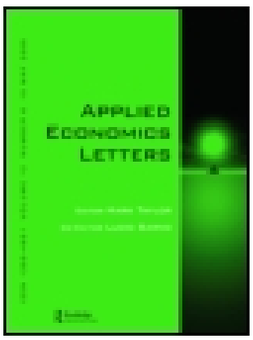

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Applied Economics Letters

ISSN: 1350-4851 (Print) 1466-4291 (Online) Journal homepage: http://www.tandfonline.com/loi/rael20

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To cite this article: B. Bhaskara Rao , Rup Singh & Saten Kumar (2010) Do we need time series econometrics?, Applied Economics Letters, 17:7, 695-697, DOI: 10.1080/13504850802297889

To link to this article: https://doi.org/10.1080/13504850802297889

Applied Economics Letters, 2010, **17**, 695–697

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Do we need time series econometrics?

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It is argued that whether the need for unit roots and cointegration-based econometric methods is a methodological issue. An alternative is the econometrics of the London School of Economics (LSE) and Hendry approach based on the simpler classical methods of estimation. This is known as the general to specific method (GETS). Like all other methodological issues this is also difficult to resolve, but we think that GETS is very useful.

I. Introduction

It is unusual to start an article, with a 2000 word limit, with quotations. However, to explain the essence of this article, it is necessary to note the views of two leading econometricians namely Professor David Hendry and Nobel Laureate Clive Granger. Hendry is a well-known proponent of the econometric methodology of the London School of Economics (LSE) known as the general to specific approach (GETS). He said that 'I actually thought cointegration was so blindingly obvious that it was not even worth formalizing it . . . [However,] I still think . . . it [cointegration] is completely trivial but it is very, very interesting because. . . [when] the things that . . . are [in] equilibria [imply]. . . (a) they are the targets agents are trying to achieve and (b) when they get there they will stay there and when they are not there they will try to move there' (Hendry, 2000, p. 241). Granger, commenting on GETS, said that 'The LSE methodology is a mid-point between the classical econometrics strategy, *with a heavy dependence on economic theory*, and the theoretical pure time series techniques . . . extend the Box–Jenkins approach, such as VAR. Economic theory is used to suggest an initial specification, but then the data are allowed to speak in the process of considering alternative specifications and in the eventual evaluation' (Granger, 1990, p. 279), [author's italics].[1]

Given these observations, why do economists heavily tilt towards the time series econometric methods and spurn established and simpler classical methods of estimation? Disregarding trivial merits like an opportunity to decorate articles with impressive mathematical symbols, applied economists do not seem to remember Smith's (2000) three important stages in research, of which the very first one is *purpose*. For our article, a distinction between the purpose of testing economic theories and developing models for forecasting is necessary, although in practice there is a mixture of both purposes.

II. Testing Theories and Generating Forecasts

The atheoretical Box–Jenkins equations are good examples of research where the main purpose or objective is to make forecasts with improved accuracy. On the other hand, testing the quantity theory and purchasing power parity etc., are examples of research with the main objective of testing the validity of theories. The Engle–Granger time series methods can be seen as an intermediate method extending the

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[1] The originals are a bit longer and the reader is requested to refer to the reference to get the full flavour.

Box–Jenkin's atheoretical pure time series methods by adding theoretical information to further improve the accuracy of forecasts. It is hard to admit that the cointegration methods are superior for testing economic theories than GETS. This is so because, in spite of their different starting points, cointegration and GETS are indistinguishable from each other and seem to be observationally equivalent. Therefore, Hendry is justified in saying that 'cointegration was so blindingly obvious that it was not even worth formalizing it'. Yet, in much of the applied work, the bulk of which is actually on testing theories and not necessarily to generate more accurate forecasts, cointegration methods are widely used instead of GETS.

As an example, it can be said that from medium to long-run perspectives, central banks are more interested in understanding by how much nominal money supply should be increased to maintain stability of prices and economic activity. They are seldom interested in knowing what should be the increase in money supply every month. If they need accuracy in inflation forecasts, they may perhaps use the Box–Jenkins equations, and these may do an equally good job as those based on cointegration methodology. Therefore, for policy formulation, valid theories are more important than accurate forecasts.

III. GETS and Cointegration

A drawback of economic theories is that they are essentially equilibrium relationships between variables in their levels of and/or growth rates. Theory seldom gives much information about dynamic adjustments and how long is the transition process in the real calendar time. However, the data from the real world which is used to test theories are hardly generated by an equilibrium world. Therefore, there is a methodological problem with using data generated from a disequilibrium world to test equilibrium theories. And this is the starting point for the development of GETS.

Economists and econometricians at the LSE took a pragmatic view, mostly under the influence of Popper's methodology, that dynamics is an empirical issue to be determined by data and theoretical insights. They discarded the popular partial adjustment-based dynamics as an inadequate model and extended the Phillips (Phillips curve fame) error correction model (ECM) with its negative feedbacks, to augment with additional adjustments because of the current and past changes in the variables of the model. This basic equation is known as the general dynamic equation (GDE). A parsimonious version of this GDE is derived by deleting insignificant variables with the variable deletion tests. PcGets of Hendry and Krolzig (2001, 2005) does an excellent job of searching for parsimonious dynamic equations.

As an example, this approach can be explained as follows with the money demand equation. Theory implies that demand for real money (m) depends on real income (y) and the nominal rate of interest (R). A semi-log form for narrow money is as follows:

$$\ln m = \alpha + \beta \ln y - \gamma R \tag{1}$$

Changes in the current period demand for money are due to two reasons. First, the money market may have been in disequilibrium in the past period, and therefore, there will be a change in the demand for money in the current period. Second, money demand may also change, because the explanatory variables may change in the current period and/or their past changes may have some delayed effects. Therefore, the following general dynamic specification is reasonable to explain current period changes in the demand for money.

$$\begin{aligned}\Delta \ln m_t = &-\lambda[\ln m_{t-1} - (\alpha + \beta \ln y_{t-1} - \gamma R_{t-1})] \\ &+ \sum_{j=0}^{n_1} \Delta \ln y_{t-j} + \sum_{k=0}^{n_2} \Delta R_{t-k} \\ &+ \sum_{l=1}^{n_3} \Delta \ln m_{t-1}\end{aligned} \tag{2}$$

The expression in the square bracket is the measure of past period departure from the equilibrium, and it is known as the lagged error correction (ECM) term. ECM has been borrowed from GETS by the cointegration method. λ in Equation 1 is the speed of adjustment, and it should be negative for negative feedback adjustment to take place. It will be positive and may be insignificant if the underlying economic theory is inadequate. Theories can be tested with GETS by estimating the coefficients and testing for the significance of the lagged explanatory variables in the ECM. A parsimonious version of Equation 2 with fewer lagged changes of the variables will improve the SEs of the estimated coefficients and forecasting accuracy by increasing the degrees of freedom. Equation 2 can be estimated with the classical methods, and also the instrumental variables method can be used to minimize any endogenous variable bias.

So, what is wrong with this approach to test theories and probably also use it for forecasting? Although the time series-based cointegration approach is very similar, it has shown that if the variables are nonstationary in their levels, their means and variances violate the classical assumptions as they are constant. Therefore, the estimated SEs with the classical methods are

spurious and unreliable. It is necessary to transform such nonstationary variables into stationary variables by differencing and at the same time estimating the models without ignoring the theoretical information on their levels. Time series methods have been developed for this purpose. In the first stage, these methods estimate efficiently the coefficients of the variables in the ECM term in Equation 2, and this is the cointegrating equation. The short run dynamic adjustment equation is estimated in the second stage, in the same way as in GETS. In contrast, coefficients of the cointegrating equation and the dynamic adjustment are estimated in GETS in one step.

The above similarities between these two methods have been ignored by many critiques of GETS who in spite of repeated statements by Hendry argue that the level variables in the ECM are nonstationary, and therefore classical methods are inappropriate. For a long time, the fact that GETS can also be made consistent with cointegration has been ignored. Hendry repeatedly stated that if economic theory is correct, the combination of variables in the ECM should be stationary. Conceptually, this is similar to the drunken farmer and his dog, the example to explain the concept of cointegration. In this example of the money demand equation, output and the rate of interest are the drunken farmer and demand for money is the dog. If theory is correct, they should move closely. Therefore, the order of the variables on both sides of Equation 2 is balanced and consistent with cointegration and the time series methods. Ericsson and McKinnon (2002) have developed a test, perhaps belatedly, to test for cointegration in GETS. However, by then cointegration and time series econometrics have become enormously popular and GETS did not receive its due recognition.

In much of our applied work at the University of the South Pacific, we have extensively used GETS as well as the standard time series and cointegration techniques. Nowhere had we found that GETS performed worse than the time series methods.

IV. Conclusions

This article briefly stated the story and methodology behind GETS and the cointegration techniques. We took a methodological view that both these techniques are observationally equivalent, but GETS based on the classical methods is simpler to use and well suited for the purpose of testing theories. However, like in all such methodological controversies, it is difficult to assert without any reservations that only one particular methodology is the best. Whether the entirely atheoretical Box–Jenkins equations, or GETS or the cointegration-based time series techniques or their variants give the best forecasts is something not yet well explored. This is an area worth examining further with real-world data. But we can be fairly confident and claim that if the main purpose of a researcher is testing theories for policy formulation, the simpler GETS seems to be second to none.

References

Ericsson, N. R. and McKinnon, J. G. (2002) Distributions of error correction tests for cointegration, *Econometrics Journal*, **5**, 285–318.

Granger, C. W. J. (1990) Introduction, in *Modeling Economic Series: Readings in Econometric Methodology* (Ed.) C. J. Granger, Clarendon Press, Oxford, pp. 277–8.

Hendry, D. F. (2000) Econometrics techniques: general discussion, in *Macroeconomics and the Real World* (Eds) R. E. Backhouse and A. Salanti, Oxford University Press, Oxford, pp. 239–42.

Hendry, D. F. and Krolzig, H. M. (2001) *Automatic Econometric Model Selection*, Timberlake Consultants Press, Oxford.

Hendry, D. F. and Krolzig, H. M. (2005) The properties of automatic GETS modeling, *The Economic Journal*, **115**, C32–61.

Smith, R. P. (2000) Unit Roots and all that: the impact of time-series methods on macroeconomics, in *Macroeconomics and the Real World* (Eds) R. E. Backhouse and A. Salanti, Oxford University Press, Oxford, pp. 199–218.