the dismal science
The Search for 100 Million Missing Women
An economics detective story.

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Posted Tuesday, May 24, 2005, at 3:42 AM PT

What is economics, anyway? It's not so much a subject matter as a sort of tool kit—one that, when set loose on a thicket of information, can determine the effect of any given factor. "The economy" is the thicket that concerns jobs and real estate and banking and investment. But the economist's tool kit can just as easily be put to more creative use.

Consider, for instance, an incendiary argument made by the economist Amartya Sen in 1990. In an essay in the *New York Review of Books,* Sen claimed that there were some 100 million "missing women" in Asia. While the ratio of men to women in the West was nearly even, in countries like China, India, and Pakistan, there were far more men than women. Sen charged these cultures with gravely mistreating their young girls—perhaps by starving their daughters at the expense of their sons or not taking the girls to doctors when they should have. Although Sen didn't say so, there were other sinister possibilities. Were the missing women a result of selective abortions? Female infanticide? A forced export of prostitutes?

Sen had used the measurement tools of economics to uncover a jarring mystery and to accuse a culprit—misogyny. But now another economist has reached a startlingly different conclusion. Emily Oster is an economics graduate student at Harvard who started running regression analyses when she was 10 (both her parents are economists) and is particularly interested in studying disease. She first learned of the "missing women" theory while she was an undergraduate. Then one day last summer, while doing some poolside reading in Las Vegas—the book was Baruch Blumberg's *Hepatitis B: The Hunt for a Killer Virus*—she discovered a strange fact. In a series of small-scale medical studies in Greece, Greenland, and elsewhere, researchers had found that a pregnant woman with hepatitis B is far more likely to have a baby boy than a baby girl. It wasn't clear why—it may be that a female fetus is more likely to be miscarried when exposed to the virus.

Oster was suitably intrigued. She set out first to see if she could use data to confirm Blumberg's thesis. A vaccine for hepatitis B, she learned, had been available since the late 1970s. She found good data on a U.S. government vaccination program in Alaska. Before the vaccinations began, Alaskan natives had a historically high incidence of hepatitis B as well as a high birth ratio of boys to girls. White Alaskans, meanwhile, had a low incidence of hepatitis B and gave birth to the standard ratio of boys to girls. But after a universal vaccination program was carried out in Alaska, the Native Alaskans' boy-girl ratio fell almost immediately to the normal range, while the white Alaskans' ratio was unchanged. A vaccination program in Taiwan revealed similar results.

Convinced now of the relationship between hepatitis B and birth gender, Oster set out on a vast data mission to determine the magnitude of that relationship. She measured the incidence of hepatitis B in the populations of China, India, Pakistan, Egypt, Bangladesh, and other countries where mothers gave birth to an unnaturally high number of boys. Sure enough, the regions with the most hepatitis B were the regions with the most "missing" women. Except the women weren't really missing at all, for they had never been born.

If you believe Oster's numbers—and as they are presented in a soon-to-be-published paper, they are

extremely compelling—then her detective work has established the fate of roughly 50 million of Amartya Sen's missing women. Her discovery hardly means that Sen was wrong to cry misogyny, at least in some parts of the world: While Oster found, for instance, that Hepatitis B can account for roughly 75 percent of the missing women in China, it can account for less than 20 percent of the boy-girl gap in Sen's native India. The culprits behind the disappearance of the 50 million women whom Oster did not find are likely the horrible ones that Sen and others have suggested. But Oster's analysis does show that economics is particularly useful for challenging a received wisdom—in this case, one that was originally put forth by another economist.

The key to Oster's research was the availability of large and reliable sets of data. This is an advantage in economics that is not always conferred on the other social sciences. Consider now a different piece of groundbreaking research in developmental psychology.

In the early 1980s, a group of psychologists and linguists banded together to write *Narratives From the Crib*, a study of how children acquire linguistic skills. *Narratives* was built around the speech patterns of one child, a 2-year-old girl. Her parents had noticed that she often talked to herself in the crib after they said good night and left her room. They were curious to know what she was saying, so they began to record her chatter. They turned on the tape recorder while they were tucking her in and then left it running. Eventually they gave the tapes to a psychologist friend, who shared it with her colleagues. The big surprise to these experts was that the girl's speech was far more sophisticated when she was alone than when she was speaking with her parents. This finding, as Malcolm Gladwell would later write in *The Tipping Point*, "was critical in changing the views of many child experts."

The 2-year-old girl in question was referred to as Baby Emily. Her full name? Emily Oster. In retrospect, it would appear that *Narratives From the Crib* suffers what researchers call an "n of 1" problem, with "n" representing the size of the sample set—a problem that is gravely exacerbated when the one subject turns out to be … well, a good bit brighter than average. Studying how children learn to talk by observing Baby Emily may be a bit like studying how children learn to play golf by studying Tiger Woods. Now that she's an economist, Emily Oster has at least assured herself that she will never contribute to another "n of 1" problem. The challenge in her field—and so far she has met it well—is quite the opposite: to take a mass of disparate numbers and somehow wring from it one thing that is true.

Steven D. Levitt and Stephen J. Dubner are the authors of [Freakonomics: A Rogue Economist Explores the Hidden Side of Everything](#).

Article URL: http://slate.msn.com/id/2119402/