 1-4

0.8% households with households missing information excluded from quintile estimates

Computed by the author from the 15% census sample

Disaggregated results shown in Table 1 illustrate the range of variations observed across regions and socioeconomic quintiles. No region seems exempt from some degree of son preference in parity progression. But the Red River Delta region once again stands out as the part of the country with the most pronounced sex bias. In the Red River Delta, the birth of a fourth child is 4.7 times as frequent after three successive girls as it is after the birth of at least one son. Son preference is significantly higher than in the two other northern regions, and twice as high as in the three southern regions of Central Highlands, Southeast and Mekong Delta. Differences in the impact of previous male births on fertility behavior are also visible across SES quintile. There is a regular increase from low son preference among the poorest section (1.35) to higher levels among the two richest quintiles (1.91 and 1.80). These estimates reveal that the higher levels of birth masculinity described earlier for North Viet Nam and for the richer households run parallel to the gender preference expressed by parity progression ratios.

Figure 3: Son preference in fertility progression and sex ratio below one year by province, Viet Nam, 2009 census



Notes: N=North Viet Nam ; S = South Viet Nam.

See Appendix for details on the estimation of the son preference indicator.

Sources: computed from the census sample.

In the following Figure 3, the same measure of son preference in fertility progression is plotted against the sex ratio at birth by province (sex ratio below 1). On the left-hand side of the chart, the lowest sex differential in parity progression, 1.1, is recorded in the Kon Tum province (Central Plateaus), and corresponds to a marginal difference of 10% between parents without and with previous male child. But on the right-hand side, the indicator reaches 4 in some provinces such as Hai Duong, a predominantly rural North Vietnamese province located midway between the metropolises Hanoi and Haiphong. In fact, more than 15 provinces record values above 2, and all of them are located in the North of the country. A relatively straightforward picture emerges from this comparison: higher son preference in fertility progression is clearly associated with a greater proportion of male births. Provinces with the highest indicators of son preference have the highest SRB levels and happen to be the “outliers” appearing on Figure 2.

A very strong positive association between both series emerges for Northern provinces. The few provinces in the North with a moderate level of son preference display for example almost normal SRB levels around 105. However, the picture is different for Southern provinces concentrated on the left side of the figure. There is little variation among them in the intensity of son preference and no tangible correlation with observed SRB levels. In other words, the

relationship between sex bias in fertility decisions and birth masculinity is extremely strong in North Viet Nam and inexistent in the South.¹⁸

Gender preference and kinship structures

The link between SRBs and the son preference in parity progression is partly self-evident, since prenatal sex selection is only a more effective strategy for both limiting one's offspring and ensuring a male birth. What remains poorly explained here is the source of the variations in gender preference observed across the country. The literature proceeding from field surveys clearly links the bias for sons with the requirements of the traditional society, based on "patriarchal" family structures and value systems. Patriarchy is often the notion used for encapsulating gender discrimination. Yet, it remains a loosely defined concept, encompassing domains ranging from male dominance in social and economic sectors to strict patrilineal and patrilocal institutions. Social, political, cultural and anthropological definitions of patriarchy and of gender inequity only partly overlap.

Instead of examining other social and economic manifestations of gender inequity, we have opted here for a narrower definition of patriarchy by focusing on kinship structures and marriage practices. Several other practices such as ancestors' worship, inheritance patterns or land entitlements would probably offer interesting clues on the extent of gender asymmetry, but they cannot be explored for lack of adequate regional statistics. On the contrary, marriage practices and the prevalence of patrilateral patterns—when a married couple resides with the husband's family—can be examined by using census data and reflect directly on the prevalence of patrilineal systems. Kinship structures are often a clear sign of the nature of gender arrangements (Dube 1997, Kaser 2008) and have often been fruitfully used in demographic research (Dyson and Moore 1983, Todd 1985). In Viet Nam, previous research using survey data has already associated formally the incidence of patrilineality with various demographic outcomes such as fertility (Bryant 2002), life expectancy (Le et al. 2009) and old age support (Anh *et al.* 1997; Knodel et al. 2000; Friedman et al. 2003). At the same time, anthropological features typical of Asian societies have also been used to account for the extent of age-old discrimination against women, starting with female infanticide in the past to the rise in sex selection in specific regions.¹⁹ In fact, the obvious contrast in kinship structures between North Viet Nam and neighboring countries such as Cambodia, Laos, and Thailand—where sex selection has never been observed—indeed offers an additional hint of the potential influence of kinship arrangements in shaping gender preferences. But before going further, a preliminary discussion of Viet Nam's kinship systems is required to clarify some of our hypotheses.

¹⁸ The province-level correlation coefficient (r^2) between SRBs and sex differentials in fertility behaviour varies from 0.73 in North Viet Nam to almost zero in South Viet Nam.

¹⁹ For a more general perspective linking kinship systems and gender preferences in Asia, see in particular Das Gupta et al. (2003), Das Gupta (2010) and Croll (2000). Using ethnographic and census materials from the British period, Chakraborty and Kim (2010) have recently provided an exemplary analysis of the relationship between kinship institutions and sex ratios in colonial India.

Kinship and ethnicity in Viet Nam

The “Vietnamese kinship system” refers to a host of family institutions that have been documented by field studies over the last fifty years. To a large extent, these studies have been restricted to the Northern provinces and as a result, Vietnamese kinship structures are often associated with those prevailing in China—a country which ruled North Viet Nam for a millennium in the past and deeply influenced its society and polity. Ethnic Kinh who constitute the backbone of Viet Nam’s population are in effect mostly characterized by a patrilineal system akin to that found in Confucian China. Relatives are for instance clearly divided into the patrilineal “inside lineage” (*ho noi*) and the “outside lineage” (*ho ngoai*) on the mother’s side. But significant variations from the Chinese pattern have been emphasized, such as the frequency of simple, nuclear household structures in North Viet Nam. Even if staying in the husbands’ village, recently married couples do not cohabit indefinitely with the paternal parents, and they tend on the contrary to form a new household after a few years or immediately after marriage. The marriage system appears predominantly patrilateral, but neo-local arrangements are also common.²⁰ Moreover, the position of women appears more favorable than in China: some elements of relative gender equity are a trait of the kinship system in Viet Nam emerging from the close study of the Lê Code, an indigenous penal code introduced from the 15th century onwards by Vietnamese rulers of the Lê dynasty.²¹ More gender-symmetrical features in inheritance patterns, divorce rights, relation with maternal kin, and status of widows are also apparent in the kinship patterns.

All this suggests that in spite of their many commonalities, the so-called Vietnamese kinship system exemplified in North Viet Nam does not simply replicate that of the more patriarchal systems in *Han* China. Drawing on additional evidence from studies conducted in the South, Haines (2006) has offered an even more nuanced view of kinship in Viet Nam by emphasizing its “mix of influences” and its lack of uniformity. He stresses for instance the heterogeneity of kinship features found across the country instead of positing a somewhat “monolithic structure of an essentialized Vietnamese kinship” (Haines 2006: 8) that exists mostly in reference to China. Seeing Viet Nam at the confluence between East and Southeast Asia has major implications if we consider kinship systems and gender roles. Rather than looking for typical patriarchal features, it appears preferable to explore the intricacy of local kinship patterns in relation with their diverse historical and cultural origins.

A first source of diversity in kinship structures is the presence of a large number of ethnic minorities. Many groups such as the Muong have a shared history with ethnic Kinh, but some are closer to ethnic groups found in neighboring countries. This for instance is the case of ethnic populations found in several provinces of the Central Plateaus. Kinh migrations towards these semi-mountainous areas have been considerable over the last three decades, resulting in a rapid ethnic recomposition of the entire region (Hardy 2003). Indigenous ethnic groups in the central

²⁰ See monographs referred to in the footnote 12. Hirschman and Vu (2002) provide a recent analysis of patrilocality. Hong (2009) stresses the stem family aspects of kinship in North Viet Nam. See also Nguyen (2010) on the implications of lineage membership.

²¹ Tran (2008) expresses a more reserved position on the assumed gender equity implied by the Lê Code. See also the introduction and afterword in Barbieri and Bélanger (2009) and Huy (1998) on the incomplete historical penetration of Confucianism in Viet Nam.

uplands belong to two different linguistic families, starting with Khmer groups such as the Xo Dang and the Ba Na along the border with Cambodia. The smaller Chamic groups found on the Central Plateau, as well as along the littoral of south central Viet Nam, belong to the Malayo-Polynesian languages, a subgroup of the Austronesian languages spoken from Madagascar to the Philippines and Fiji. This linguistic outlier is a vestige of the Indianized Cham kingdoms of Viet Nam, which after centuries of conflict with the Dai Viet were finally subjugated by the northerners in 1471. Large Khmer communities are also found further South in the Mekong region and also bear testimony to the mostly non-Kinh composition of the population a few centuries ago. Marriage systems in all these groups are characterized by a significant amount of bilaterality, a typical feature of Southeast Asia.²²

Another important observation on kinship diversity in Viet Nam relates to the Kinh population itself and to the southward expansion (*Nam tien*) that has characterized its history (Tran and Reid 2006). Kinh originated from the northern plains and delta regions and they have progressively expanded towards South Viet Nam from the 11th to the 18th century. It is only by the middle of the 18th century that the Vietnamese took control of the southernmost region of the Mekong Delta which was previously part of the Khmer Empire. While Kinh (and Chinese) colonization progressed, a large amount of local population remained of Khmer and other origin. The Kinh now constitute the largest ethnicity in all Southern provinces, including the mountainous regions. But in the Mekong delta and along the southern littoral, this ethnic transformation has been probably fuelled as much by actual immigration by Kinh population from the North as on gradual incorporation of local groups into the Kinh society. We may for instance note the virtual demographic extinction of the Cham ethnic group, despite the domination of the Cham kingdom over large parts of coastal South Viet Nam for more than five centuries. Similarly, the Khmer demographic component has gradually declined. A significant fraction of today's ethnic Kinh in South Viet Nam is therefore likely to be composed of descendants of populations of other ethnic background, including groups that have long been known to follow more bilateral kinship rules as mentioned previously. In this regard, the census definition of Kinh may be taken as a somewhat incomplete indicator of anthropological features, which are likely to be regionally more diverse in view of local socio-historical influences (Do 1991). We may add that the late colonization of the South by Chinese and Kinh settlers also explains why the North-South divide coincide with the old division into Mahayana and Theravada Buddhist schools and why the influence of Confucian ideology has long been weaker in South Viet Nam.²³

²² A bilateral (or consanguineal) kinship system is a system in which the mother's family and father's side are equally important in terms of descent and inheritance. It is usually characterized by a significant portion of matrilocal marital patterns, besides patrilocal and neolocal arrangements. The Khmer kinship system in Cambodia has for instance been considered as "bilateral with a preference for matrilocal residence" (Rouen, 2004; Demont and Heuveline 2008). On bilateral descent systems in Southeast Asia, see King and Wilder (2003) and Dube (1997).

²³ North Viet Nam, long under the domination of the Chinese Empire, followed Confucian tenets and the Mahayana form of Buddhism. On the other hand, the South was mostly influenced by the Khmer, who along with the Siamese had adopted Theravada Buddhism from the 11th century onwards. See Huy (1998) and Keyes (1995).

Kinship structures and gender preference

We would therefore expect family structures across Viet Nam's provinces to display a large amount of heterogeneity, with features extending from typical patriarchal patterns as exemplified in the Red River region to a more bilateral system in Southern provinces. Anthropological research—once again focusing on the North—provides only a biased mapping of Viet Nam's kinship systems, as many areas or social groups have not been subjected to intensive surveys. No consistent set of ethnographic across the country would allow for the type of regional analysis pioneered for India by Miller (1981). Yet, several anthropological studies point to the variations in kinship encountered in the South. For instance, Haines (2006) and Do (1991) give illustrations of more bilateral systems in South Viet Nam.²⁴

Analyses of household structure based on sample surveys have, however, shown the extent to which the South differs from the North Vietnamese patrilineal norm.²⁵ Once again, census data will allow us to overcome the limitations of available ethnographical and statistical materials by offering a more systematic analysis of household structures across provinces, using the residential arrangements of married children as a yardstick of patrilocal vs. bilateral systems. We use here a very simple indicator of kinship systems by identifying the share of male and female among married children residing with their parents. To do this, we first compute the proportion of married children residing with their parents and derive from it the respective proportion of sons and daughters among them. As already noted, Vietnamese households are on the whole small and less likely to include married children than other Asian countries, but multigenerational arrangements with one married child staying with his or her parents are far from uncommon, especially following marriage and the birth of children. In fact, 20% of the households used in the analysis below (with household head aged above 40) include a married child.²⁶

²⁴ The most detailed village study conducted fifty years by Hickey (1964) in Long An province describes, however, a community which, in spite of inheritance of land by both sons and daughters, presents with several typically patriarchal features such as village exogamy, absence of divorce, patrilocality, and preeminence of the patrilineage.

²⁵ See Hirschman and Vu (1996), Anh et al (1997), Bélanger (2000), Knodel et al. (2000), and Haines (2006). The emphasis of these studies is mostly limited to the North-South dichotomy.

²⁶ The frequency of multigenerational arrangements is also reflected by the fact that as many as 30% of children below 5 years are classified by the census as grandchildren of the household head.

Table 2: Coresidence of married children by region, Viet Nam, 2009

Region	Households with married children		Proportions of daughters among coresiding married children	Number of households with married children
	All children	Daughters		
Northern Midlands and Mountains	22.5%	2.8%	12.4%	60 339
Red River Delta	16.1%	2.3%	14.1%	100 279
North and South Central Coast	16.4%	3.5%	21.3%	89 479
Central Highlands	16.4%	6.6%	40.3%	18 519
Southeast	23.7%	9.8%	41.1%	79 486
Mekong River Delta	29.2%	8.4%	28.8%	138 768
Total	20.6%	5.1%	24.8%	486 873

Restricted to households whose head is aged 40 years or more

Computed by the author from the 15% census sample

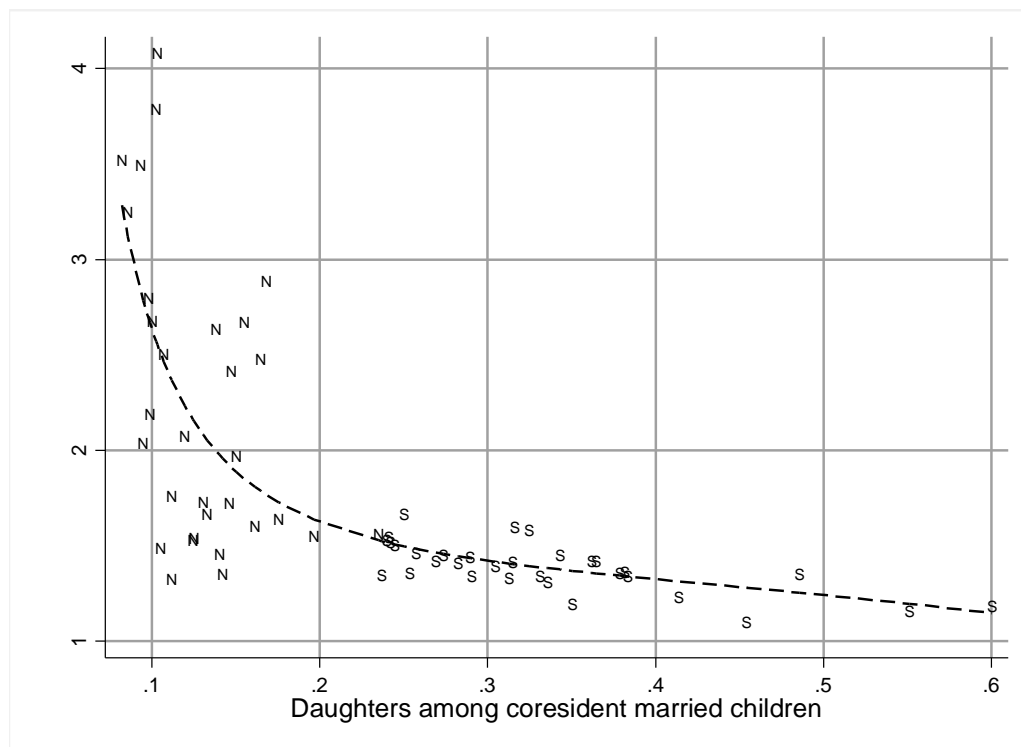
Coresidence of daughters after marriage with their family is of course in direct contradiction with a patrilineal system in which female children have only a transient social and economic role in their native family. Such a practice is largely avoided in the traditional patrilocal setting since women automatically join their husband's descent group after marriage and often reside for several years in their new husband's family. Uxorilocal residence is, on the other hand, a feature common throughout the rest of Southeast and constitutes one of the typical traits of its bilateral system. The proportion of sons and daughters of the household head among married children therefore reflects the relative weight of patrilocal and uxoriocal family arrangements and will serve here as an indicator of more balanced, bilateral arrangements.²⁷ As Table 2 confirms, there are significant variations in the proportions of households with married children across Viet Nam's regions. The Mekong region emerges in particular as the area with the largest proportions of families with married children. But of more interest to us is the share of daughters among co-residing married children: their proportion varies across regions from 12% to 41% and is twice as large in the South as in the North.

Geographical variations appear even wider when the proportion of married daughters is computed over provincial averages. In two Southern provinces, married daughters actually predominate among coresiding married children while, at the opposite extreme, they account for less than 10% of married children in more than five Northern provinces. Province-level estimates of the proportion of daughters among married children are plotted in Figure 4 against the indicator of son preference in fertility progression used previously. The demarcation between the North and the South is nowhere more evident than on this graph since post-marital

²⁷ Another possible indicator of gender equity could be the frequency of female headship. But female headship is also affected by the frequency of divorce, widowhood, and migration, as well as by strategic work or residential considerations (Teerawichitchainan 2009).

residential patterns neatly divide Viet Nam into two separate groups, with a higher frequency of bilateral arrangements found South of Da Nang.

Figure 4: Son preference in fertility progression and proportion of coresiding married daughters by province, Viet Nam, 2009 census



Sources: computed from the census sample.

Notes: N=North Viet Nam ; S = South Viet Nam.

See Appendix for details on the estimation of the son preference indicator.

In the South, the two provinces where daughters form the majority of married children coresiding with their parents are Gia Lai in the Central Plateaus and Ninh Thuan along the coast. Their respective socio-historical profile is revealing. Gia Lai is a typical Central Plateau province that has long lived in relative isolation and is characterized by frequent matrilineal systems (Nguyen 1991). In spite of the flow of Kinh migrants over the last decades, it is still characterized today by a high proportion of indigenous populations, with Khmer and Cham-related groups such as the Gia Rai and the Ba Na prominent among them. The adjacent province of Kon Tum shares the same characteristics and its proportion of married daughters is also among the highest in the country. For its part, the coastal province of Ninh Thuan coincides with the former Champa principality of Pandarunga, which managed to retain some degree of independence under the protection of the Vietnamese dynasties after the invasion and

obliteration of the Champa kingdom in the late 15th century.²⁸ Today, Ninh Thuan remains a province with one of the largest concentrations of Cham people in the country. They constitute a special subgroup called the Cham-Hroi, among which a large number have remained “Brahmanic” (*Bà La Môn*), while most Chams elsewhere have converted to Islam. Chams follow a matrilineal system, with uxorilocal residence and inheritance transmitted along the female line.²⁹ Other local ethnic groups and the adjacent provinces of Lam Dong and Binh Thuan share the same kinship characteristics.³⁰ Apart from Ho Chi Minh City and its vicinity, another cluster of bilateral family arrangement is recorded in Tra Vinh and Kien Giang, which are the provinces in the Mekong Delta with the largest Khmer minorities.

Figure 4 eloquently illustrates the relationship between the prevalence of patrilineal systems and high son preference across the country. The low levels of son preference as inferred from parity progression ratios correspond almost exactly in South Viet Nam to the mixed kinship systems and the prevalence of bilateral marital residence. In that part of the country, the effective contribution of daughters to their biological family, illustrated here by coresidence but also attested in various socioeconomic surveys by other forms of solidarity, cancels the preference for male births observed elsewhere in Viet Nam. The situation appears more confused in the North where patrilocal residence predominates and seems only weakly related to the intensity of son preference.³¹

As our previous observations suggest, there is a close link in Viet Nam between kinship systems and the ethnic origin of the population, even when the present demographic share of the minority population appears limited. The preservation of the Theravada Buddhist tradition—one of the mainstays of the Southeast Asian civilization (Keyes 1995)—and the local adaptation of the Mahayana Buddhism in Southern provinces may also reflect on kinship and gender attitudes. The ethnic and religious background of the population may be a primary determinant of Viet Nam’s current kinship structures, which in turn have a direct bearing on the intensity of son preference as measured by fertility behavior.

²⁸ Pandarunga’s relative autonomy was preserved until the 1830s when the suppression of the revolt against the Nguyen Lords marked the end of the last remnant of Champa. On Champa history, see Hardy et al. (2009) and Southworth (2004).

²⁹ See Nakamura (2005) and Hardy et al. (2009). The other Cham branch inhabits the Southern An Giang province bordering Cambodia. In spite of their near-absence of exchange with other Cham populations in Viet Nam, these Muslim Chams follow similar matrilineal patterns (Taylor 2007).

³⁰ For instance, Ninh Tuan province also includes a sizeable proportion of Raglai, an Austronesian ethnic group closely related to the Cham. Cham and Raglai together account for 22% of the total population and are also found in significant numbers in neighboring provinces.

³¹ As a matter of fact, Northern provinces lying below the fit curve—with lower than expected son preference—are characterized by higher fertility and significant minority population. These are regions with a strong patrilineal descent system, but where high fertility tends to reduce the significance of our son preference indicator.

The correlates of high SRB in Vietnamese provinces

This preceding review of factors contributing to high birth masculinity in Viet Nam suggests the interplay of various social, demographic and economic characteristics. This section will bring them together to rank the respective influence of these different factors. To do so, we will use the variables examined previously in a multivariate analysis of variations in sex ratio below 1 at the provincial level.³²

In view of the relatively small number of provinces (63), we have limited the analysis to a restricted number of independent variables. A preliminary multivariate analysis indeed showed a large range of variables to be uncorrelated to the sex ratio at birth, as was the case of urban/rural, density, indicators of average education levels, and all variables related to economic status. This absence of correlation may be partly due to the limited size of the sample and to potential multicollinearity between variables used. In fact, several key variables display a high level of collinearity. Multicollinearity is especially strong between our indicators of bilaterality, fertility, and son preference. We have therefore orthogonalized these variables in order to improve the specification of the model.³³

Table 3 presents the results of our multivariate analysis of the regional variations in birth masculinity. In spite of the very good fit ($r^2=.712$), only a small number of variables are meaningfully related to birth masculinity at this scale of analysis. As expected, son preference in fertility progression, ethnic minority and bilateral marriage systems (coresidence of married daughters) emerge as the strongest predictors of SRB variations. Son preference, even after correction for the collinear effect of fertility and bilaterality, remains the first correlate of sex ratio at birth in Viet Nam. This confirms, if it indeed requires confirmation, that the pure demand factor remains paramount to the phenomena of prenatal sex selection. The prevalence of patrilineal postnuptial arrangement also acts as a distinct factor increasing the proportion of boys among children. The proportion of ethnic minorities in a province is the third major factor influencing birth masculinity. In fact, the introduction of this factor has entirely eclipsed the otherwise well-established influence of the average regional SES level, this variable being subsequently removed from the statistical analysis. In addition to specific social and cultural differences, the presence of a minority population is a powerful indicator of low socioeconomic status, poor infrastructures and accessibility, and poverty levels. This result reflects on the strict ethnic patterning of the Vietnamese society in spite of the intensity of population redistribution through inter-regional migration and of the specific policies towards minorities.³⁴ Fertility plays

³² An alternate modeling approach based on individual sample births is not applicable here since the most relevant variables—son preference, bilateral marriages and fertility—are not available for individual mothers or households.

³³ The orthogonalization procedure ranks variables, based on the assumption that bilaterality and fertility were prior determinants of son preference. The resulting son preference variable therefore corresponds to variations in son preference not accounted for by regional levels of bilateral coresidence and of fertility.

³⁴ The growing socioeconomic gap between Kinh and other ethnic groups is analyzed in detail in Baulch et al. (2002) and VASS (2006). The strong spatial clustering of poverty in upland Viet Nam corresponding to minority-inhabited areas is also related to agro-climatic factors and lack of access to markets and urban centers (Minot et al. 2006; Epprecht et al. 2011).

a less prominent role in this analysis. Yet, low fertility tends as expected to exacerbate birth masculinity when other determinants are factored in.

Table 3: Multivariate model of sex ratio of children below one year by province, Viet Nam, 2009

Independent variables	Coefficient	t	P>t
Fertility	-0.728*	-2.170	0.034
Fertility (log)	0.437	1.420	0.161
Minority	-0.052***	-4.200	0.000
Son preference	2.515***	8.240	0.000
Bilaterality	-1.224***	-4.040	0.000
Constant	110.150***	272.850	0.000
<i>n</i>	63		
<i>r</i> ²	0.712		

All data are province-level averages from the 2009 census

Fertility: total fertility rates; Minority: % non-Kinh population; Son preference: son preference in fertility progression (see text); Bilaterality: % daughters among coresiding married children (see text).

Bilaterality, fertility and son preference variables have been orthogonalized (in this order).

Significance levels: *5% **1% ***0.1%

This model neatly sums up the underlying layers of the process of demographic masculinization: son preference, overall regional environment, anthropological diversity including marriage patterns, and individual family formation. Interestingly, variables introduced in the model have totally displaced the North-South divide that seemed at first at the core of the geography of sex ratio in Viet Nam since the dummy North/South variable is of no more statistical significance in this model. An additional geostatistical analysis has also shown the absence of spatial autocorrelation among model residuals. This demonstrates that the geographical patterning of the SRB in Viet Nam is entirely explained by the variables included in the statistical model presented here. Yet, a more systematic analysis of the regional variations in birth masculinity would probably require a larger number of administrative units, such as the 650 counties (*huyen*). This would allow for the inclusion of additional variables, such as socioeconomic variables (education, employment, and household amenities) and specific ethnic variables.

One important lesson from this statistical exercise is the foremost role played by our indicator of son preference in determining variations in birth masculinity. Similar models of birth or child sex ratio applied to other Asian countries have only used indirect indicators of patriarchal inclination—regional identity, religion, ethnic composition, traditional behavior – to capture the presence of gender preferences. The use of a more straightforward indicator of son preference based on census sample data suggests that other social, economic and spatial dimensions have by comparison limited influence on the sex ratio at birth. This in turn should encourage researchers to launch a more direct enquiry on the determinants of son preference itself. The heterogeneous nature of most Asian countries affected by sex ratio imbalances may offer the

perfect social and cultural terrain to explore the factors underlying gender preferences in given contexts.

Conclusion and recommendations

Our paper started with a summary of the recent findings on sex ratio at birth in Viet Nam. We have highlighted several traits of sex imbalances at birth such as regional and socioeconomic differentials. These variations appear familiar in the light of the experience of other countries in East and South Asia where the sex ratio at birth started increasing long before it did in Viet Nam. We have then tried to relate these features to the three variables determining the prevalence of prenatal sex selection: sex selection is related to low fertility (the squeeze factor) and to a more prosperous environment (the supply factor), and the swift rise in SRB levels observed after 2003 in Viet Nam is most probably attributable to a change in technological supply. But these two factors appear secondary to the underlying need for a male progeny. Son preference emerges therefore as the strongest predictor of current birth imbalances in Viet Nam.

We have then explored in greater depth variations in gender preference observed in Viet Nam and their relation to patrilineal families. Our findings shows that Viet Nam's kinship structures are significantly more heterogeneous than field studies tend to suggest. In the same vein, we argue here that the extensive notion of Kinh ethnicity as encapsulated in official statistics conceals a significant amount of sociocultural diversity, with parts of the country marked by a significant level of bilateral arrangements common in Southeast Asia. The type of household structures found in Viet Nam is associated with several dimensions of the local gender system and women's autonomy, with consequences on socioeconomic features as varied as prenatal discrimination, family solidarity, old age support and fertility behavior. The close relationship between lower son preference and more flexible kinship arrangements in South Viet Nam demonstrates that gender discrimination is not simply a spin-off of social change, population policies, or economic development. On the contrary, it manifests the underlying effects of kinship institutions on gender attitudes which are legacies of centuries of social and historical change.

Prenatal sex selection points not only to the intensity of gender bias in Viet Nam, but announces also a future sex imbalance among adults. While the situation is currently less adverse than in China or India—where sex imbalances have now accumulated over two decades (Guilmoto 2012)—, the high number of Vietnamese women marrying abroad may worsen the potential marriage squeeze for men in the future (Thai 2008). Yet, Viet Nam has definitely learnt some lessons from its Northern neighbor by acting early. The prohibition on prenatal sex selection introduced in 2003 has already been strengthened in 2006 by a decree imposing significant fines on users and practitioners. Several awareness and girl support schemes have also been launched on a pilot basis since 2009 (see also UNFPA 2010b: 78-85).³⁵

³⁵ Contrary to the experiences of many countries in Asia or Eastern Europe, there has never been in Viet Nam any public denial of the existence of birth imbalances. Several qualitative and statistical studies have been launched to document the issue over the last five years. The author was personally impressed by the level of awareness and commitment expressed by the various officials of the Ministry of Health and health

As a conclusion, we would like to offer four recommendations.

Firstly, several key elements in our reasoning are derived from ordinary census data. We have for instance devised a new indicator of son preference in fertility behavior based on the households' child composition, which has allowed us to demonstrate the link between gender preference in fertility and prenatal discriminatory behavior. While anticipated, this relation cannot be formally established based on in-depth surveys, which are not representative of larger regions and do not provide quantitative measurement of the intensity of existing sex bias. Similarly, using the information on the coresidence of married children with their parents, we devised an indirect measurement of patrilocality, a trait commonly associated to the pivotal role of sons in their native family. These two results provide illustrations of the insights that can be gained from census micro-data, and how they can supplement existing or limited field evidence by providing indirect quantitative estimates for sociological or anthropological mechanisms.

Secondly, estimates of the prevalence of son preference in fertility behavior may lead to a systematic identification of localities and social groups exhibiting high gender bias. Based on samples of adequate size, such assessment of the intensity of son preference provides more reliable predictors of potential bias against girls than the more commonly used measurements of ideal family composition. This methodology could be applied everywhere for evaluating the latent demand for sex selection, including in countries where the other preconditions of prenatal sex selection (modern technology, access to abortion, small families) are not met. This may be for instance the case of several countries in West and South Asia where son preference has already been reported in surveys. We recommend therefore that census-based samples be used to compute the impact of gender preference on fertility behavior in order to detect in a more systematic manner the potential for prenatal or postnatal discrimination in specific regions or social groups.

Thirdly, our analysis has emphasized the role played by kinship role and ethnic composition in explaining variations in prenatal sex selection across Viet Nam. In previous works, we had stressed the seemingly irreducible spatial patterning of gender discrimination in countries such as China or India, but census indicators of kinship structures and gender preference used here appear to account for all the geographical variations in the sex ratio at birth. This suggests that the commonly observed spatial patterning of prenatal gender bias discrimination derives primarily from anthropological differences rooted in local communities. Recent social and economic change has had but a limited influence on this geography.

Fourthly, these findings have significant implications from a policy perspective. Several concomitant factors such as fertility decline and economic progress are unlikely to change directions in the future. As a matter of fact, smaller families, increased access to healthcare infrastructures, and higher incomes may soon affect underprivileged regions and become a source of further deterioration of the overall SRB level in Viet Nam. But the role that underlying kinship structures play in determining the intensity of biased gender preference means that addressing traditional attitudes inherited from a deep-seated kinship system may prove as difficult as was promoting fertility decline in the past. Social norms are in fact less easily

managers in Hanoi and Tai Binh hospitals he met during different visits in 2009, 2010 and 2011 as well as by the extent of the media coverage of prenatal selection.

amenable to change than biased legal dispositions or market failures. In addition, we do not know whether the relatively women-friendly features found in parts of Viet Nam, which are typical of a more Southeast Asian kinship system, will be able to withstand the gradual homogenization of Vietnamese society. The fact that traces of prenatal sex selection can also be detected in the largest metropolitan areas such as Ha Noi or Ho Chi Minh City suggests that rapid social transformations and the growing employment opportunities for women have not yet seriously eroded traditional gender arrangements. If local authorities and civil society organizations want to accelerate the return to normalcy of the SRB, they will have to support a complex mix of interventions combining monitoring of sex selection, legal changes, targeted financial schemes, and campaigns to change the traditional patriarchal mindset.

Appendix

Data sources

In the absence of published birth registration data, Viet Nam's SRB situation can only be monitored by use of decennial censuses and sample surveys. Unless stated otherwise, all data used in this paper come from the 2009 census, including mortality rates derived from the life tables computed by the General Statistics Office. Some figures are from the recently published complete census results (GSO 2010), which provide age and sex distribution for administrative units and ethnicity. Despite sex differentials in infant mortality, the sex distribution of the population below one year provides a very good indicator of sex imbalances at birth.

Most individual and household information used in this paper is drawn from a sample based the "long questionnaire" restricted to 15% of the population. These sample micro-data make it possible to compute the sex ratio of the births during the last 12 months for a variety of individual and household characteristics. A selection of household-level variables—housing amenities and household goods—has also been used to construct the synthetic indicator of socioeconomic status and the corresponding SES quintiles (UNFPA 2010a). Sample data can also be used to reconstruct the indicators used in this paper: birth order, parity progression and kinship structures.

Reconstructed sibling population

Demographers have long used individual census and survey records of household children to reconstruct past fertility trends. In a nutshell, the procedure—the own-children method developed initially for estimating fertility (Cho et al. 1986)—consists in reconstructing birth history by using surviving children residing with their mothers. As it happens, the method can also be applied to the reconstructed children population to assess past trends in SRB with respect to other demographic and family characteristics.

We have reconstructed the sibling population from individual records from the 2009 census sample by identifying children (and whenever possible grandchildren) with identical parents. 94 % of the population below 15 years can thus be reclassified as siblings. Compared to age-specific sex ratio, the reconstructed children population has the advantage of providing an indication of the birth rank of each child and allows therefore for estimation of past SRB levels

by parity and by sex composition of the family. The limitation of this estimate is the inevitable underestimation of the real parity by using child rank in the family: the reason is that some children are missing from the household of their mothers because of mortality and migration. The bias caused by differentials migration and mortality on the sex distribution of children is likely to be modest.

Son preference in parity progression

The parity progression ratio (PPR) at parity n is computed as the proportion of women with n births who have an additional $n+1$ th birth. PPRs can be computed on detailed birth histories collected in population surveys such as the DHS, with the birth history truncated by the age of the mother at the time of the survey.³⁶ As the detailed birth history is usually missing from the census, we had to reconstruct the sibling population as described in the previous section. With it, we can then reclassify surviving children by birth order, sex and age as well by other characteristics of their mothers and households. This reclassification allows for the calculation of the proportion of children of various ranks with a younger sibling, a measure similar to the PPR. In contrast with survey data, the 15% census sample is large enough for disaggregated regional and socioeconomic analysis by birth rank and sex composition of the family.

We have devised a parity-specific measure of son preference in fertility progression pertaining to the 1999-2009 intercensal period.³⁷ This indicator of son preference is computed as the ratio of the PPR *without* previous male child to the PPR *with* a previous male child. As a result, this indicator is equal to one when the sex composition of previous children does not influence the subsequent fertility behavior, but takes values above one if the absence of a son enhances the probability of an additional birth. We also computed a synthetic indicator of son preference in fertility progression by averaging the parity specific indicator for birth ranks 1, 2, 3 and 4. We used the respective proportions of births by rank in each population studied as relative weights. This indicator of son preference takes the value of one in the absence of sex-specific bias in fertility progression and of 1.5 if the absence of previous male child augments the probability of a subsequent birth by 50%.

While this indicator directly reflects the intensity of son preference, it is also indirectly influenced by the fertility target of the parents. Moreover, as the indicator is based on truncated data collected during the census, it may slightly overestimate son preference if birth intervals are shorter among women who have never given birth to a boy.

³⁶ Some women who have not yet reached parity n may eventually go on to parity $n+1$ after the survey. As a result, the true cohort-specific PPRs may be underestimated.

³⁷ There are various methods for estimating the intensity of the differential stopping behaviour or male-preferring stopping rules. Filmer et al. (2009) follow a slightly different method.

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