Econometrics: Science or Pulp Fiction?

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Although there are similarities between economics and 'science' in terms of their interest in the interactions between theory and evidence, Tom Lyons investigates the degree to which economics and more particularly econometrics should be considered scientific. He examines the issues of data problems, model simplifications and other more inherent differences between the methods of the two disciplines. Aware of econometrics' flaws on the one hand, and applications on the other, he concludes that a lowering of its status as a 'science' does not lessen its importance

"It's only when the tide goes out that you learn who's been swimming naked."
– Warren Buffet.

So Economics had become a science. He pondered the meaning of this as he bit into a cheap cigar. Yet there were niggling questions, rumours if you will, that he'd been sent to investigate. Word was Economics might have something to hide, might be claiming to be something she was not. So Philip Marlowe watched her from the shade of the bar fingering a treble, occasionally flicking an eye towards a good-looking broad with legs it would be a pleasure to make the acquaintance of, just as soon as this was over…

There are a number of reasons for opening this essay in a crude attempt at emulation of the crime novelist Raymond Chandler. Firstly, there is the time scale. Chandler's first novel, *The Big Sleep*, was published in the 1930s, so too was the first *Constitution of the Econometric Society*. Both continue to influence. Secondly there is the content. Chandler dealt with ambiguous characters, very often cloaked with ulterior motives. This was a world where the facts, muddy at best, competed for interpretation. Econometrics, this essay hopes to show, has much in common with this world. Finally, Chandler, although he dealt with serious issues of crime, vice and urban decay, nevertheless wrote fiction. Econometrics too deals with serious issues. But how objective are its findings? How real are its claims to contribute to the scientific status of economics?

The structure this essay will take will be to briefly outline two working definitions of both science and Econometrics. It will then examine some points and counterpoints that the title of this essay provokes. In doing so it cannot claim to

unconditionally resolve but hopes to elucidate some openings into a difficult question.

The 1930 *Constitution of the Econometric Society* proposed that Econometrics should be concerned with *"the advancement of economic theory in its relation to statistics and mathematics."*[1]This is essentially still the case. Mathematical models are formed which are intended to explain the relationships between economic variables. The empirical usefulness of such models is then evaluated using statistical data of perceived pertinence. In the narrow sense it concerns *"the interpretation and analysis of such data in the context of 'established' economic theory."*[2] On the other hand is the idea of "Science" with its immediate connotations of progress and truth. Ideally, science *"uses systems of concepts called theories to help interpret and unify observation statements called data; in turn the data are used to check or 'test' theory."*[3] It would appear therefore that Econometrics and science with their concerns regarding the interactions between theory and evidence have much in common on an aspirational level at least, but what of on a more practical level?

"Is the economic data available accurate enough for our purposes?"[4]

The success of economics is driven by the quality of the data available to it. Elegant theories are well and good but if they are to transcend the journals of academia into the realm of policy, intense attention must be paid to uncovering accurate and relevant data.

This is not easy for a number of reasons. Firstly, data is too often a by-product. This is not a problem of great extent for scientists who tend to collect their own data. Econometricians, until relatively recently, did not take an active role in their collection. As such it was easy to shift responsibility for errors. Econometricians need to become more involved in setting the agenda of statistic collection. As it is data may often be highly aggregated or inefficiently collected. Tied in with this is the need to explore new avenues such as using experimental models[5] and various

[1] Econometrica (1933)
[2] Hendry (1993)
[3] ibid
[4] Morgenstern (1976)

longitudinal surveys. Secondly economic data are, especially in the area of macroeconomics, highly prone to political regime shifts, technological advances, financial innovations etc. There is thus an historical dimension, which is very difficult to integrate in a stringent manner such as science requires. Time-series are evidently especially contingent upon the historical path followed by the economy. Furthermore, economic agents tend over time to learn a process, which may not even be "rational". In science a similar adaptation is seen in viruses, plant behaviour, evolution etc. However human economic behaviour is capable of being fuelled by such mixed motivations as to be difficult to analyse. Thirdly, into this mix must be thrown the problems of data mining, which may occur, in prior beliefs influencing the collection process or even conflicting evidence being camouflaged. Finally there are the problems of linear regression such as omitted variables, unobservable variables such as expectations, spurious correlations, multicollinearity, dynamic reactions and lag lengths, inadequate sample sizes etc.

These problems challenge the fundaments of econometrics. Empirics have not proven to be a powerful means of falsification. Economic theories are not easily proven wrong as they are always relative to a specific formalism and a specific set of assumptions.

Model Formation

Econometric models compound the problems of data where realism is often ignored when choosing assumptions resulting in beautifully ineffectual theories. Further theories often do not evolve with increasing refinements or falsifications but more often emerge in response to sudden turbulence for which explanation is demanded.

The degree of detail and precision with which a model is specified needs emphasising. Should it be presented in terms of parametric or non-parametric statements? We need to pay more attention to less parametric specific models in recognition of the fact that

[5] See the experiments carried out upon income maintenance programs, electricity time of day pricing etc. These have had a mixed success rate and have not it is probably fair to say *"settled questions as definitively as in the sciences,"* or at least so Kmenta & Ramsey (1980) conclude.

> *"rejecting hypotheses couched in terms of a specific model may merely be a rejection of the modeller's detailed parametric specification and not the economic hypothesis of interest."*[6]

This reflects the fact that by definition models are approximations and thus contain error.

The Lack of Unity

Economics has no core set of basic/unifying equations, which can withstand rigorous realistic testing. No approach has been made, unlike in physics, of finding a Theory of Everything.[7] Economics appears to be a much more disarticulated set of theories grounded in unrealistic assumptions. Further, its predictions are always relative to a specific formalism or a specific set of assumptions. Without a strong basis of fundamental theory empirical analysis such as econometrics cannot be a powerful means of falsification.

The "Neurotic Inhibitions of an Artificial Methodology of Science"[8]

Mathematical formalism is only one mode of discourse. Whilst it has the "advantages" of clarity, specificity etc. does this make it intrinsically better? There is a danger identified by Duménil and Lévy (1997) and others. The adherence to strict "scientific" status threatens to impoverish and limit the scope of theory they claim. The history of economics should not be interpreted as the progressive maturation from doctrine to formalised science. Econometricians should resist the temptation to straightjacket thought by insisting on formalised standards of expression as in science. To do so is to attack the diversity so far inherent in economics.

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[6] Kmenta & Ramsey (1980)

[7] This is far from being achieved, but through the work of Einstein, Heisenberg, Pauli, Van Nieuwenhizen, etc. a set of such equations is felt to exist. It's worth noting Pauli's comment affixed to a blank sheet of paper he sent to Heisenberg who had prematurely thought he was approaching a unification theory: *"This is to show I can paint like Titian. Only technical details are missing."*

[8] McCloskey (1983)

There is certainly strength in this argument. A plurality of approaches surely must be encouraged. In addition if economics is to influence the public it must be able to translate its "scientific" findings into effective rhetoric. Would Marx have had greater success if he had issued a maths book filled with equations or a Manifesto boiling with inflammatory words?[9]

It is worth noting that one of the arguments in favour of econometrics clutching the cloak of scientific status is that it can prevent unsound policy based more on ideological rhetoric then empirical fact. However the ease with which "nonsense" regressions[10] can be created negates this view. Econometrics does not necessarily lead policy in the right direction any better than any other means. Instead its findings must be viewed with scepticism. As Summers points out *"I invite the reader to try…to identify a meaningful hypothesis about economic behaviour that has fallen into disrepute because of a formal statistical test."*[11]

Conclusion

"She bit her lip and turned her head a little and looked at me along her eyes. Then she lowered her lashes until they almost cuddled her cheeks and slowly raised them again, like a theatre curtain…That was supposed to make me roll over on my back with all four paws in the air."[12] Chandler's private detective is perhaps half-seduced yet he holds back. This essay has emphasised the limitations of econometrics, not to denigrate the strength of the subject. It is only surely through an awareness of the edges and flaws in our understanding that Econometricians can hope to progress. As such to argue over the "scientific status" of Economics and Econometrics' role in this process should assume less importance. Judgement is reserved. The relevance and improvement of Econometrics so as to better inform policy is what truly must be focused on. Otherwise Econometrics may well find itself naked and floundering on the beach.

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[9] The attempts at insurrection in Russia in 1917, Bulgaria and Germany in 1923, Indonesia in 1926, China in 1927, Brazil in 1935, Castro in Cuba, the early ANC, student revolts in 1968 etc. attest to the influence of Marxism. This is not to say that his ideas were right but illustrates the need for economics to find expression in understandable words if it is to be successful.

[10] Granger & Newbold (1974)

[11] Summers (1991), p. 130.

[12] Chandler (1992)

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