

# *The Relationship Between Wealth Disparity and the Sex Ratio at Birth*

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**Abstract:** This work delves into the complex interplay between the wealth gap, son preference, and sex ratio at birth (SRB) imbalance. Although the natural sex ratio is around 105 to 100, imbalances in some regions that exceed this range are associated with a preference for boys, which has cultural and economic roots. This paper examines the link between wealth inequality and SRB and finds that the relationship is not direct. Global and Chinese data analysis shows no direct relationship between GDPs per capita and SRB in different countries, nor is there a one-to-one correspondence between GDPs per capita and SRB in other provinces in China. The study found that the family planning policy and unregistered women after birth also contributed to the gender gap. Contrary to assumptions, the study shows no significant relationship between wealth gaps and skewed SRBS, underscoring the multifaceted nature of this issue.

**Keywords:** wealth disparity, Trivers-Willard theory, sex ratio at birth, fertility squeeze

## **1. Introduction**

Based on information from the United Nations, the 'natural' sex proportion at birth (SRB) is about 105 boys per 100 girls (varying from about 103 to 107 boys) [1]. Besides genetic reasons, the SRB above this range is related to son preference. As wealth imbalance becomes a bigger problem today and the gender imbalance worsens, the gap between rich and poor and the inequality between male and female offspring are linked.

### **1.1. Basic idea of son preference**

Son preference means that some societies, often patriarchal, place a higher value on male children than female children, so they wish to have a male rather than a female. However, it is essential to recognize that son preference is a harmful practice that perpetuates gender inequality and can have severe consequences for girls and women and the broader social and economic development of communities and countries. The reason for son preference turning into skewed SRB is that in those countries with a son preference notion, having a son is often seen as more desirable for various reasons, such as carrying on the family name, inheriting property, and providing more significant financial support. Therefore, families may guarantee that they have a male kid by going to great lengths, including using modern technology to identify the sex of the fetus early in the pregnancy and using selective abortion to abort female fetuses.

The negative consequences of son preference are significant. For example, Skewed sex ratios can result in a shortage of marriage partners for men, leading to social unrest and violence; girls who are born in cultures with solid son preferences may face discrimination and neglect from their families, including lower rates of education and access to healthcare, etc [2,3].

### 1.2. Biological explanation of the unbalanced offspring ratio

Chromosomal abnormalities are more likely to occur when the embryo is male - in the first week of pregnancy, male mortality is higher, meaning pregnancy is skewed towards females. Over the next 10-15 weeks, the higher mortality rate among females grows, the proportion favoring males. Around week 20, male and female mortality rates are roughly equal. Male mortality is higher between 28 and 35 weeks of pregnancy. Overall, SRB outcomes are skewed towards males. Therefore, an SRB around 103 to 107 is considered normal in the following paragraphs.

### 1.3. Trivers-Willard theory

The Trivers-Willard theory in evolutionary psychology suggests that the SRB may vary depending on the parents' condition or status. The theory proposes that if a mother is in good condition or has a high social level, she will produce more male offspring, while if she is in poor condition or has a low social class, she will produce more female offspring. In the Trivers-Willard theory, "good condition" refers to the physical or social status of the parent. Females in good condition may have more resources to invest in their offspring. They may better support the development of male offspring, which usually have more resources than females since males are biologically more potent and have access to more survival materials. Because males mate in a broader age range than females, they can produce more offspring, and in patrilineal societies, males have far more status than females. The specific "good condition" criteria may vary depending on the species and environment. Thus, this paper uses wealth to indicate the term "condition" [4].

## 2. Comparison of wealth disparity and the unbalanced SRB

Figure 1 shows that the SRB in most countries is relatively balanced, with around 103 males born for every 100 females. However, in some East Asian countries, such as China, the SRB is significantly higher, with more than 110 males born for every 100 females. For instance, China, which has the most unbalanced SRB, falls in the middle-class category in terms of average wealth per adult. This indicates that overall wealth is not the only factor determining the sex ratio in the given demographic (Figure 2). Other socio-cultural and economic elements may also exert an effect. Moreover, the cultural background and the son preference concept, policies like monogamy and polygamy may also affect the SRB. Hence, the comparison between country and country is not the best demographic [5-7].



Figure 1: shows the SRB in various countries in 2021. The colors in the map indicate the degree of imbalance in the SRB, with darker colors indicating a higher proportion of boy-to-girl births [8].

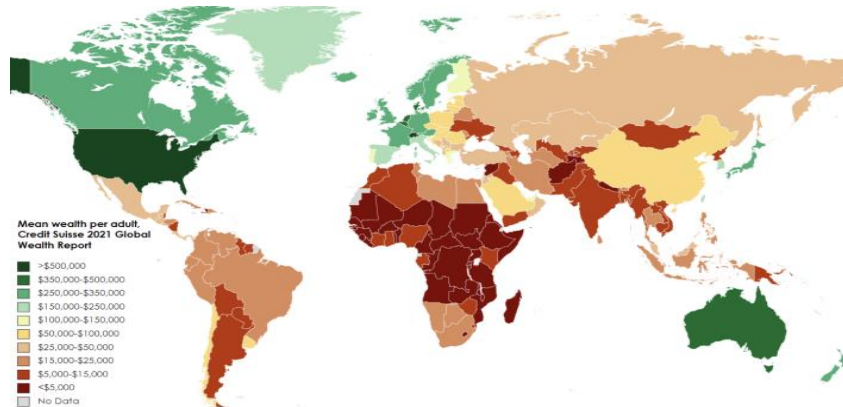


Figure 2: The Credit Suisse report shows that the countries with more sex ratio issues are not the wealthiest, but they are not the poorest either [6].

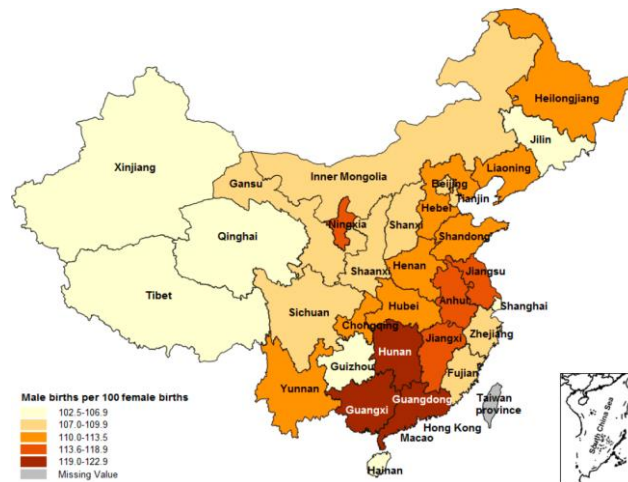


Figure 3: Sex ratio at birth by province, 2015 [7]



Figure 4: According to the GDP per person in each province of China, the researcher can see that the wealthiest province does not have the most unequal sex ratio [5]

The lighter the color is, the more unbalanced the sex proportion of offspring at birth (Figure 3). For example, Shanghai and Beijing have the highest GDP per person, over \$14,000, but their SRB is smaller than 109, which is in the normal range (Figure 4) [7,8].

## 2.1. Trends of SRB and GDP per capita in some countries

As the researcher can see in Figures 5 and 6, SRB in China, South Korea, and Vietnam have been consistently high, peaking in the late 1990s and early 2000s. One reason for the high sex ratio may be a preference for sons and government policies, such as China's one-child policy. In contrast, Albania and Tunisia have had relatively stable SRB over the past few decades, while India has had consistently low SRB. In terms of GDP per capita, all these countries have experienced significant growth in recent years, with South Korea, China, and Montenegro Posting the most significant increases. As can be seen from Figure 5, South Korea's SRB started rising in the 1980s and peaked in the late 1990s and early 2000s. The country's gross domestic product per capita increased dramatically during the same period. Although Montenegro's SRB has remained relatively stable over the past few decades, the country's GDP per capita has increased substantially since 2000 [6,8].

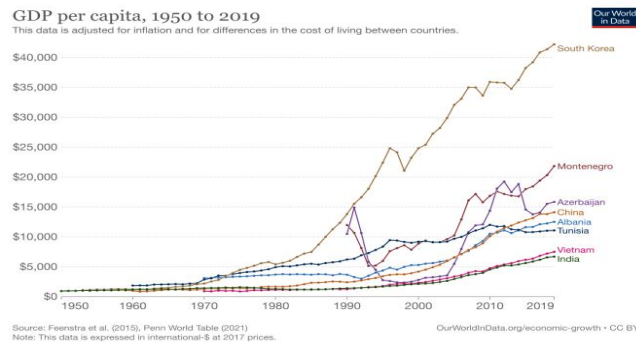


Figure 5: GDP per capita of some countries, 1950 to 2019

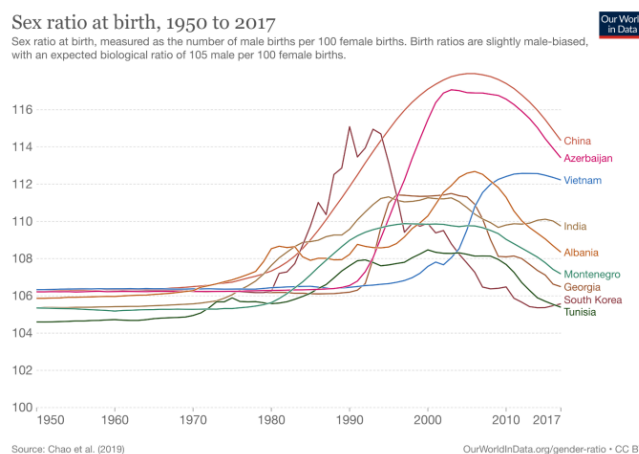


Figure 6: Sex ratio at birth of some countries, 1950 to 2017 [8]

From figures 5 and 6, the researcher can see that in China, the sex ratio has remained stubbornly high since the 1980s and peaked in the early 2000s, mainly due to the country's one-child policy. China's per capita GDP has also increased significantly over the past few decades. Albania and Tunisia have experienced relatively stable SRB over the past few decades, with slight increases in the early 2000s. Since 2000, both countries have also seen significant growth in per capita gross domestic product. Finally, Vietnam's SRB, which has remained high since the 1980s, has declined slightly in

recent years. The country's gross domestic product per capita has also increased significantly since the 1980s.

Overall, while there is no clear relationship between SRB and GDP per capita in these countries, the researcher can see that there has been a significant increase in GDP per capita in each of these countries over the past few decades. However, the peak growth of SRB does not match the peak of GDP per capita, and the ranking of SRB from largest to smallest does not correspond to GDP per capita. [6,8]

## 2.2. Family planning policies

One kid policy means one family is only allowed to have one kid, or the family has to be fined for it or get the child aborted by the government. The average SRB in China during that period was 113/100, a ratio of 53.1% (male to female) (Gupta, 2016). The first row of Figure 7 indicates the different stages of family planning policy in China. If the husband and wife were the only child, they could have two kids in policy (BTCP). If only one of them was the only child, they could have two children in policy (OTCP). According to the Universal Two-Child Policy (UTCP), couples were allowed to have two kids [9,10]. According to the above information, the SRB tends to be expected when the family policy is more relaxed.

	BTCP <i>n</i> =76,466	OTCP <i>n</i> =77,481	UTCP <i>n</i> =116,931	<i>F</i> / $\chi^2$
Maternal age (year) <sup>a</sup>	27.2 ± 4.6	27.7 ± 4.7 <sup>d1</sup>	28.7 ± 4.6 <sup>d2,d3</sup>	2708
<20 years <sup>b</sup>	1453(1.9)	1294(1.7)	1277(1.1)	583
20–24 years <sup>b</sup>	19,958(26.1)	16,664(21.5)	17,486(15.0)	
25–29 years <sup>b</sup>	36,188(47.3)	37,128(47.9)	55,035(47.1)	
30–34 years <sup>b</sup>	14,059(18.4)	16,056(20.7)	29,702(25.4)	
≥35 years <sup>b</sup>	4800(6.3)	6323(8.2)	13,405(11.5)	
Unknown	8(0.0)	16(0.0)	26(0.0)	
Baby sex <sup>b</sup>				13.2
Female	36,686(48.0)	37,790(48.8) <sup>d1</sup>	57,133(48.9) <sup>d2f3</sup>	
Male	39,780(52.0)	39,691(51.2)	59,798(51.1)	
SRB <sup>c, a</sup>	1.084	1.050 <sup>d1</sup>	1.047 <sup>d2,f3</sup>	15.9
Birth weight (kg) <sup>a</sup>	3.34 ± 0.52	3.33 ± 0.52 <sup>d1</sup>	3.34 ± 0.51 <sup>f2,d3</sup>	10.2
Neonatal death <sup>c</sup>	0.912	1.110	1.130	
Male neonatal death <sup>b</sup>	283(44.0)	253(48.5) <sup>d1</sup>	340(49.7) <sup>d2,d3</sup>	15.2
Female neonatal death <sup>b</sup>	310(48.2)	228(43.7)	301(43.9)	30.8
Unknown <sup>b</sup>	50(7.8)	41(7.8)	44(6.4)	
Deliveries per day <sup>e</sup>	141(121, 163)	116(90, 162) <sup>d1</sup>	154(130, 181) <sup>d2,d3</sup>	47.9

Figure 7: SRB in different stages of family planning policies in China [11]

## 2.3. Unregistered and under-reported female births

The family planning policy is applied disproportionately across China, especially in rural areas. To give themselves the chance to have a son and avoid fines for having too many children, some parents in China's rural areas do not register baby girls, resulting in a shortage of baby girls. Although it was the responsibility of village officials to implement the policy, they underreported the number of births so that higher authorities would not punish them.

The study also found that many women showed up after age ten due to late registration in different



age groups. For example, the sex ratio of births in 1990 was 111, but because 4.8 million births were registered late, the sex ratio for the same population dropped to 103 in 2010, with more than 900,000 more women than men, which is in the normal range. The same pattern of proportions was repeated in other years, with 550,000 to 950,000 more women than men per unregistered people. [10]

### 3. Analysis

According to the horizontal comparison of the GDP per person of each country, each province in China, and the unbalanced gender of offspring at birth, the researcher can tell there is no significant relationship between each other, which means the result supports hypothesis 2 and dis-confirms hypothesis 1. Sex elective abortion is still an essential factor since our data is the gender ratio after children get birth. The SRB is much more unbalanced than would occur naturally, especially where there is a clear son preference. Still, there's no significant relationship between wealth disparity and SRB.

### 4. Conclusion

The complex interplay between son preference, the wealth gap, and the imbalance in the sex ratio at birth poses multifaceted challenges to societies worldwide. Having found some highly unbalanced SRBS, this paper delves into the complex relationships between these factors and their implications for gender equality and population stability.

Biological factors also influence the sex ratio, with higher male mortality rates at certain stages of pregnancy, resulting in natural fluctuations in the sex ratio. The Trivers-Willard theory introduces the idea that the sex ratio of offspring is influenced by the condition or status of the parents and that more resources may result in a sex ratio biased towards males so that wealthier families may be more likely to produce male offspring.

The deep-rooted preference for boys in the patriarchal society has led to the imbalance of gender ratio in different regions to a large extent. Cultural values favoring male offspring due to factors such as inheritance, family continuity, and economic support have led to practices such as sex-selective abortion that perpetuate gender inequality and undermine the development of girls and women. Negative consequences of gender imbalance include marital imbalances, discrimination, limited access to education and health care, and social unrest.

By analyzing the relationship between the wealth gap and the gender imbalance, we found that some countries with skewed sex ratios, while not the richest, are also not the poorest. This suggests that socioeconomic status alone does not fully explain the gender balance imbalance. Other socio-cultural factors, such as son preference, family planning policies, and cultural norms, also play an essential role in the observed imbalance. China's family planning policy shows that looser guidelines often lead to a more balanced SRB.

In addition, the sex ratio is further distorted by the deliberate failure to register female births after birth because of the family planning policy. Parents in rural areas may avoid writing baby girls to avoid penalties, leading to an underestimation of the number of baby girls born.

Overall, this article comprehensively explores the complexities surrounding son preference, the wealth gap, and the unbalanced sex ratio. While the wealth gap does play a role in influencing the SRB, a combination of social, cultural, economic, and policy factors collectively shape the observed patterns. Addressing these issues cannot be underestimated, as achieving gender equality and a balanced gender balance is essential for the well-being and development of societies worldwide. Effective policies, education, and advocacy are necessary to challenge and change entrenched prejudices.

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