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What Granger Overlooked, and Mises Did Not

By Frank Shostak

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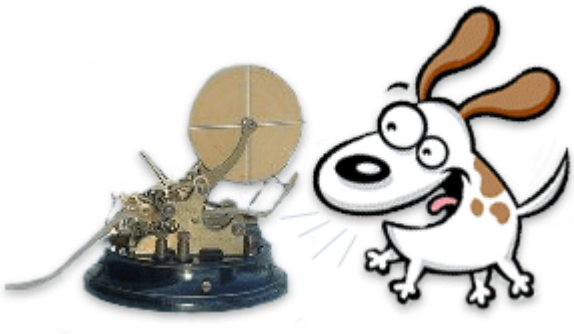

Two economists who have developed statistical techniques to track economic trends and to measure investment risk—Clive Granger and Robert Engle—were this year awarded the Nobel Prize in economics.

In this article I will be focusing on the contribution of Clive Granger to economics. According to the Nobel committee Granger's important contribution to economic science is his discovery of a phenomenon called *cointegration*. This discovery, so it is held, enables economists to accurately validate relationships among various economic data.

So what is it all about?

Making sense of economic data

Often we observe that two pieces of data, which are not supposed to have any relationship, appear to have very high visual correlation. For instance, we may discover a strong correlation between the intensity of dog barking and movements in stock prices. One is then tempted to take advantage of this discovery in order to make money in the stock market.

In reality, however, both the barking of the dog and movements of stock indexes have nothing to do with each other. What makes the apparent good correlation is that they are both influenced by an upward long-term trend. Also, fluctuations of these data don't seem to converge around the trend but just seem to move in an upward direction. These types of data statisticians label nonstationary.[1]

In contrast, data that converges around a fixed value is labelled stationary. Data that is stationary implies an unchanged structure, something that is stable and hence one can make sense of it, whereas nonstationary data is associated with irregular fluctuations, which of course makes it very difficult to make any sense of. Thus, if something drifts aimlessly it is not possible to say much about its future course.

Now, if one tries to make sense from data that is irregular obviously one will not get very far. This, however, creates a major problem for economists since it is held that most of the data that economists and financial analysts are employing are not stationary. Consequently, incorporating these types of data into economic analyses leads to misleading results.

For instance, an economist wants to establish the importance of changes in production on people's consumption. The common procedure for this is to apply statistical methods on consumption and production data in order to establish their interrelationship. In short, by means of a statistical technique, also known as regression analysis, one establishes how consumption and production are quantitatively connected to each other. Let us assume that an economist has found that the relationship between consumption and production is summarised by the following mathematical expression:

$$\text{Consumption} = 10 + 0.5 * \text{Production}$$

Armed with this finding the economist can now tell us the direction of consumption if there is a change in production. Thus, if production is 100 then consumption will be 60 (because 10+0.5*100=60). Economists label the numbers 10 and 0.5 parameters. Observe that the knowledge regarding the size of these parameters, i.e., whether they are 10 and 0.5 or something else is obtained by means of the regression technique.

Note that 10 and 0.5, which have been generated by regression method, are estimates of true parameters in the real world, or so it is held. It is also held that on average these estimates are very close to the true parameters. In short, it is held that any conclusions derived from the equation regarding the relationship between consumption and production are a reflection of reality.

Granger, however, contests this. He argues that no meaningful conclusions can be drawn from the above equation if the data employed in establishing this equation are nonstationary. In plain English, it is counter-productive to establish meaningful conclusions from data that drifts aimlessly. The parameters that one will get from such data will be erroneous and hence the outcome of the analysis will be meaningless. So how does one overcome the problem?

Now, if one could establish a common factor that influences both consumption and production then these two time-series are said to be connected, or cointegrated. Granger and others have shown by means of mathematical and statistical methods that the existence of the common factor makes the interrelationship between non-stationary time series stationary. Thus consumption and production can be observed separately as a non-stationary time series.

Therefore if one tries to establish economic relationships between them one will get misleading answers. However, if one were to suggest that both consumption and production have a common factor then one could infer that over time both consumption and production must move together. This common or cointegrating factor could be that people's well-being requires consumption and production. Moreover, without production there cannot be consumption and without consumption no production is possible.

Another example is an identical good which is trading in different locations. The day-to-day fluctuations in prices may appear to be random in various locations and therefore most likely will not correspond to each other.

However, the existence of arbitrage and the law of supply and demand will make sure that over time prices in various locations will move close to each other. Instead of trying to find out what the cointegrating factor is, Granger and others have produced a mechanized framework, which enables economists to establish whether data complies with cointegration, i.e., whether the relationship between the data makes sense so to speak. Once it is established that the data is cointegrated it can then be incorporated by means of a certain mathematical procedure to establish the correct parameters. [2]

Various statistical results that are produced by means of Granger's framework therefore are regarded as valid since they have been applied on cointegrated data. Granger's discovery raises serious doubts about conclusions regarding economic interrelationships which are reached by means of the old techniques. It also provides a criticism of the popular usage of correlations without attempting to make sense of the relationships.

Granger's framework can be seen as a preventative in minimizing the use of meaningless correlations. For instance, the Granger framework will indicate that movements in the stock market and the intensity of the dog barking cannot be cointegrated and therefore the use of these relationships to make money in the stock market could prove to be a very expensive exercise.

In this respect it could be regarded as bringing back the validity of fundamental analysis. This must be contrasted with the popular way of thinking that fundamental analysis is of little help since the data is of a random, i.e., nonstationary, nature. So it seems that the Granger's framework is a great tool in furthering our understanding of the economic universe.

But is it?

Are there constants in economics?

The major issue that Granger hasn't addressed is not whether the old techniques have been generating valid parameter estimates, but whether such parameters exist at all. In the natural sciences, the employment of mathematics enables scientists to formulate the essential nature of objects. Consequently, within given conditions, the same response will be obtained time and again. The same approach, however, is not valid in economics. For economics is supposed to deal with human beings and not objects. According to Mises,

> The experience with which the sciences of human action have to deal is always an experience of complex phenomena. No laboratory experiments can be performed with regard to human action.[3]

In short, people have the freedom of choice to change their minds and pursue actions that are contrary to what was observed in the past. As a result of the unique nature of human beings, analyses in economics can only be qualitative. In other words, there are no parameters in the human universe. Thus Mises wrote, "There are, in the field of economics, no constant relations, and consequently no measurement is possible."[4]

The popular view that human economic activity can be captured by mathematical formulae expressed through fixed parameters implies that human beings are operating like machines. For instance, contrary to the mathematical way of thinking, individual outlays on goods are not "caused" by income as such. In his own context, every individual decides how much of a given income will be used for consumption and how

much for savings.

While it is true that people respond to changes in their incomes, the response is not automatic, and it cannot be captured by a mathematical formula. For instance, an increase in an individual's income doesn't automatically imply that his consumption expenditure will follow suit. In short, every individual assesses the increase in income against the goals he wants to achieve. Thus, he might decide that it is more beneficial for him to raise his savings rather than raise his consumption.

At best, mathematical formulations can be seen as a technique to provide a snapshot at a given point in time of various economic data. In this sense it can be seen as a particular way to present historical data. These types of presentations, however, can tell us nothing about the driving causes of human economic activity. What's more, the employment of established historical relations to assess the impact of changes in government policies will produce misleading results notwithstanding Granger's framework.

After all, to assume that a change in government policy will leave the structure of the equations intact would mean that individuals in the economy ceased to be alive and were, in fact, frozen.

In this regard Mises wrote, "As a method of economic analysis econometrics is a childish play with figures that does not contribute anything to the elucidation of the problems of economic reality."[5]

Frank Shostak is an adjunct scholar of the Mises Institute and a frequent contributor to Mises.org. Send him MAIL and see his outstanding Mises.org Daily Articles Archive. He would like to thank Andrew Pease and Dean Dusanic for comments.

[1]Granger, C.W.J. and Newbold, P. 1974. "Spurious Regressions in Econometrics", *Journal of Econometrics*, Vol. 2, pp 111–20.

[2]Granger, C.W.J. and Weiss, A.A. 1983. Time series analysis of error-correction models, in S.Karlin, T. Amemiya and L.A. Goodman, *Studies in Econometrics, Time series and Multivariate Statistics*, in Honor of T.W. Anderson, Academic Press, San Diego, pp 255–78.

[3]Ludwig von Mises. 1963. *Human Action.* P. 31.

[4]Ibid. P. 55.

[5]Ludwig von Mises. 1962. *The Ultimate Foundation of Economic Science.* P. 63.

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