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**ECONOMIC VIEWPOINT**

By Robert J. Barro



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## The Case Of Asia's "Missing Women"

**The culprit may not be government policy, but hepatitis B virus**

In 1990 my Harvard colleague Amartya Sen caused a stir by observing in *The New York Review of Books* that excess female mortality in China, India, and other Asian countries meant that there were 100 million women fewer in the world than there should be. The presumption was that the excess mortality came from discrimination against women by men and governments. Although the estimate was lowered to 60 million by demographer Ansley Coale's more detailed analysis in the *1991 Population & Development Review*, this still shockingly large number became a symbol of discrimination against women in developing countries. Many people think the reason is abortion and the killing of newborn girls. But new research suggests another reason. Harvard economist Emily Oster, in her PhD thesis "Hepatitis B and the Case of the Missing Women," suggests that biology explains a good deal of the missing-women puzzle.

In Western countries, such as the U.S., the ratio of male to female births is around 1.05. Higher male mortality leads to decreasing male-female sex ratios as the population segment gets older. In the whole population, the two forces roughly cancel each other out, leading to an overall male-female ratio close to 1. In contrast, since at least 1980, male-female ratios are around 1.08 in China, India, and Pakistan. This demographic phenomenon is limited to Asia and does not relate to economic development. The male-female ratios are not high in sub-Saharan Africa and Latin America.

The Sen-Coale assumption was that the high ratios in Asia reflected high female mortality rates. They calculated how many women would have existed if female mortality rates had been normal, which Coale computed in relation to a country's overall life expectancy. The difference between this hypothetical number of women and the actual number equaled the missing women.

Oster argues that this calculation overlooked something crucial -- unusually high male-female birth ratios in Asia years before abortion became widespread. Given mortality rates by gender, a rise in the male-female birth ratio leads to an increase in the male-female population ratio. Motivated by Baruch Blumberg's book, *Hepatitis B: The Hunt for a Killer Virus*, Oster sees the high incidence of the hepatitis B virus (HBV) as a major culprit.

There is much evidence that parents infected by HBV are more likely to have male children. Places with substantial HBV -- Asia, Alaska, and parts of the the former Soviet Union -- tend to have high male-female birth ratios. Studies in Greece and France show that HBV-positive parents had male-female ratios for offsprings of 1.7 to 1.8, vs. 1.1 to 1.2 for those who are HBV-negative. This pattern also shows up among immigrants, with those from high HBV areas, such as China, having high male-female offspring ratios in the U.S.

The biological explanation for the HBV effect is unclear, though it may involve more frequent spontaneous abortion of female fetuses. But the effect is large, concentrated in certain regions, and susceptible to elimination via the HBV vaccine. In Alaska, the use of the HBV vaccine in 1982 led to a sharp decline in high male-female birth ratios.

Among Asian countries, the HBV influence is greatest in China, explaining 75% of Coale's missing women. In India, the adjustment is less important, explaining only 17%. For Asian countries in general, Oster locates 46% of the absent women, ending up with 33 million missing, rather than Coale's 60 million or Sen's 107 million.

Looking ahead, broader use of the HBV vaccine should lower male-female ratios. But another force -- sex-selective abortion -- which wasn't critical before the 1980s, is growing in importance because of the spread of ultrasound technology and, in China, the one-child policy. In Chinese censuses, the male-female birth ratio rose from 1.09 in '82 to 1.13 in '89 and 1.18 in 2000. The 1982 ratio likely reflected HBV prevalence but the subsequent increases probably reflected sex-selection. An obvious countermeasure: Eliminate the one-child policy.

The Oster research features interactions between biology and family behavior and government policy in the sensitive area of gender studies. This is the kind of research that Harvard President Larry Summers recently advocated in widely criticized remarks. Fortunately, the typical approach in economics is to take on almost any topic that can be usefully tackled with economic tools and let the data speak for themselves.