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Professor Weintraub has given us two books in one. First, he traces from Marshall forward how high-level mathematics came into and changed the presentation of modern economics. What he means by mathematics is set theory and the type of axiomatic proof offered by Arrow and Debreu in their famous "existence" paper. Second, he tells the story of his father, Sydney Weintraub, who was a pioneer in mathematical economics, his father's influence over his son's work in economics, and the shaping of his son's intellectual agenda as a renowned historian of economics. Math happily runs in the Weintraub family.

His methodology is biographical. He relates many interesting stories of mathematicians and economists and their interactions and intersections, at times (as with Debreu) reporting discussions that he had with them. Stigler to the contrary not withstanding, Professor Weintraub amply demonstrates the value of a biographical approach to the history of science. Along the way, we meet names that are familiar (Patinkin) and some new names (Volterra) from the little known world between economics and mathematics. Particularly fascinating is the tale of the editorial review of the Arrow-Debreu paper by Econometrica, in which the mathematician referee (Phipps) argued strenuously against publication while the economist referee (Baumol) easily acquiesced.

To me the central message of the book is that axiomatic economic theory was a by-product of the intellectual curiosity of certain economists and mathematicians working on the boundaries of their disciplines. But for these personalities, there may not have been an axiomatic economics. In this respect the biographical method is the core contribution of the book. And, of course, Weintraub is correct. Great economists are highly specialized resources, and the history of economics is undoubtedly greatly influenced by their preferences and constraints. In this way we are the product of our own science. Axiomatic proofs became a part of modern economics because scientific entrepreneurs discovered their usefulness and import. The only oddity in this case is that we know who the economists were but not for the most part the mathematicians. Weintraub brings these scholars to light.
I have nothing critical to say about the book. It is an important contribution to the history of economics, it is interesting in all respects, and I recommend it to economists and historians of science. Ah, but I do have a few quibbles.

The first concerns the focus on the axiomatic mathematics that has enabled general equilibrium theory to play such a prominent role in modern economics. While quite important in its own right, this focus deflects us from such issues as the role of R.G.D. Allen's textbook, as well as Samuelson's Foundations. These works did not lead to existence theorems, but they were very important in changing the presentation of modern economics. Perhaps some distinction between higher and lower mathematics would be helpful here. It could be argued, for example, that calculus has had more useful effects in economics than set theory.

The second quibble is empirical in nature. The latter part of the last century saw the rise and fall of mathematical economics. If one examines the leading journals of economics, for example, the American Economic Review, from 1950-2000, the number of equations per page has been in decline since the early 1980s. For whatever reason, mathematical presentation is on the wane. What are the causes of this development? Is there a turn away from math? Is the level of math the same, with the result being driven by a more concise presentation? There is work to be done here.

A related and final quibble is that the data may be suggesting that math has diminishing returns in economics. Indeed, economics has diminishing returns in that any science is finite; there is only so much that we can learn. And the data indicate that citations to economic research have fallen dramatically over recent years. Are we at the end of economics? Have all the crucial relationships been discovered? Is mathematical economics the capstone to the history of our discipline? Does mathematical economics mean that once we are able to express ourselves in so precise and general a way, there is little of value left to say?

These, of course, are all subjects for another time. For now, let us salute Professor Weintraub for his excellent and stimulating book. One can only be heartened at Duke's continuing preeminence in and emphasis on the history of economics.
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