

Econometrics: Pro-active Science, or PR stunt?

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Grellan McGrath examines the current status of economics and econometrics. The methods of econometrics are placed under scrutiny and he concludes that econometrics still has a long way to go before it can be considered a science.

'If economists could get themselves thought of as humble, competent people, on a level with dentists, that would be splendid'

Keynes J.M., *'Economic Possibilities for our Grandchildren'*

'Econometricians... are a positive help in trying to dispel the poor public image of economics (quantitative or otherwise) as a subject by in which empty boxes are opened by assuming the existence of can openers to reveal contents which any ten economists will interpret in eleven ways'

Darnell A.C., and Evan J.L., *'The Limits of Econometrics'*

Introduction

Economics as a discipline has always struggled to win over the faith and trust of the wider public. This is, of course, caused by many factors, but one of the most common grievances has traditionally been that the studies followed are too theoretical, and that predictions can be vague, co-dependant and not clinical. In short that economics is not scientific.

In this essay we shall see that at first glance, econometrics does advance economics' struggle to be reckoned with the likes of botany and biology as a precise science, but that just underneath the surface, the scientific properties of econometrics are questionable at best.

We shall begin with a look at the current status of economics, and then discuss the nature of theory and predictions arising from it.

Then we shall turn to econometrics and its interaction with economics, before analysing the chinks in its scientific armour.

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The Current Status of Economics

When we compare economics with established natural sciences such as physics or astronomy we see that it is extremely young and essentially remains an adolescent discipline.

Characteristic of economics' youthfulness is its diversity and variability. The range of schools of thought in the field is almost endless, from Marxism to Monetarism, Classical to Keynesian. Although certain schools and theories have enjoyed brief spells of popularity such as Keynesianism post World War II and Marxism in the early twentieth century, no one view has become accepted as "the right view". Like any adolescent, economics has not yet decided on a core view of the world.

However, also like any other adolescent, economics seems to be in a frantic rush to be treated as more mature than its years, and with the respect accorded to its natural science peers.

Many economists seem at pains to have economics recognised as, or at least compared to, the exact sciences such as chemistry or physiology. Why is this so? In my opinion, it is because if a discipline becomes established as so, it lends itself to respect, and its proposals to acceptance by the general public. Assuming the altruistic aim of economists is to prescribe an allocation of resources for us all to adopt so as to maximise welfare, these attributes are desirable.

They should be wary, though, that to gain plaudits and respect for predictions and propositions, proven accurate over time is one thing, but to present oneself as something they're not and then be "found out" would set the discipline back decades in gaining the trust of more established avenues of study, and most importantly, the general public.

With this in mind should we readily proclaim econometrics as a '*colossal step forward on the road to the development of our discipline*'.¹ Are we ready to put forward the opinions of Friedman or Marshall as equivalent truths to those of Einstein or Pythagoras in their respective disciplines? Or should we, instead, be careful of "crying wolf?" To answer this we must look at the current nature of

¹ Schumpeter, J., (1908) *Economic Methodology* p.499, in F. Malchup, (1978) *Methodology Economics and Other Social Sciences* Academic Press.

economic propositions, and how econometrics serves to further their scientific tendencies. It is also necessary to scrutinise the methodology of econometrics, as it may not be all it seems at first glance.

The Nature of Economic Theory and Predictions

Here we shall follow the distinctions of J.R. Hicks², who describes several divisions of predictions.

Firstly, we draw a line between the conditional and unconditional predictions of this world. A conditional prediction says that something will happen if some condition is satisfied - a condition that we know how to describe. An unconditional prediction makes no qualifications, and is traditionally the realm of fortunetellers and psychics.

Hicks uses the case of the astronomer as an example of a scientific unconditional predictor. He or she will be able to tell us when there will be an eclipse of the moon with remarkable accuracy. There are two reasons for this. Firstly, his/her studies are beyond the realm of being influenced by human actions. Secondly, and perhaps more relevantly, he/she has been able so to circumscribe their description of the phenomena that they can feel sure that there are no conditions, which they have not taken into account. This is not, and will not foreseeably be the case of economics or econometrics.

However, in general most traditional sciences' predictions are conditional, and so economics is not precluded from being scientific on those grounds.

Within conditional predictions we distinguish between strong and weak predictions. A strong prediction basically says that given the stated conditions an event will follow.

A weak prediction says '*the event will follow if there's no disturbance*', i.e., some of the conditions for this event to follow have been identified. As you can see there is a marked difference between a strong and a weak prediction.

In general, scientific predictions are strong and economic predictions are weak; this is due to the unpredictability of human behaviour and the erratic nature of day-to-day economic forces. This gives rise to the *ceteris paribus* nature of economics.

² Hicks, J.R., (1986) *Is Economics a Science?*

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Conditional, weak predictions? All other things being equal? No wonder the world has been slow to embrace this subject!

Econometrics and its Interaction with Economics

It is clear from the above appraisal of economic predictions and the general distrust in which it is held by the greater public, that economics lacks scientific credibility. It is almost as if in the early 1930's, economists realised this problem and called in some image consultants or branding specialists. *'Your discipline seems too vague'*, these consultants may have said, *'we want to do a major deal to tie in your brand (economics) with the established names of Mathematics, Statistics and Logic. Once the public identifies economics with these established distant cousins, it's bound to be taken more seriously on a scientific level.'*

And so, much in the same way that an instant coffee was named "Gold Blend", many years later to imply luxuriousness, econometrics as we know it, was publicly unveiled with the publication of the 'Constitution of Econometric Society' in 1930.

So what exactly is econometrics? Well there are a myriad of definitions, which we need not delve into, as long as we know its *raison d'être* is to apply statistical and mathematical methods to the analysis of economic data in order to give empirical content to economic theories. In other words, to lend practical examples to the sometimes abstract ideas of economics. But is it successful in its attempt to marry economics with mathematics and statistics in order to bring it closer to the realm of science? On first impressions, the answer would appear to be yes.

The three golden rules of econometrics are *'test, test, test'* according to Hendry³ and from the outset, this would do much to improve the reputation of economics for producing lofty and (crucially) unfalsifiable theories.

The method of testing of choice is usually "Hypothesis Testing" of estimators, which themselves are chosen by strict criteria from a number of options including "Least Squares," "Maximum Likelihood," etc. We have a range of models, from "Probit" and "Tobit" to "Distributed-Lag" models. The decision to reject or not reject a particular hypothesis is based on diagnostics such as R^2 , t , F and Durbin-Watson d -statistic. All this brought together is broadly termed "Regression

³ Hendry, D.F. (1980) p.403

Analysis,” investigating causation and correlation. So there we have it. If anyone would dare question the scientific credentials of economics we can quote the above jargon as being representative of a particular branch of economics.

And so, it seems, econometrics is a success in moving economics away from the academic and abstract world into the world of science. That is, until we begin to look under the surface of the maze of technical terms.

Questions to be asked of the Scientific nature of econometrics

‘Economists’ search for “truth” has over the years given rise to the view that economists are people searching in a dark room for a black cat; econometricians are regularly accused of finding one.’⁴

The flaws of econometrics have been long debated and argued, and although I have nothing new to add, I feel it is necessary here to outline some of them in order to show that it holds limited ability to aid economics on its path to becoming a science.

Firstly, natural scientists regularly have at their disposal experimental data. The investigator may collect data holding certain factors constant in order to assess the influence of some other factor on a given phenomenon. This is rarely, if ever the case with econometrics since much of the data is ‘second hand,’ but more relevantly because most of what we want to know is about human behaviour in the real world, and experimental data on that is almost impossible to achieve. As Kamarck put it:

‘More prestige is acquired for applying the latest technique to good bad or indifferent data than arriving at valid, verifiable and useful results’⁵

Secondly, we have the need in econometrics to use a “disturbance term” or “stochastic error.” This is not for the variables deemed irrelevant (if it was there would be no need for the term), but for those that (unlike the astrologer), we cannot account for.

It is due to econometrics dependence on experimentally unobservable human behaviour and its reliance on the assumption that random or unforeseen events will

⁴ Kennedy, P., (1992) *A Guide to Econometrics* (3rd ed.) (Cambridge, Mass.: the MIT Press) p.82

⁵ Kamarck, A.M., (1984) *Economics and the Real World*. (London: Basil Blackwell) p.9

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follow a statistical distribution that I contend that econometrics is not legitimately an exact science. In this way I further say that although it may have pushed economics closer to being classified alongside the natural sciences, this is purely for superficial reasons and its power is currently limited.

However, we must note that if economics is adolescent, then econometrics is in its infancy, and it is only natural to have a few teething problems. In the future econometrics may make leaps and bounds past these stumbling blocks, in which case it will definitely be able to play a significant role in the re-launching of economics as a science.

Conclusion

There are those who seem over-zealous, in that they want to have economics considered an accurate science before its time. Econometrics has (superficially) helped their cause.

However, by contradiction, if we place econometrics as it is now under scrutiny, we see that it is a system of assumptions, non-experimental data and simplification, which cannot be taken as the basis of a precise science.

For the moment, as economics matures, in order for it to gain respect and credibility from the public, it will be necessary to come out as the highly skilful but ultimately fallible forecaster and advisor that it is.

We do not currently possess anywhere near enough knowledge of human behaviour nor the power to process the unquantifiable amount of influences on an econometric model to call the discipline of economics "scientific." However, that is not to say that we never shall.

In the meantime, economics should enjoy its youth in its entirety, including making mistakes which at the time seem huge, but in the future we will all be able to look back at and smile upon!

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