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Professor Paul A. Samuelson
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Dear Paul,

Thanks for your kind words about my Marschak memoir.^{*}
As you can imagine, it was a labor of love.

Mea culpa about the comma in the title of Keynes's magnum opus. This is an example of what the lexicographers call regularization. Since the comma properly belongs there, it must have been there.

About Marschak's paper on expected utility^{*}, I may have undervalued it, not merely in the memoir. I had been around when Savage was developing his ideas, with more contribution from both Herman Rubin and Herman Chernoff than might be gathered from the final acknowledgements. I felt then that Marschak was merely restating well-known or at least well-understood results, though admittedly in a new way. I think though, on reconsideration, that the restatement really gave an insight lacking in Savage's presentation. From the influence of his presentation on you and others, it is pretty clear that his axiom formulation was considerably more transparent. I doubt that Savage felt there was anything new in it. Incidentally, Rubin's considerable gifts did not extend

** For National Academy of Sciences (USA) in which Arrow didn't mention Marschak's 1950 Econ. paper.*

to improving anyone's intuition, so I would guess that Marschak did his own distillation, though his method was undoubtedly to grill everyone who knew anything until he had fully assimilated it. He had a great capacity for exposing himself to correction from bright young characters like Rubin (or, on different matters, Arrow or Hurwicz). His intuitions were very sharp, even in areas where his lack of mathematical skills would seem to tell against him. For example, Abe Girschick noticed that when a single equation in a complete system was just identified, simultaneous equations estimates were equivalent to least squares estimates of the reduced forms. The restrictions on other equations played no role. He conjectured that, in fitting one equation, even if overidentified, there would be a great simplification in ignoring restrictions on other equations. Koopmans was not at all interested; he felt that one could not afford to sacrifice any information (perhaps a heritage of his Calvinist background). Marschak grasped the importance of the step and got Ted Anderson and Herman Rubin interested in it; they worked out the limited information estimates very shortly, and this technique made simultaneous equations estimation feasible.

If I recall correctly, the papers of Koopmans and von Neumann on the distribution of the serial correlation coefficient came out in the same or succeeding issues of the Annals of Mathematical Statistics. As I recall, von Neumann's feat seemed less impressive to me, because it was based to a considerable extent on simulation; he had, I believe, tables rather than formulas. Koopmans did not have precisely an exact solution, because he made an ingenious approximation at one stage in the analysis. I am intrigued to here about still another contribution. However, the question was in the air. Hotelling insisted to us that this was a very important question and even had some ideas about approaching its solution, and no doubt other theoretical statisticians felt the same.

Which suburb are you and Risha living in? It sounds like Lincoln or Weston, from your description. Love to Risha. Selma sends her love.

As ever,

