The Evanescent Haavelmo

When Trygve Haavelmo completed his paper 'The probability approach in econometrics' in 1939, it seemed that many of the most difficult problems in econometrics had finally been solved. Before, econometrics was for all intents and purposes a discipline of pure logic. Economists created their theories, and then later tried to find some linear regression from the data that fit the theory. With enough trial and error, some true formula would be found. By creating a formal method of testing theories based in statistical probability Haavelmo gave econometricians tools that could be used for conducting empirical research. Once empowered with the probability method, econometricians could test their theories by creating their models in advance and examining their predictive power against the data. However, this view of progress stands in stark contrast to Haavelmo's treatment in modern textbooks, which is to say, his absence. Most university students are unlikely to know who Haavelmo is because his paper is virtually ignored in class or in their textbooks. Compared to other major figures in economics, Haavelmo appears to have been quite neglected. Unfortunately

for Haavelmo, most of the ideas in his paper were too complex for textbooks, and were slowly purged out over time. What has survived in modern textbooks is only that final vestige of the probability method, hypothesis testing. Haavelmo is still the basis for econometrics, but it remains yet to be seen if econometrics can remain coherent without giving more prominence to the theoretical foundations that he created.

Before Haavelmo's paper, econometrics was an oddball assortment of organizations and groups that studied econometrics, but lacked a common discipline. As a student under one of its founders, Ragnar Frisch, Haavelmo was affiliated with the Cowles Commission (now known as the Cowles Foundation) which was dedicated to pursuing econometric research and developing econometrics as a science. Haavelmo was a native of Norway, who went to the United States in 1939 on a Rockefeller fellowship to research econometrics [Bjerkholt 2007: 777]. At this time probability models were thought impossible because econometric data changed with time, and experiments could not be performed [Morgan 1990: 232]. There did not seem to be much interest, or potential in using probabilities in econometrics. Instead, econometricians held to linear models, trying to fit the data to their theories in the hopes of finding the true model from the data [Morgan 1990: 235]. Since the data never fit the model perfectly, using linear regressions was a flawed science, but most economists at the time felt the current method worked well enough. Many of economics luminaries at the time were quite critical of trying to introduce more probability into econometrics: one of Haavelmo's contemporaries who challenged the status quo, Nikolaas Tinbergen, was thoroughly criticized by John Maynard Keynes for

(among other things) including probabilities in his models, and using econometrics to test models [Keynes 1939: 561]. Even Milton Friedman chipped in to concur that the only valid test that could be performed upon a model would be with other data [Morgan 1990: 127]. During his time in the United States, Haavelmo had been won over to supporting the use of probability in econometrics by the influence of his professor, Frisch, although he had already been partially converted to the cause by Jerzy Neyman (of the Neyman-Pearson method) in Great Britain [Bjerkholt 2007: 782]. Frisch had been interested in developing probability models in econometrics However, due to Norway being annexed by Nazi Germany in World War II, Haavelmo stayed in the United States much longer than he had planned, leading to him updating his thesis paper into The probability approach.

Haavelmo's paper itself is very much a product of its time. The first two chapters are primarily theory, aimed at the economists who were critical of the idea of using probability. Surprisingly, neither Keynes nor Friedman commented directly on the paper. Haavelmo labours to show that it is possible to take a purely empirical approach, and that probability can be the linchpin of this model [Haavelmo 1944: iii]. Haavelmo's method was to define the model as not one relationship, but a system of many relationships between the variables, known as the structure [Christ 1994: 36]. The probability of an event occurring was the joint probability (the probability of multiple variables) of all the variables in the system. This allowed for the creation of a sample space [Haavelmo 1944: 46] and then testing from that sample space. In order for this structure to work, Haavelmo used a theory developed by Frisch known as

autonomy [Aldrich 1989: 22]. To determine joint probabilities, the equations must operate autonomously, such that a change in one equation did not affect any other equation in the structure. This is akin to the classical statistics definition of an intersection, where it is necessary that the two events intersecting be independent to find the probability of the intersection. Autonomy had some different characteristics, but the idea that the equations in an autonomous relation must not influence each was similar. This groundwork of probability made it possible for Haavelmo to introduce his testing theory. Having been influenced by Neyman for some time, Haavelmo was fortunate enough to study with him in the United States, and kept in touch with Neyman regularly during the time he was writing his paper [Bjerkholt 2007: 786]. No doubt Haavelmo needed the advice while he was writing the central section of his paper on hypothesis testing following the Neyman-Pearson method. Under this method, economists would include their model in their theory, and test using proper statistical methods – all based in probability, of course. This was a major revolution against the pure logic economics, which treated the model as pure math, and would change it to fit the data. When the models were included with the theory, it meant that the theory could be rejected along with the model, which was not possible before [Morgan 1990: 257]. This settled econometrics into a coherent form, so that the discipline became a useful method which economists could use for continued empirical research.

But that hasn't exactly been the case. Pick up any modern econometrics textbook, such as A.H. 'Woody' Studenmund's 'Using econometrics', and the

ressemblence to Haavelmo's paper may be difficult to spot. In fact, Haavelmo is not even cited or mentioned anywhere in Studenmund's text. The similarities between Haavelmo's paper and econometrics textbooks were swiftly purged twenty years after the paper was published. Robert Lawrence Klein, another Cowles researcher produced his textbook, creatively named a 'Textbook of econometrics', in 1953. Klein joined the Cowles Commission just as Haavelmo published his paper, in 1944 [Cowles 1944]. His textbook is a clear descendent from Haavelmo's paper. It describes in the introduction the econometric approach as being hypothesis testing, and in the second chapter on statistical groundwork, probability is the first topic covered. But Klein's book was not especially successful. It never made much headway beyond graduate students [Ball 1981: 82] and was not a commercial success. That accolade went to John 'Jack' Johnston, who published his textbook, 'Econometric methods', a decade later in 1963. Johnson's textbook was apparently so popular that in his obituary, it was described as 'the first econometrics textbook ever written' (pity Klein) and that it was 'the second most frequently cited book in Economics and Econometrics' (behind Das Kapital). It is also much more similar in form to Studenmund's textbook. Johnston devotes the first half of his textbook to describing linear regression models and the second half to theory, which draws on Haavelmo. However, by the second edition in 1972, Johnson dispensed with all references to Haavelmo and replaced the economic theory section with newer issues in econometrics, such as autocorrelation and lagged variables. Thus we have a lineage from Haavelmo, more or less skipping Klein, then to Johnston, Studenmund and other modern textbooks. When Klein wrote his preface to his second edition in 1974, he noted that while there were now many more econometrics books,

his linking between theory and practice was unlike the others [Klein 1974: ix].It's shocking to see Haavelmo go from defining econometrics to disappearing within thirty years, and yet as Klein writes, the other textbooks had moved on. However, there are some good reasons why textbooks writers were hesitant to refer to Haavelmo. Early reviews of Haavelmo found his paper to be an extremely difficult read [Morgan 1990: 254] and that some of the reviewers probably did not even understand what Haavelmo had wrote. Aldrich argued that because Haavelmo laid down the reasoning for the structure, Johnston took it for granted that he could concentrate on using that structure [Aldrich 1989: 34]. Due to Haavelmo being so difficult to understand by the layman, and that he had been so successful at laying the groundwork for econometrics, textbooks progressively ignored Haavelmo until he was forgotten.

Haavelmo's relative absence in economics can almost certainly be traced back to his disappearance from textbooks. New students simply do not know who he is, or why his paper is so important. Although early Cowles researchers, such as Klein, made his attempt to put Haavelmo's approach in full textbook form, it was not successful enough to have made Haavelmo's paper the blueprint for econometrics. That award went to Johnston, who was highly successful, but gave Haavelmo's approach a progressively smaller share of his textbook. Johnston's textbooks emphasized how to use the econometric structure, not its foundations. Current writers, such as Studenmund, have followed in Johnston's vein, except with no reference to Haavelmo whatsoever. This is a great loss, because without the underpinnings of Haavelmo's theory, econometrics is nearly reduced to the form it was before Haavelmo. Instead of

bringing together theory and applied research, the textbook model encourages students to take the current form of econometrics as given. Still, Haavelmo's role in the development of econometrics is crucial. Without Haavelmo's paper, linear regressions would still be created by trial and error from data. The whole concept of testing hypotheses belongs to Haavelmo, and his adaptation of the Neyman-Pearson method into econometrics proved that empirical research was possible through the correct usage of probability. There are still rumblings of giving Haavelmo a greater place in econometrics, but that will require someone willing and able to build a bridge to Haavelmo's work, just as Haavelmo built his bridge from economics to statistics.

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