



SPECIAL ISSUE ON
GRANGER ECONOMETRICS AND STATISTICAL MODELING
DEDICATED TO THE MEMORY OF PROF. SIR CLIVE W.J. GRANGER

Institutional and Personal Tributes to Professor Sir Clive W.J. Granger



Royal Statistical Society

The *Royal Statistical Society* is honoured to add its voice to the memorial issue of the *European Journal of Pure and Applied Mathematics* in celebration of Professor Sir Clive Granger.

Clive Granger was a statistician, one of the first cohorts at the University of Nottingham to study for a degree in Economics and Mathematics, and where there is now a building named after him. In all, he spent 22 years there, working his way up from undergraduate to the Chair of Applied Statistics at the exceptionally young age of 31. He later moved to the University of California at San Diego.

Few statisticians start out in life with statistics as their career objective. Clive Granger was no exception. At the end of his first year in the school sixth form, he said that all the students had to stand up and announce what career they had in mind. He thought meteorology sounded interesting, but had a slight stutter, and, when his turn came, found that he could not say the word - so he said 'statistics' instead. Later, as the sole lecturer in statistics at the University of Nottingham, he benefitted from the wide range of data-analytic problems that colleagues from other disciplines brought to him.

Several statisticians have been awarded Nobel Prizes, where, since there is no such prize for statistics, they often appear in the lists of economics Nobel Prize winners. Sir Clive Granger is an important luminary in this list, having been awarded the 2003 prize for his work on co-integration of time series, carried out in the 1970s. This work had revolutionary consequences for economic data. It is an example of a profound theoretical idea which has major practical consequences. It is an illustration of statistical thinking at its best.

Yours sincerely

Professor David J. Hand

President, Royal Statistical Society

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Japan Statistical Society

It is an honor, but a difficult task for me to write a letter of condolence on behalf of the *Japan Statistical Society* (JSS). I would like to carry out my duty by describing mainly my personal memories of Professor Granger.

First of all, I express my greatest sympathy over the death of Professor Granger, one of the most influential econometricians and statisticians in the history of our profession. A great number of members of JSS have been influenced by his work full of originality and practical impact.

It was late 1970s and when I was a Ph.D. student at the Australian National University (ANU) that I first met Professor Granger. The time series and econometrics group at ANU led by the late Professor E.J. Hannan who was my supervisor was very active and eager to invite distinguished people from all over the world. Professor Granger, about 40 years old at that time, was among them and was invited to give a series of lectures. His lectures focused on forecasting economic time series. This was because his primary concern about time series analysis was forecasting. In fact he had just published his joint book with Professor Paul Newbold entitled *Forecasting Economic Time Series*. His lectures and the book were clear enough to persuade us that the value of time series analysis consists in forecasting. The book also describes a finding about spurious time series regression where a series that follows a random walk is regressed on another random walk independent of the former. It was found that statistics like the t-ratio and the coefficient of determination signal that the regression relation is valid, although the regression is really nonsense. This finding later led Professor Granger to develop the notion of cointegration in 1980s, the contribution of which brought him the Nobel Prize in 2003. I still remember his stimulating talks. It is also my happy memory that Professor Granger was one of the outside examiners of my Ph.D. thesis. He gave me very favorable and detailed comments.

Since then I have had several occasions to meet Professor Granger. In particular, I recollect talking with him at the Japan-US Time Series Seminar held at Honolulu in 1993. Having decaffeinated coffee he expressed his attitude toward research by emphasizing that theory and practice should be interfaced and theory is meaningless unless empirical application lies behind it. I was impressed by what he said and really thought that his way of research is exactly in line with that. In the same year I invited him to my university, Hitotsubashi University in Tokyo, to give a talk. At that time he talked about analysis of financial time series, paying attention to the long-memory and heteroscedastic behavior of the series. After the seminar, Professor Michio Hatanaka, who is the co-author of the book entitled *Spectral Analysis of Economic Time Series*, arranged dinner and we had pleasant night. He was kind enough to send me his book afterward in token of his visit.

Professor Granger was genius in suggesting new and useful ideas in statistics and econometrics. Among them is spectral analysis of economic time series, Granger causality, spurious time series regression, analysis of long-memory processes and bilinear time series, concept of unit roots and cointegration and so on. His work is always full of meaningful ideas and is always associated with fruitful applications.

Professor Katsuto Tanaka

Hitotsubashi University, Tokyo, Japan

On behalf of the Japan Statistical Society



The University of Melbourne

Sir Clive Granger, who won the Nobel prize in economics in 2003 and was knighted in 2005, passed away on May 27th 2009 at the age of 74. Clive together with Robert Engle, with whom he shared the Nobel Prize, revolutionized time series analysis in theoretical and empirical econometrics by introducing the concept of cointegration. Clive's work on cointegration represents the culmination of his work in time series analysis over a thirty year period, beginning with his earlier work on spectral analysis and causality testing in the 1960s, followed by the development of non-stationary models including spurious regressions and fractional integrated processes in the 1970s and early 1980s. He also had strong interest in forecasting and its application to asset markets in particular. All of these areas represent standard econometric tools now, with the common factor being Clive whose research was always the initial seed.

From 2005 to 2007, Clive was a Nobel Laureate visitor in the Department of Economics at the University of Melbourne, which he visited twice a year. Clive always enjoyed his visits to the department. He showed a strong and active interest in the research of both staff and students and always took great pleasure in sharing his ideas with people whether it was on the grand stage of a public lecture, or on a smaller and more specialized stage of the econometrics study group. Clive was very much an old fashioned academic who was interested in developing new ideas. He also had a huge reserve of knowledge which he loved sharing with people. His generosity of mind was matched only by his generosity of spirit. He was one of the more humble and approachable people whom you could ever meet, and he will be deeply missed.

Clive is survived by his wife Pat, son Mark and daughter Claire.

Professor Nilss Olekalns

Head of the Department of Economics, University of Melbourne
Parkville, Australia



University of Canterbury

Clive Granger was a regular visitor to the University of Canterbury since 2000. His first visit was under the prestigious Erskine visitor programme and was so successful that Clive and his wife Pat returned for two months each year thereafter. In 2004 Sir Clive was named the inaugural Canterbury Distinguished Professor. The title is bestowed by the University Council “to recognise the exceptionally prestigious position of occasional academic visitors to the University”.

Clive Granger received news of the award of his Nobel Prize while visiting the University of Canterbury in October 2003. The news came by a telephone call from Stockholm at 3 o'clock in the morning. A media frenzy followed which caught his host department and the university unawares. Indeed, it was the first time a Nobel Laureate had been resident in New Zealand at the time of the announcement. The following year Clive Granger was again in the department when he received the offer of a knighthood.

Robin Harrison (Department of Economics and Finance) recalls:

- The offer of a Knighthood was to remain confidential until formally announced in the New Year's Honours list. The offer came by telephone to Clive in his office. Robin Harrison remembers the occasion when their conversation was interrupted by The call and he quickly realised its import from hearing Clive's side of the phone call. It was difficult to keep the pending honour secret from colleagues when both were beaming their delight.
- Clive's Welsh origins were reflected in his unswerving enthusiasm for rugby and Clive's first priority on arrival each year would be to arrange for satellite TV at his university house since New Zealand offers a dedicated Rugby channel running 24/7. This local rugby culture was an obvious attraction to Clive.
- Clive liked to work in his office to the accompaniment of orchestral music which seemed to help his concentration. He had a collection of CDs they were all plain orchestral music never any singing.
- Clive would like to take a short “power nap” each afternoon when a “do-not-disturb” sign would be displayed on his door and at all other times his door would be open and people welcome to call in.
- Despite all the accolades Clive was always very approachable. Clive was renowned for his generosity with his time and advice for anyone with a statistics problem,

be they colleague or student. His regular visits to the department each year were always most enjoyable with Sir Clive taking an active part in seminars and the daily tea room discussions. His quietly spoken voice and words of wisdom will be much missed.

Professor Les Oxley(Department of Economics and Finance) said Sir Clive's premature death would be an enormous loss to the discipline:

- "Rarely do you find such a intellectual giant who is also humble, approachable and willing to discuss research issues openly with anyone - student or faculty. His visits to Canterbury will be greatly missed, both in terms of the weight of intellect he brought with him and the genuinely enthusiastic atmosphere he exuded."
- "We'll miss the note on the door, when he took his nap and the discussions about rugby, especially when the All Blacks played Wales."

Erskine Programme Manager Michelle Blackmore said the programme was pleased to have hosted Sir Clive as a Visiting Erskine Fellow in the Department of Economics in 2000. discipline:

- "We were also very fortunate to be able to acknowledge personally his joint Nobel Prize in Economics in 2003. He is remembered as a delightful and modest man who always took the time out to say hello on his many return visits to Canterbury."



European Journal of Pure and Applied Mathematics

On 27 May 2009, at the age of 74, Sir Clive Granger, one of our distinguished Advisory Editors, passed away. This occurrence brings much sadness to the global community of economists and statisticians. We, at European Journal of Pure and Applied Mathematics, are especially saddened, because he believed in what we are doing, and supported us strongly. Published on 27 May 2010 - the first anniversary of Sir Granger's passing - we are honoring his life and memory with a special issue entitled "Granger Econometrics and Statistical Modeling". It is also our honor and pleasure that Prof. Hamparsum Bozdogan, another distinguished Advisory Editor, has edited this honorary volume. We have included papers and messages / tributes from Sir Granger's close friends, co-authors, colleagues and former students. We want to thank Prof. Hamparsum Bozdogan and other contributors very much; without them this special issue would not be published.

We recall that when we invited him to be on the Editorial Board as an Advisory Editor, Sir Granger replied "I am trying to reduce the number of Editorial Boards that I am on, but your new journal does sound potentially important. I will agree to be on the Board". He always helped and supported us to improve our journal and efforts. Many thanks to Sir Granger for his help and cordial encouragement. We have always strived, and continue to strive, to deserve Prof. Granger's confidence. We all miss him.

Ünsal Tekir

Eyüp Çetin

Founders & Editors,

European Journal of Pure and Applied Mathematics

Istanbul, Turkey

Clive W.J. Granger Tribute by Professor Halbert White

Clive Granger was my friend, my colleague, my co-author, and my mentor. My life has been immeasurably enriched by having known and worked with Clive for almost thirty years, and I am delighted to have the opportunity to add this brief tribute to a volume honoring his life and work. Put simply, Clive was one of the most outstanding human beings I have ever had the pleasure to know. He had a profound and permanent impact on time-series econometrics. He was cheerful, brilliant, generous, and kind. Despite his Nobel Prize, his Knighthood, and the innumerable other honors that so deservedly came his way, he remained the approachable, easy-going, good-humored gentleman that he had always been, never losing that somehow mischievous sparkle of his. We all miss him keenly.

Professor Halbert White

Chancellor's Associate Distinguished Professor of Economics
University of California, San Diego, USA

Clive W.J. Granger Tribute by Professor Harald Uhlig

I met Clive Granger, when I was still a graduate student at the University of Minnesota. He was visiting the Federal Reserve Bank of Minneapolis. We talked a bit, and he essentially posed a problem: how to do a reasonable version of the extreme bounds analysis, as proposed by Leamer. Leamer had argued, that in estimating a coefficient on a particular regressor, one may often not know which additional regressor one wants to include: so, rather than making a particular choice, one ought to report the full range of possible estimates, for all potential linear restrictions on the additional regression coefficients. Clive Granger figured, that many of these regressions would not be reasonable, however, if their R-squared is low, for example. He wondered, what the range of estimates for the focus coefficient would be, if one restricted the R-squared to be among the, say, top 10 percent of all potential regressions one could think of running. We then figured out the solution to this problem, and the paper got published as "Reasonable Extreme Bounds Analysis". I did not realize it then, how very unusual it was for such a famous and established researcher as Clive Granger to simply approach an unknown graduate student such as myself, pose a problem and complete a paper, in a short amount of time! He was kind, approachable, relaxed - he put me at ease in all this: at the time he made sure that it did not feel as special (and therefore intimidating!) as it truly was. This has left a deep impression on me, I continue to marvel at this remarkable experience, and I continue to be deeply grateful to Clive Granger for it.

Professor Harald Uhlig

Chair of the Department of Economics, The University of Chicago
Chicago, USA

A Tribute to Clive W.J. Granger by Professor Roselyne Joyeux

In 1978 I started working on my PhD under Clive Granger's supervision at the University of California at San Diego. My background fitted perfectly with Granger's interests. He immediately included me in many research projects. He was dissatisfied at the time with the practice of differencing a series to achieve stationarity. He therefore suggested I write my PhD dissertation on harmonizable processes. This class of processes, Granger thought, was the most general class of non-stationary processes one might hope to study. Harmonizable processes provide a natural extension to the class of stationary processes: they can be decomposed in a sum of sine and cosine waves that are not necessarily orthogonal. By early 1979 I had finished writing my dissertation and Granger suggested we work jointly on paper he was writing for the Journal of Time Series Analysis on long memory processes. I enthusiastically accepted. This paper has been cited over 1400 times to date.

Clive Granger was a demanding PhD supervisor. He expected full commitment but you never felt rushed or stressed. He trusted completely his PhD students with their research. His love and excitement for research was infectious. This is a testimony to Granger's skills as a PhD supervisor.

The attached paper is written in memory of Clive Granger. It considers the generalization of the concept of cointegration to harmonizable processes, two areas of great interest to Clive Granger.

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