Grant H. Hillier – Econometrics Conference

May 21 and 22, 2015

Laudation
by
Kees Jan van Garderen
University of Amsterdam

Welcome to this conference in honour of Grant Highmore Hillier.

It is great to see you all here and it is great that we can jointly celebrate Grant's continuing contributions to Econometrics and his *non-retirement*.

A few years ago, before Grant was going to turn 65 and retire, there was some talk about having a conference like the one we are having now. He didn't retire, however, and nothing eventuated.

This year I had time and money, with the University of Southampton also contributing, to organize a "party" and allows me to settle part of my debt. I am deeply indebted, as many of you are also. Many of you are indebted to his teaching, research training and academic approach, insight, solving ability, and friendship. Of course this differs per person but we are all indebted to him for his contributions to science. The scientific community owes him.

Grant contributed significantly to exact small sample distribution theory.   In particular multivariate structural models, Hypothesis testing , likelihood and regression techniques. No integral over a manifold was avoided, whether it was the Stiefel manifold or very general, as in his Econometrica 1996 paper. The formula used there is one of his favourites and he put this to canvas. This is the painting which is on the Book of Abstracts of this conference in his honour.

No zonal- or other polynomials he avoided. No shortcuts to find out the deep meaning of the structure of the problem.

Grant's approach is to reduce the problem to its bare essentials to clarify the real issues without the mist of complicated formulas . Once that is clear, then, and only then, choices can be made. His paper on multiple testing procedures being a very elegant example. He does not shy away from the hard *yakka* however, which makes the final algebraic representation on occasion very difficult to read, despite the clarity of the argument and choices to be made.

He has made great contributions to discovering and exposing the properties of IV estimators and LIML estimators.

An early contribution was his '84 Econometrica with Kinal, Terrence W & Srivastava, V K, 1984. "On the Moments of Ordinary Least Squares and Instrumental Variables Estimators in a General Structural Equation," Econometrica, which he could have written on his own. In fact he did, but at the same time Kinal and Srivastava submitted a similar paper to Econometrica and I believe the Editor suggested a joint paper.

Yet more properties of IV and Likelihood based methods were discovered in various papers. Hence the title of Andrew Chesher's paper "Yet More on the Scope of Application of IV Models" today is so appropriate. All this exact work on finite sample distributions has become highly relevant again with the advent of "*weak instruments*" and people are rediscovering all this work (with or without acknowledgements)

The contrast between likelihood based methods and regression type methods. It is clear that Grant has a preference for likelihood and invariant procedures. His Econometrica paper in 1990 on the role of

normalization 1990. "On the Normalization of Structural Equations: Properties of Direction Estimators" is a beautiful example.

He is interested more widely in likelihood methods related methods and suggested Bartlett corrections, saddlepoint approximations and Empirical Likelihood to his students. For example Francesco Bravo in today's line up working EL and I am very pleased that Richard Smith, the man behind *Generalized Empirical Likelihood* has changed all his travel plans between Cambridge and Berkeley so that he can kick of this conference. On the Berkeley connection it is a great pleasure that longtime friend and colleague Tom Rothenberg flew all the way out from the East coast to participate and chair a session on identification.

Grant has many profound publications ranging from Econometrica (3), Journal of the Royal Statistical Society - B, Journal of Econometrics, Journal of Multivariate Analysis , Australian Economic Papers, Journal of Statistical Planning and Inference, book contributions and at least 11 publications in Econometric Theory for which received the *plura scripsit* Award in 2008. He also has an undisclosed number of papers in his drawers still. Which brings me to a number of bad points that he also has.

Finishing things

Finishing referees reports can take longer than average has been mentioned to me. On the other hand, some of us have benefited from his insight and suggestions when on the receiving end and I am sure many authors have benefited from his further analysis and insistence on clarity of exposition.

Finishing his PhD at the University of Pennsylvania. In 1968 he received a Fulbright Scholarship to go and study in the US. He took the boat all the way from Oz to the US. Half way through his studies his PhD supervisor left U.Penn and he did not finish the PhD at the time. He moved to Reading in the UK and if my memory serves me right Peter Praetz got him to Monash University back in Australia. During a visit to the US and a return to U.Penn years later, they gave him the option of finishing the PhD after all. So finally, through some deadline that was set, he finished the way that PhD's should: working 18 hours a day to get it out of the way.

Finishing his own papers. In fact he has a drawer with results and semi-finished papers. As an example, in 1993 I told him that Hashem Pesaran had suggested to look at some non-nested and partially overlapping models in a linear setting. Grant said it was interesting, but I need not bother to work it out myself since he had done all the exact theory for the different cases: strictly non-nested, partially nested etc . and I could write it up if I liked (i.e. type what he had written). I felt it improper to put my name on something someone else had done and naturally I refused, like he would have done. Of course, as a consequence the world does not share this knowledge and unfortunately, there are many more of these papers and results that we do not know about.

Modesty

Grant is too modest. His first reaction to the e-mail I sent round about his great contributions was one of modesty, being not deserving etc. Very inappropriate as I have just argued.

I had a hard time finding his CV. In fact I didn't . I used REPEC and the Southampton website and JSTOR trying to avoid missing any of his papers. But he forgot his own papers. His '86 Biometrika paper was missing. His Journal of the Royal Statistical Society-B with Max King was also missing.   Given the fact that Biometrika has a rejection rate of 96% and JRSS-B is one of the highest ranking journals in terms of e.g. impact factors, it seems a bit insulting to be so blasé about it.

Returning to the many good points Grant has, which clearly outshine and obliterate the two previous points. I have always appreciated his :

Integrity both academically and personally.

Genuine interest in true knowledge and science.

Brilliance in deriving new and deep results.

Patience

Grant had quite a lot of trouble to get his work published early on because it was very advanced and ideas of invariance, similarity, integration over manifolds, etc. were not accepted widely in those days. It is interesting that with the advent of weak instruments all the work he and Peter Phillips and other contributors working in this field, suddenly became very important again from an applied point of view. It was the industrious use of far-fetched instruments that made people suspicious, and rightly so. Grant's deep theoretical work is therefore also practically and empirically relevant. Something I didn't appreciate when I read his extremely technical 1984 Econometrica as an MSc student.

I also mention this example because Grant does things that are lasting. They are mathematical theorems in the sense that they remain true forever and prove valuable in the future. I think in much the same way as Alan James's work in the 50's and 60's turned out to be very valuable 40 50 and even 60 years later. The ET '96 interview that Grant and Chris Skeels had with James is interesting in this context.

Teaching and Research Training

Many of us here have benefitted from his teaching which is clear and very ambitious.

When I was his TA in Monash for a 4th year honours class, I had to work my socks of. I saw things that in Amsterdam are reluctant to teach our MSc students. In fact we do not teach them.

He started writing without any notes. I had never seen that before. I asked him if he wasn't worried that he'd forget something or make a mistake. He replied "they never notice!" Of course he does not forget anything and does not make mistakes. Many of us would recognize the sessions in his room where he would just write down complicated derivations without resorting to first writing things on paper.

Grant has had many PhD students, the majority of whom stayed on to be academics and making contributions in their own right. In the beginning he did not supervise many students. Ozzies Murray Smith and Chris Skeels, present here this weekend, where the first and then Randolph Tan, who is the only academic PhD that could not attend because he also serves as a Member of Parliament in Singapore, followed. I more or less started on half cylinders in that period, but when Grant moved to Cambridge (leaving Gael Martin and Offer Lieberman behind) and I followed to pursue my PhD full time.

In Southampton Grant has had a steady stream of excellent students who work in different fields, Patrick Marsh, Giovanni Forcini, Francesco Bravo, Federico Martellosio with whom I've overlapped and interacted, but also many others.

It is clear that we all feel very indebted to him. Everybody responded immediately when I send out the invitation. People have travelled half way around the world to pay tribute and join the conference. Students and colleagues came from England, Whales, Israel, US , Cyprus, and 3 Ozzies flew 30 hours from Melbourne and 30 hours back just to pay tribute to the main man. Some others who would have loved to come but could not make it were Merran Evans, Karim Abadir, Brendan McCabe and Andy Tremaine, but they send their best wishes.

Peter Phillips had planned a year in advance to participate, but was very sorry he had to cancel due to circumstances beyond his control that made it absolutely impossible to attend. He stayed very much in contact and involved. He wrote from the ship he is currently on:

Dear Kees Jan:

Greetings from the North Pacific ocean.

Thank you for the update on GHH. I will be interested to see the program in due course.

I am very sorry to miss this event for my very good friend GHH. I am sure it will be a great success and my warmest thanks to you for putting this event together.

Of course, please extend my congratulations and warmest best wishes to Grant!

Kind regards

Peter

He also gave instructions to make sure I would highlight the importance of Grant's contributions. He writes:

I assume you will do the Introduction. I think it is important that you spend some time in a laudation to discuss the major role GHH has played through his research, teaching, and conference participation, briefly,

1. in developing finite sample econometrics, at a general level, and exploring its implications for testing in a variety of contexts relevant to empirical work

2. in educating a steady succession of young econometricians, all of whom have helped advance the subject

3. in insisting on the highest standards in written work and oral presentations

4. in keeping the UK in the vanguard of econometrics over so many years

5. in his sustained local impact on Southampton econometrics that has ensured its continued status as a first rate department with strong quantitative economics faculty

I hope I have done justice to this and that, by quoting him, make Peter's presence felt and let his involvement contribute to the conference. He also contributes to the programme in the sense that he is coauthor to the papers by Offer Lieberman and Tassos Magdalinos.

Which brings me to the programme, which I think is very exciting.

Many of his PhD students will present with thought provoking ideas. Gael Martin has taken all the effort to come from Down Under and will present tomorrow on Bayesian Econometrics and computation. I have already mentioned the papers by Richard Smith and Andrew Chesher and the special session chairs, Max King, Chris Skeels, Tom Rothenberg, Ioannis Kasparis and Jean-Yves Pitarakis. Finally I am very pleased that his longtime friend Garry Phillips will conclude the conference.

I look forward to all the presentations. I wish everyone a very enjoyable conference.

Kees Jan van Garderen

Grant H. Hillier

Born and first degree Adelaide, South Australia;
Fulbright Scholar 1968;
PhD University of Pennsylvania
Associate Editor, *Econometrica*, 1994–2000;
Associate Editor, *Econometric Theory*, 1987-2012;
Econometric Theory plura scripsit Award, 2008;
Fellow of CeMMAP

based on incomplete information: at least:
Econometrica 3x
Econometric Theory 11x
Journal of the Royal Statistical Society - B
Journal of Econometrics
Journal of Multivariate Analysis
Australian Economic Papers
Journal of Statistical Planning and Inference
WPs
Book contributions
Drawer

Articles

Hillier, Grant, Kan, Raymond and Wang, Xiaolu (2014) Generating functions and short recursions, with applications to the moments of quadratic forms in noncentral normal vectors. Econometric Theory, 30, (2), 436-473. (doi:10.1017/S0266466613000364).

Hillier, Grant and Martellosio, Federico (2011) Spatial circulants, with applications. Journal of Statistical Planning and Inference, 141, (7), 2368 -2385. (doi:10.1016/j.jspi.2011.01.023).

Hillier, Grant (2009) Exact properties of the conditional likelihood ratio test in an IV regression model. Econometric Theory, 25, (4), 915-957. (doi:10.1017/S026646660809035X).

Hillier, Grant H. (2009) On the conditional likelihood ratio test for several parameters in IV regression. Econometric Theory, 25, (2), 305-335. (doi:10.1017/S0266466608090105).

Hillier, Grant, Kan, R. and Wang, Xiaolu (2009) Computationally efficient recursions for top-order invariant polynomials with applications. Econometric Theory, 25, (1), 211-242. (doi:10.1017/S0266466608090075).

Hillier, G. (2006) Yet more on the exact properties of IV estimators. Econometric Theory, 22, (5), 913-931. (doi:10.1017/S0266466606060415).

Hillier, Grant and Martellosio, Federico (2006) Spatial design matrices and associated quadratic forms: structure and properties. Journal of Multivariate Analysis, 97, (1), 1-18. (doi:10.1016/j.jmva.2004.11.004).

Forchini, Giovanni and Hillier, Grant (2003) Conditional inference for possibly unidentified structural equations. Econometric Theory, 19, (5), 707-743. (doi:10.1017/S0266466603195011).

Hillier, Grant (2001) The density of a quadratic form in a vector uniformly distributed on the n-sphere. Econometric Theory, 17, (1), 1-28. (doi:10.1017/S026646660117101X).

Hillier, Grant and Armstrong, Mark (1999) Notes and Comments. The density of the maximum likelihood estimator. Econometrica, 67, (6), 1459-1470. (doi:10.1111/1468-0262.00086).

Hillier, Grant (1990) On the normalization of structural equations: properties of direction estimators. Econometrica, 58, (5), 1181–1194. (doi:10.2307/2938305).

James, A.T., 1996. "Interviewed by Grant H. Hillier and Christopher L. Skeels," Econometric Theory, Cambridge University Press, vol. 12(01), pages 155–185, March.

Hillier, Grant H., 1991. "On multiple diagnostic procedures for the linear model," Journal of Econometrics, Elsevier, vol. 47(1), pages 47–66, January.

Hillier, Grant H. & King, Maxwell L., 1991. "Editors' introduction: 40 years of diagnostic testing," Journal of Econometrics, Elsevier, vol. 47(1), pages 1–4, January.

Hillier, Grant H., 1987. "Classes of Similar Regions and Their Power Properties for Some Econometric Testing Problems," Econometric Theory, Cambridge University Press, vol. 3(01), pages 1–44, February.

Hillier, G. H. & Satchell, S. E., 1986. "Finite-Sample Properties of a Two-Stage Single Equation Estimator in the SUR Model," Econometric Theory, Cambridge University Press, vol. 2(01), pages 66–74, April.

Hillier, Grant H., 1986. "Limited Information Estimation Solution," Econometric Theory, Cambridge University Press, vol. 2(02), pages 294–297, August.

Hillier, Grant H., 1985. "On the Joint and Marginal Densities of Instrumental Variable Estimators in a General Structural Equation," Econometric Theory, Cambridge University Press, vol. 1(01), pages 53–72, April.

Hillier, Grant H & Kinal, Terrence W & Srivastava, V K, 1984. "On the Moments of Ordinary Least Squares and Instrumental Variables Estimators in a General Structural Equation," Econometrica, Econometric Society, vol. 52(1), pages 185–202, January.

Hillier, Grant H & Giles, David E A, 1984. "Estimation in Equilibrium Models Involving Discretionary Policy Instrument Choice," Australian Economic Papers, Wiley Blackwell, vol. 23(43), pages 179–96, December.

Book Sections
Hillier, Grant (2007) On the joint density of the sum and sum of squares of nonnegative random variables. In, Phillips, Garry D.A. and Tzavalis, Elias (eds.) The Refinement of Econometric Estimation and Test Procedures. Cambridge, GB, Cambridge University Press, 326–346.

Hillier, G. and Satchell, S.E. (2003) Some exact results for portfolio estimators in the two-period capital market model. In, Satchell, S.E. and Scowcroft, A. (eds.) Advances in Portfolio Construction and Implementation. London, UK, Butterworth Heinemann, 310–325.

Hillier, G. and O'Brien, R. (2000) Exact properties of the maximum likelihood estimator in exponential regression models: a differential geometric approach. In, Marriot, Paul and Salmon, Mark (eds.) Applications of Differential Geometry to Econometrics. Cambridge, UK, Cambridge University Press, 85–118. (doi:10.2277/0521651166).

Hillier, G. and Skeels, C. (1993) Some further exact results for structural equation estimators. In, Phillips, Peter C.B (ed.) Models, Methods and Applications of Econometrics: Essays in Honor of A. R. Bergstrom. Cambridge, US, Basil Blackwell, 117–139.

Monographs
Hillier, Grant and Bech, Katarzyna (2015) Nonparametric testing for exogeneity with discrete regressors and instruments. London, GB, Centre for Microdata Methods and Practice/Institute for Fiscal Studies (Cemmap Working Papers, (doi:10.1920/wp.cem.2015.1115) , CWP 11/15).

Hillier, Grant and Martellosio, Federico (2013) Properties of the maximum likelihood estimator in spatial autoregressive models. Southampton, GB, University of Southampton, 43pp. (CeMMap Working Paper, (doi:10.1920/wp.cem.2013.4413) , 44/2013).

Hillier, Grant and Martellosio, Federico (2010) Spatial circular matrices, with applications. , Centre for Microdata Methods and Practice (Centre for Microdata Methods and Practice Working Papers CWP06/10).

Hillier, Grant, Kan, Raymond and Wang, Xiaoulu (2009) Generating functions and short recursions, with applications to the moments of quadratic forms in noncentral normal vectors. Southampton, University of Southampton, 45pp. (Discussion Papers in Economics and Econometrics 0918).

Hillier, Grant, Kan, Raymond and Wang, Xiaolu (2008) Generating functions and short recursions, with applications to the moments of quadratic forms in noncentral normal vectors. London, GB, Centre for Microdata Methods and Practice (CEMMAP Working Paper, CWP14/08).

Hillier, Grant, Kan, Raymond and Wang, Xiaolu (2008) Computationally efficient recursions for top-order invariant polynomials with applications. London, GB, CeMMAP, 37pp. (CeMMAP Working Papers, CWP07/08).

Hillier, Grant (2007) Exact properties of the conditional likelihood ratio test in an IV regression model. London, UK, Cemmap, 48pp. (Cemmap Working Papers CWP23/06, (doi:10.1920/wp.cem.2006.2306)).

Hillier, Grant (2006) On the Conditional Likelihood Ratio Test for Several Parameters in IV Regression. London, UK, The Institute for Fiscal Studies (CeMMAP Working Paper, (CWP26/06)).

Forchini, Giovanni and Hillier, Grant (2005) Ill-conditioned problems, Fisher information, and weak instruments. London, GB, Department of Economics, University College London (CeMMAP Working Papers, (CWP04/05) CWP04/05).

Forchini, G. and Hillier, G.H. (1999) Conditional inference for possibly unidentified structural equations. Southampton, UK, University of Southampton (Discussion Papers in Economics and Econometrics 9906).

Hillier, G.H. and O'Brien, R.J. (1999) Exact properties of the maximum likelihood estimator in exponential regression models: a differential geometry approach. Southampton, UK, University of Southampton, 33pp. (Discussion Papers in Economics and Econometrics 9901).

Hillier, G.H. (1999) The density of a quadratic form in a vector uniformly distributed on the n-sphere. Southampton, UK, University of Southampton (Discussion Papers in Economics and Econometrics 9902).

Hillier, G. and Armstrong, M. (1996) On the density of the maximum likelihood estimator. Southampton, GB, University of Southampton (Discussion Papers in Economics and Econometrics, 9645).

Hillier, G. and Forchini, G. (1995) Some exact distribution theory for the Gaussian AR(1) model. I: joint density of the minimal sufficient statistics. Southampton, UK, University of Southampton (Discussion Papers in Economics and Econometrics 9511).

Hillier, G.H. (1995) The union of best critical regions: complete classes, p-values, and model curvature. Southampton, UK, University of Southampton (Discussion Papers in Economics and Econometrics 9503).

Hillier, G. (1994) Quadratic forms: expansions, moments and applications to regression diagnostics. Southampton, UK, University of Southampton (Discussion Papers in Economics and Econometrics, 9420).