香港統計學會

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Editor's Foreword

I would like to express our sincere thanks to all contributors in this Bulletin. This is the first issue of Bulletin of this year. I hope you like it and can give us your support and feedback. As usual, I would urge our members to contribute their articles, or members may inform us some important and interesting news in statistics for the next Bulletin.

In this issue, we have our President's Forum. To commemorate the 30th anniversary of the Hong Kong Statistical Society, the Society organized a public lecture by Professor Sir Clive Granger on 16th May 2007 in Chiang Chen Studio Theatre, the Hong Kong Polytechnic University. This public lecture was jointly organized by the society and the Hong Kong Polytechnic University.

As we all know, global economic models are large and complicated but potentially very important, as growing world trade draws economies together. There are now several such models built with a variety of backgrounds. However, how do we know if any of these are useful or not? Nevertheless, we may have some idea of the answer to this question by reading Prof. Granger's article "Evaluation of Global Models".

Lastly, we would like to remind our members that a public seminar would be organized jointly by the Society, the Census and Statistics Department and the Education Bureau of the Hong Kong Government on 20th November at the Hong Kong Central Library. The aim of the seminar is to promote the proper use of sample survey results amongst the general public. The seminar will discuss some important principles and the proper way of conducting sample surveys as well as the questions that one should ask to assess the reliability of a sample survey.

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President's Forum

Leslie TANG

It is my pleasure to have an opportunity to say a few words in this forum.

First of all, I would like to express my deepest gratitude to Professor Tony W.K. Fung, the former President of the Hong Kong Statistical Society. Professor Fung has served as the President for four consecutive terms, breaking the record as the President with the longest year of service. More importantly, he has laid a good foundation for me to build on. Thank you, Tony.

This year marks the 30th anniversary of the Hong Kong Statistical Society. As one of the activities to celebrate the anniversary, the Society together with the Department of Applied Mathematics and the School of Accounting and Finance of the Polytechnic University of Hong Kong, organized the Public Lecture by Professor Granger, the Nobel Laureate in Economics in 2003, on 16 May 2007. Professor Granger offered an interesting and insightful talk on the topic of "Evaluation of Global Economic Models". Participants were impressed by his fresh perspective on the issues related to global economic modeling. For those members who could not join the seminar, a summary of the speech by Professor Granger has been published in this issue of the Bulletin of the Hong Kong Statistical Society.

Over the past few months, the Society received several international visitors. On 22 March 2007 after the Annual General Meeting of the Society was held, two distinguished guests, Professor Howell Tong and Mr. HUANG Lang-hui, joined us for dinner. Professor Tong is an internationally renowned scholar and recently received the Guy Medal in Silver 2007 awarded by the Royal Statistical Society. Mr. HUANG, the Director-General of the International Statistical Information Centre of China, is a pioneer of pricing statistics in the mainland China. He set up the pricing statistics system in National Bureau of Statistics in 1990s. We exchanged views on various issues related to the development of statistics in Hong Kong and worldwide.

Also, on 12 April 2007, a delegate of 37 statistical professionals from the Jiangsu Province of mainland China visited the Society. As the President of the Society, I shared our experience in the promotion of statistical literacy in Hong Kong and the organization of professional examinations and the accreditation of the examination

results by the Royal Statistical Society. I also shared with them the benefits of organizing the Statistical Project Competition (SPC) for secondary students. All the participants found the discussion useful and stimulating.

Talking about the SPC, I am pleased to inform you that the Education Bureau, in recognition of the significance of the SPC in promoting official statistics and statistical techniques among secondary school students, will join us in running the event starting from the coming (2007/08) round. Also, the Sun Hung Kai Properties Ltd. has kindly provided generous sponsorship to support the competition.

The Society has provided professional services in several occasions. In particular, Dr. Philip Yu, the Vice President of the Society, has participated in a consultation meeting on *a study on income distribution in Hong Kong* organized by the Census and Statistics Department. Dr. Yu has provided constructive and professional views which help enhance the outcome of the study.

On statistical literacy, you may recall that we have invited members of the Society, Prof. Y.K. CHAN of The Chinese University of Hong Kong, Mr. F.W.H. HO (the ex-Commissioner of the Census and Statistics Department), Prof. K.W. NG and Dr. S.M. SHEN of the University of Hong Kong to prepare a booklet "A Practical Guide to Sample Surveys" in 1991. The booklet presents the complicated subject in an easy-to-understand manner and is a useful reference to both the survey-takers and users of sample survey results. Thanks to the consent of the authors, we have recently put the electronic copy of the booklet on the Society's website for free download by the public. It is another move we made to advocate the proper conduct of sample surveys.

Finally, looking ahead, the Society will join the Census and Statistics Department of the Hong Kong Government in organizing a public seminar on the proper use of sample survey results in the coming November. It is part of the public seminar series of the Census and Statistics to commemorate its 40th anniversary. At the same time, this seminar is, apart from the Public Lecture by Professor Granger organised in May this year, another activity for us to commemorate our 30th anniversary. The topic of the seminar is "Sample surveys – How to be a smart user" and the purpose is to promote the proper use of sample survey results amongst the general public. The target participants include secondary school teachers, students, people who finance sample surveys, media and the general public. Apart from the Census and Statistics Department and our society, the Education Bureau of the Hong Kong Government is another organizer for the seminar. The seminar will be held on 20 November 2007 at the Hong Kong Central Library. We look forward to seeing you at the seminar.

Evaluation Of Global Models

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Abstract: *Complicated and sophisticated global models are available and popularly used (but commonly without model evaluation procedures), and hence, the question of how one can evaluate a global model is worth investigating. We discuss whether or not these global models together can be fully utilized and, if so, how this might be accomplished.*

Acknowledgments*: We are grateful to Ray C. Fair, Douglas Laxton, Adrian Pagan, David Rae, and Martin R. Weale, Hashem Pesaran, and Ken Wallis for helpful comments as well as participants in a conference at the University of Cambridge in 2007. and also for correcting factula problems on earlier versions of this paper, entitled .Country Models and Global Models - A New Set of Research Tools?. This paper is scheduled to be presented at Project Link Meeting in China, May 2007.*

JEL Classification Numbers: C3, C5, F0.

Introduction - Types of Models

Considering how to capture the major features of the global economy is truly a daunting task. The world contains six billion individuals divided into about one and a half billion families, each of which provides at least one decision maker. There are also many millions of other decision makers, including government units and corporations, in total there will be at least two billion decision makers, all interacting, throughout the globe.

It would be possible to build a single and quite simple model for the whole world economy using just aggregate variables. An aggregate global GDP data series has already been constructed and similarly data for other important macro variables such as production, consumption and, possibly, unemployment could be formed[1]. However there are already international markets for interest rates and for various commodities, such as oil and the major metals, producing global prices. I have not seen an example of such an "aggregate world model" but it is likely that several do exist. If such a model is dynamic, it could be used to

[1] But, some of these aggregates would make little economic sense and definitions vary across countries and there is no single market for employment.

form forecasts of all the global variables involved. The recent discussions about a world central bank (called a global federal bank) would be relevant in the construction of this model in the future (see www.grb.net).

The other extreme would be to build a separate econometric model for every country in the world. The obvious problem is that many countries are very small, economically. Currently the United Nations has 192 members (including San Marino but not The Vatican). We suspect that the majority of these countries would not have data of sufficient quality or quantity for an adequate model to be built, although we have no direct information on this. We call this the "all country model". It does not exist and we see little reason for it unless a model is needed for every individual country, however small.

Model LINK has an extensive history and there is plenty of experience with it and comes closest to the all-country model. It currently involves "over sixty" countries each with its own model, according to its web-site. However, it is not easy to obtain examples of specifications for these models, but the most recent one that we saw was based on traditional macroeconomic theory and used an error-correction form. It was thus both linear and dynamic. Project LINK is an example of a "many-country model". There is a mention on the web, under "link", leading to its Toronto center and a full account of the LINK meeting in Mexico, May 2005. This includes discussion of outputs, some forecasts but no discussion of the econometric form of the models nor of the economics behind it. The web link also presents many forecasts, but without confidence intervals and with no discussion of evaluations. It appears to be a very old-fashioned approach!

Among the forecasts provided are three given in May 2005 for oil prices (Brent, $/pb) for the years 2004 ($38.3), 2005 ($46.0) and 2006 ($37.0) whereas oil prices actually reached $78 in 2006 and were at $58 on October 19, 2006. As the original forecasts were given without confidence intervals these actual values are difficult to interpret, relative to the forecasts. There seems to be generally little knowledge of LINK in the profession (although some academics do know the group who run the local model). This is surprising as world-wide LINK must be a major employer of econometricians and it is also generally known that Larry Klein is closely involved with the models.

An obvious alternative strategy is to group countries in convenient ways. An IMF web site in 2006 includes the following summary information:-

Countries	%World GDP	%World Population	%Exports
8 Major	46	12	47
29 Advanced	55.5	15.5	73.4
China	12.6	20.9	5.3
India	5.7	17.2	0.9
8 Major +China+India	64.3	50	53
29 Advanced +China+India	73.8	53.5	79.6

Here the eight “Major” industralised countries are: United States, United Kingdom, Germany, Japan, France, Italy, Spain and Canada. The “29 Advanced” include the 8 “Major” countries but not India or China. The exports are of goods and services. It is seen that a model using data from just ten countries would account for almost two-thirds of the world GDP and a half of total exports. Further, a model using thirty-one countries would account for three-quarters of the world GDP and nearly eighty percent of the exports.

Some global models will use a number of single countries, such as the ten just indicated, plus groups of other countries’ examples could be “rest of Western Europe”, “Eastern Europe, including Russia”, “rest of Southeast Asia” and “South America”. The quality and quantity of the data available from various countries will determine how they are handled. We will call this type of model a “grouped global model”.

The particular grouped global model just described, with ten individual countries and four regional groups will cover most of the productive world but will often leave out some important countries and regions, such as Australia and New Zealand, Central America, Africa (and particularly South Africa) and the Caribbean.

How many groups are used in such a model will depend greatly on the objectives of the model, as well as the resources available for model construction together with the quantity and quality of economic data that is available. If the purpose of the model is to represent the economies of many economies you will naturally need a comprehensive model. The following section overviews some popularly grouped global models.

Overview - Examples of Global Models

The Fair Model

Ray Fair, at Yale, has been producing macro models of good quality for several decades. His web-site provides plenty of information about the models and where further information can be found. He has two books, published in 1994 and 2004, which describe the models and their evaluation in detail. In each book he considers two major models, one for the United States and one for the Rest of the World (ROW), which is a grouped model. This model is described in his 1994 book *Testing Macroeconometric Models*. The ROW model involves 45 countries, 32 of which have structural equations estimated. 13 of the models use quarterly data and the others are annual.

The form of the equations often consists of mixtures of lags and concurrent variables acting as explanatory variables. For example the change of log (number of jobs) is essentially explained in terms of the lag of this variable [and of the workers that “the firm would like to employ if there were no adjustment costs”] and by current log production. The equations are thus dynamic and make an effort to ensure that residuals are not autocorrelated but they are generated contemporaneously. It follows that forecasts and other foreward-looking quantities cannot be formed directly from an estimated equation, but instead the whole model has to be “solved”.

The book is very helpful as most details are carefully spelled out and presented, and it therefore contains a great deal of information.

Fair also performs many interesting tests on his models, including forecasting (and some combining) but as this work was pre-cointegration the VARs did not perform well although a simplified form of dynamic model did help improve his model forecasts. He also ran several quite interesting "policy simulations" asking what would have happened to the US economy if the Fed had increased interest rates, for example. Of course, one cannot evaluate the outcome, but just compare what different models indicate.

All of Fairs' models are available on the web and it is possible to make small changes to the specification and work out the impacts on forecasts, but the whole model cannot be re-estimated. Ray Fair is to be congratulated for his openness, which we think is unique in this area.

The Pesaran Model

For several years now M. Hashem Pesaran and his co-workers have been considering modeling "Regional Interdependencies Using a Global Error-Correcting Macroeconometric Model" [see Pesaran, Schuermann and Weiner (2004). A general discussion of the research program is given in the book Global and National Macroeconometric Modeling by Garratt, Lee, Pesaran and Shin (2006), although there most attention is paid to the national models. These use an error-correction EC form but strictly ECX as the models are augmented with variables generated largely out side the national economy, such as oil price. These x terms are not necessarily lagged and so contemporaneous relationships can exist between the variables in an economy.

The individual country models are then combined to give the global VAR (GVAR) or GEC model. Interactions between countries occur because of x and lag x for each country, the global exogenous variables such as oil price and because error terms can be cross-correlated. No mention is made of trade, we believe. The result is a very dynamic, interactive set of equations using a modern form of specification. Particular attention is paid to certain types of risk found in financial markets.

Computable General Equilibrium (CGE) Models

In a particularly interesting and helpful paper Scarf (1987) points out that these CGE models are based on a theory by Walrus that generalizes the "elementary notion that prices move to levels which equilibrate supply and demand", the basic viewpoint is that an economy starts with all sectors in equilibrium, then is hit by some major impact which removes it from the equilibrium, and the model then suggests a path back to equilibrium for each sector. If correct the model will indicate paths and the ultimate objective, but it will give no indication of how long the journey will take.

An interesting and well developed model of this class is called G-cubed, organized by Warwick McKibbin, although it is commercial

and so few details are available on the web.

Other Econometric Models

There are several other global models that exist but whose details are unavailable and so cannot be properly evaluated from the outside. These include the NIESR global model, designated NIGEM and the Federal Reserve Board global model. Individual equations do not seem to be generally available for inspection.

A Science-Based Model

MIT has a large technical or "scientific" model that includes an economic component. This is a modern version of the well known "Limits to Growth" global model, also known as the "Club of Rome World 2 Model" of the 1970's. It is essentially an extension of Malthus's ideas but made more complex. The model has six linked sectors: population, pollution, geographic space, agriculture natural resources, and capital investment. It appears to be deterministic.

The original model was nonlinear, dynamic, and contained about fifty equations. Only a few of the parameters were estimated from data, the rest were given "sensible values". A "Standard Run of the World 3 model of 1974" produced forecasts that industrial output per capita would peak around 2010 and then go into a sharp decline, closely followed by food per capita. The model received substantial criticism and a revised version appeared in 1992 (Meadows et.al) which produced similar forecasts but with the peaks delayed by about five years or so. We will have to wait to see how correct these forecasts turn out to be. We have seen no corresponding forecasts from the current MIT model.

Some Basic Considerations

Just because a model is based on a "good" theory and sound econometrics does not guarantee that the model is satisfactory in some total sense or even better than alternatives. A good place to start is to think about:

The Purposes of Modeling

Some examples of statements:

a. *Pesaran Model* The authors state that users "would benefit from working with a global macro-model that is capable of generating forecasts for a core set of macro factors for a set of regions and countries" for which they "have risk exposures". They also state in the "rejoinder" section that the objective "was to estimate a compact and theoretically coherent global model capable of generating multi-step ahead forecasts, whose assumptions could (in principle) be tested".

b. Mitchel, et al (1997). . . Macro Models "play a key role in the policy-making process" and later talk about "forward looking behavior".

c. Klein(1981): "The main use of econometric models is likely to be in scenario analysis in the form of simulation to explore the alternatives before us".

d. Fair says [his page 3, 1994] "My primary aim is to develop a model that is a good

approximation of how the macroeconomy works, and testing is clearly an essential ingredient in this process".

e. In the book by Garratt, Lee, Pesaran and Shin (2006) they say that "models are used to organize and describe our understanding of the workings of the national and global economies, provide a common framework for communication, predict future developments under alternative scenarios, and to evaluate potential outcomes of policies and external events". Later they mention "policy analysis and forecasts" and also probability forecasts. They write "despite the imaginative attempts that have been made over the past two decades it remains a formidable undertaking to construct a theory-consistent large scale macroeconometric model which has transparent long-run properties and fits the data well".

Evaluation

Evaluation is an essential aspect of modeling but is also a particularly difficult task with global models because of their size and complexity.

However, once we can agree on the purpose of the model the aim of evaluation does become a little easier.

Generalised objectives such as to "develop a model that is a good approximation of how the macroeconomy works" (Fair) or "describe our understanding of the workings of the . . . global economies" [Garratt, et al] are quite untestable. On the other hand the foreword-looking objectives such as forecasting and future effects of policy analysis are more likely to be stated in forms that can be evaluated. Point forecasts (hopefully with confidence bands although these are rarely available) can be compared with the eventual outcome. However, there are still problems, as will be seen. For global models, as with other macro models, quality is not measured just by the amount of fit but rather by the quality of decisions that the relevant decision makers can make with it.

One of the important questions to ask is whether evaluation should take place country (or region) by country or for the whole globe at once. The latter is strictly the correct answer yet the standard measures such as impulse response functions (irf's) and forecasts are considered for each country or region. Global models are of real importance for events that effect many regions.

Consider a specific "event" where a country that is a major producer of an important commodity suffers a bad storm or a political upheaval. There will be a direct effect which the model should measure and an indirect effect which should be available through the trade links. Whether the direct or the indirect effect is the more important will depend on the country but the relevance of the indirect effects will illustrate the usefulness of the global model.

Forecasting

The paper by Pesaran et.al (2004) is

noteworthy for its careful presentation and evaluation of forecasts. In sample root mean square forecast errors for a ten year period, using quarterly data and six economic variables are shown in their Table 1 for nine countries/regions plus the averages across regions. Values are shown for both their GVAR model and from a random walk (RW) for comparison. In the following table, we consider just the ratio of the root mean squared forecast (RMS) errors for the two models. One would expect that their model would beat the RW and so achieve a value less than one.

Variable	Average	Best	Worst
Real Output	.76	SE Asia (.46)	China (.94)
Inflation	.85	Se Asia (.69)	China (.92)
Interest Rate	.97	Germany (.66)	USA (1.02)
Real Equity Price	.96	SE Asia (.82)	Germany (1.1)
Exchange Rate	.87	SE Asia (.76)	Japan (.96)
Money Balance	.85	Japan (.70)	Western Europe (.94)

The "averages" have been formed in a simple fashion, directly from Table 1 of the paper which shows individual RMS of forecast errors for each region and model, and then an average for each model. We have shown just the ratio of these averages as a rough indicator of the relative quality of the GVAR model compared to the RW. Thus the figures had a ratio for the RMS errors for the models for China of 94% for Real Output and an average value of 76%. The average of the averages in the table is 0.87. The histogram of the individual RMS values has:

Individual RMS Value	Frequency
Greater than 1.0	3
From 0.9 to 0.99	14
From 0.8 to 0.89	16
From 0.7 to 0.79	11
Less than 0.7	6

It is seen that the GVAR typically beats the RW in terms of forecasting. However, the GVAR has no ability to forecast stock prices or interest rates, which is no surprise as they are speculative variables. For three other important variables, inflation, exchange rate and money balance GVAR beats RW by about 15% on average, which is a worthwhile amount. Finally for output GVAR is better on average by about 25%, but this is a little misleading as the story is less satisfactory for several important countries, such as US (ratio=.89), Germany (.87), China (.95) and the Middle East (.85).

One has to congratulate the authors for providing this forecasting information which is greater in extent and deeper in format than all the alternatives that we have available. There are just two simple criticisms, the first is that the forecasts have no confidence intervals associated with them and secondly a simple combination of the forecasts from the two models would have been valuable in helping to evaluate their joint abilities. It might also have been interesting to ask why the SE Asia region model was so successful in this exercise.

One of the natural questions is how to

compare forecasts across models. Suppose that we had forecasts for 20 variables, 30 countries (or regions), and 10 models (all point forecasts with a single horizon, to keep things relatively simple). This gives a total of 6,000 forecasts to compare and evaluate! Eventually the actual value of the variable will become available and the forecast can be replaced by the forecast error or, better, the percentage or relative error. Suppose that there is a generally agreed "cost of error" function *c(e)* such as the square or absolute value of *e*. It should be expected that the basic value of *c* will vary across variables and across countries, but not across models for a given variable and country. It would follow that an interesting way to proceed would be to optimally combine the forecasts from the different models for each country/variable pair. In the example above that would be 600 simple regressions. For each model form the histogram of the rankings of each of the combining coefficients from the 600 equations, together with the medians. The relative success of the models can be judged from these diagrams. Similarly one could compare just variable forecasts.

As another possible forecast evaluation exercise, we could gather forecasts of oil prices (plus confidence intervals) from alternative global models for recent years (5 or 10, for example) and compare to actual oil price (average for close of each month or close of year, but we need to find out precisely what is being forecast). Similarly, could we do the same thing for other world market commodities, such as gold, silver, scrap steel, copper, zinc, and so on?

Now, we make a suggestion on evaluating models by forecasting trade links. Each country model should certainly be forecasting total imports and exports each quarter as these are easily available, important variables and should be of high quality. In fact, each country model should also be forecasting individual imports and exports from each of their major customers and trade partners. If each model considered five import countries and five exports, then with say seventy country models that give an extra seven hundred forecasts, half will be imports and the other half will be exports. Consider a pair of countries, *a* and *b*. There will be a pair of forecasts, the exports from *a* to *b* (made in *a*) and the imports to *b* from *a* (made in *b*) and there are thus two forecasts for the same quantity. It needs to be discussed how to combine these two forecasts. There may be technical reasons why there are constant biases in some direction, but this can be allowed for. We can combine the forecasts and the resulting weights and constant may be interesting. They could possibly vary a lot across pairs of countries.

As other forecasters remark, when considering long-run forecast we need to include science forecasts. It should be noted that all models concentrate on forecasting the mean, the present models would not be able to handle cases when we want to forecast the variance, a semi-variance above the mean, or a quantile, such as a VaR.

Alternative Evaluation Procedures

Impulse Response Functions (IRF)

The statistics that are often provided by both modelers and academic discussants are Impulse Response Functions which personally we view as being of very little use and which are never evaluated with real events. A paper by Mitchell, Sault, Smith and Wallis (1998) starts by saying that macro models "play a key role in the policy-making process" and later talk about "forward looking behavior". However they spend most of the paper illustrating with IRF's how three particular models differ MULTIMOD, MSG2 and NIGEM. MSG2 is a dynamic general equilibrium model produced by Warwick McGibbon which used little data and is "estimated" by calibration. MULTIMOD from the IMF and NIGEM from the National Institute of Economic and Social Research, London, use standard econometric estimating procedures. Two different forms of MSG2 are used to produce IRF's and the results can be quite different, but it is difficult to be certain as no confidence intervals are shown.

Furthermore, there seems to be no real demand for them from government agencies, or by finance or industry. They tell us much more about the model than about the economy. We virtually never see them 'evaluated' using actual breaks and considering their impacts, compared to IRF's. What we can see are pages of IRF's from different models compared diagrammatically (usually without confidence intervals) and shown to be different!

The paper (by Pesaran et al.(2004)) also reports a number of IRF's demonstrating how the model could be used (if true!) in the analysis of the transmission of stock market and interest rate shocks from one region to the rest of the world economy (although no mention is given to the importance of the size of the shock).

Some model builders at a conference in Cambridge, England (February 2007) noted that journalists and others do call them after a specific new shock to the economy and ask what would be the impact over the next few periods on a few specific variables. These are questions that can potentially be analyzed by impulse response functions. The essential difference here is that the answers to these questions are specific forecasts as they are associated with particular dates, and so they can be evaluated by standard forecast evaluation procedures.

Possible Policy Evaluation and Thick Modeling

We could consider a 2% increase in interest rates and see what a model says will be the effect on major economic variables, and similarly for other % increases [note that impulse responses assume linear impact of impulses but an actual model may not.] Then one could forecast the effect of an actual interest rate increase and later compare to what actually happened.

One major change in the new century is that we are no longer thinking about finding the single best model but can contemplate several alternate good models using different specifications and types of theory restrictions,

estimation methods, etc. The use of thick modeling frees us from all those problems whilst we build the model(s). For example, if the results of a test are unclear, then we build both models!

Conclusion: A Set of Questions for Consideration

Question A: Why are we not concerned about the quality of data?

Presumably trade data is often of high quality, because much of it is gathered by "customs and excise" officers who oversee trade activities most of which produce taxes. The import data should be particularly sound, because of (excise) taxes being collected, but exports will be of lower quality! However in the EU some exported goods are exempted from the value-added-tax (VAT).

We understand that most capital movements are quite well measured, but some movements are rather poorly measured. What is well measured is capital used by industry for classical investment uses. Less well understood is financial speculative capital. Macroeconometrics is generally not very concerned with the quality of data and yet this will be a particular problem for global models.

One could speculate that for most countries many of the data series are of rather poor quality, if ever we made a real effort to check it out! All we can really ask is that the series is gathered essentially the same way every period so that some form of 'stationarity' applies, but even that is not possible in some countries that are upset by political and natural disruptions. This seems to be an area which is very undeveloped.

Question B: Why do we care about the long-run properties?

Government policy is not long-run. In the long-run tastes will change, technology will change, relative prices will change. But do we know how many years ahead is the 'long-run'? ["in the long-run I am dead" Keynes predicted , and he was correct!]. These days we have an aging population who control most of the wealth and do not care very much about the long-run!

We cannot see making an effort to get the long-run "correct" at the cost of spoiling the short-run performance of the model. Perhaps this is another reason why we need more than one model! A 'long-run' model is going to be particularly difficult to evaluate.

It is clear that if we consider equilibrium, the relevant model may be found in Pesaran, CGE/McKibbin and EC models. All will make statements about "equilibrium" but how do we evaluated them? We could do long run forecasts such as the forecasts made by the MIT [limits to growth] group 20 years ago about the collapse of the global economy starting about now, but then have to wait a long time to evaluate them. What one can do is investigate how robust these statements about equilibrium are to quite small changes in assumptions or to the starting values.

Question C: What does a theory add to a model?

A correct theory improves its quality but an incorrect theory detracts. Unfortunately we do not know what type of theory we are using! The developer of the theory will say that it must be good because it is logical and consistent, but it may not be relevant. We need to build two models, one with the theory and one without and compare them by combining their forecasts and seeing what weights they get. Unfortunately this is only a linear combination!

Question D: Finally A Few Ideas

It may be possible to utilize the concept of common factors in global models by asking is the global GNP a common factor for all countries, or is it just the US GNP? We could regress individual country GNP onto potential common factors and see the size of the residual, which may help with forecasting. This would be relevant for cointegration.

Furthermore, the current cointegrations may be considered, are they all "within country" whereas some could exist "between countries". A true global model would make use of this, as the Pesaran VEC model already does.

Another idea is to move error-correction terms around. We can take EC's from one system and use as inputs to another EC model?[2]

[2] Kozicki (unpublished and verbal comments) and Granger and Haldrup (1997).

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The Asset Management Industry in Hong Kong

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Background

Hong Kong has now developed into a major asset management centre in Asia and a premier capital formation centre for the mainland of China. Results of the Fund Management Activities Survey (FMAS) conducted by the Securities and Futures Commission (SFC) indicate that the combined fund management business[1] in Hong Kong amounted to some $6,154 billion as at end-2006, 4.2 times the GDP of Hong Kong in 2006 and up by more than onefold from that in 2003.

While the market size of fund management activities can be reflected by the value of the combined fund management business, other useful statistics are required to promote a better understanding on this proliferating sector. In this regard, the Census and Statistics Department (C&SD) has since 2005 started collecting more comprehensive data through the annual and quarterly economic surveys on the financial services sector for compiling other useful asset management (AM) statistics. These include the operating characteristics, economic contribution and short-term business performance statistics of the AM industry.

Coverage

In compiling the aforesaid AM statistics for Hong Kong, due reference has been made to the coverage of the FMAS conducted by the SFC. SFC is the regulatory body for various securities and futures related activities in Hong Kong.

The FMAS aims at gauging the value of funds managed or advised by various banking and non-banking institutions. Among the non-banking institutions involved, most of them are fund houses and investment advisory companies. In the industrial classification system of C&SD, these fund houses and investment advisory companies, which engage in portfolio management or investment advisory services as their major business, are regarded as constituting the AM industry.

[1] Combined fund management business comprises fund management business and SFC-authorized real estate investment trusts (REITs) management business. Fund management business comprises asset management business, advisory business and other private banking business.

On the other hand, the FMAS has been extended to cover the value of assets managed for clients by banking institutions as from the reference year 2003 because of its growing importance. Thus, in compiling the total economic contribution of AM business in Hong Kong, both the value added of the AM industry *per se* and that part of the value added of the banking industry brought about by its engaging in AM business are counted.

Portrait of the AM Industry in Hong Kong

Number of companies and employment

In 2005, there were about 190 companies in the AM industry, engaging some 3 600 persons. (Table 1)

Business receipts and other income

The industry generated $12.7 billion of business receipts and other income in 2005, up by 22% over 2004. Of this $12.7 billion, 85% were charges due to rendering of portfolio management and investment advisory services, while the remaining 15% were mainly other service charges, dividends and interest income.

Operating expenses

Operating expenses of the AM industry amounted to $4.0 billion in 2005, up by 6% over 2004. Service charges paid to banking and other financial institutions (including commission fees to stock brokers, etc.) took up the largest portion (37%) of operating expenses.

Compensation of employees

While employment of the industry only increased slightly by 2% from 2004 to 2005, its total compensation of employees increased substantially by more than 50% from $3.1 billion in 2004 to $4.8 billion in 2005. Accordingly, the remuneration per person engaged in this industry increased from $0.9 million in 2004 to $1.3 million in 2005, which is among the highest of various trades.

Table 1 Principal statistics of the AM industry in Hong Kong, 2004 and 2005

HK$ billion (unless otherwise specified)

	Number of companies	Persons engaged	Business receipts and other income	Operating expenses	Compensation of employees	Gross surplus
2004	244	3 511	10.4	3.8	3.1	3.5
2005	189 (-23%)	3 583 (+2%)	12.7 (+22%)	4.0 (+6%)	4.8 (+54%)	3.9 (+11%)

Note : Figures in brackets denote percentage changes compared with the preceding year.

Profit margin

While the gross surplus[2] of the AM industry increased from $3.5 billion in 2004 to $3.9 billion in 2005, its profit margin[3] decreased from 34% to 31%.

Sectoral concentration

The top 20 companies in the industry accounted for some 63% of the total business receipts and other income of the industry in 2005, comparable to the percentages of other major trades in the financial services sector like the insurance industry (78%) and banking industry (81%) in 2005.

Economic Contribution of AM Business in Hong Kong

Apart from fund houses and investment advisory companies, a number of banking institutions also engage in AM business in the form of portfolio management or rendering discretionary securities account services to private banking[4] clients. In assessing the total contribution of AM business in Hong Kong, the contribution brought about by the AM business of the banking industry is also included.

In 2005, value added of AM business amounted to $11.6 billion, contributing to 0.86% of GDP at factor cost, up by 0.12 percentage point from 0.74% in 2004. Within this $11.6 billion, the AM industry took up $8.1 billion. AM business rendered by the banking industry contributed the remaining $3.5 billion, accounting for a considerable proportion (30%) of the value added of all AM business in Hong Kong. (Table 2)

Table 2 Value added and economic contribution of AM business, 2004 and 2005

HK$ billion (unless otherwise specified)

	2004		2005	
	Value added	Percentage contribution to GDP at factor cost	Value added	Percentage contribution to GDP at factor cost
(A) The AM industry	6.1	0.49%	8.1	0.60%
(B) AM business of the banking industry	3.2	0.25%	3.5	0.26%
Total (A+B)	9.3	0.74%	11.6	0.86%

[2] Gross surplus equals to business receipts and other income less operating expenses and compensation of employees. It more or less reflects the profit level before tax.

[3] Profit margin equals to the ratio of gross surplus to business receipts and other income.

[4] For a more detailed definition on other private banking activities, please refer to the *Reports on the Fund Management Activities Survey* compiled by the SFC.

Value Added Per Person Engaged in the AM Industry

Based on the number of persons engaged (3 583) in the AM industry in 2005 from Table 1 and the corresponding value added ($8.1 billion) from Table 2, it can be derived that the value added per person engaged in the AM industry in 2005 was about $2.26 million[5]. This is much higher than the corresponding figures of the entire financial services sector[6] and the other three key industries in Hong Kong, viz. trading and logistics, professional services and other producing services, and tourism, at $0.95 million, $0.46 million, $0.38 million and $0.26 million respectively.

Short-term Business Performance of the AM Industry

Apart from the annual operating characteristics and economic contribution statistics introduced earlier in this article, a quarterly Business Receipt Index (BRI) of the AM industry is also compiled by C&SD to serve as an indicator on the short-term business performance of the AM industry as from the first quarter of 2005. Data on business receipts are collected through the Quarterly Survey of Service Industries.

The BRI of the AM industry in general exhibited an upward trend from Q1 2005 to Q1 2007. In 2005, the BRI was higher in the first and the fourth quarter, while in 2006, the BRI remained rather stable for the first three quarters and reached its highest value in the fourth quarter. (Table 3 and Chart 1)

Throughout 2006, the quarterly BRI of the industry maintained robust year-on-year growth (ranging from 25% to 82%). Taking the four quarters together, the business receipts of the AM industry soared by 52% in 2006 over 2005. In Q1 2007, the BRI recorded a 31% growth as compared with a year earlier.

[5] Since there is no information on the exact number of persons engaged in AM business of the banking industry, it is not possible to derive the value added per person for all employees engaged in AM business in both banking and non-banking AM institutions.

[6] Covering the banking industry, the insurance industry, and other financial services including asset management, investment and holding companies, securities companies and non-banking money lending institutions, etc.

Table 3 Quarterly Business Receipts Index (BRI) of the AM industry, Q1 2005 to Q1 2007

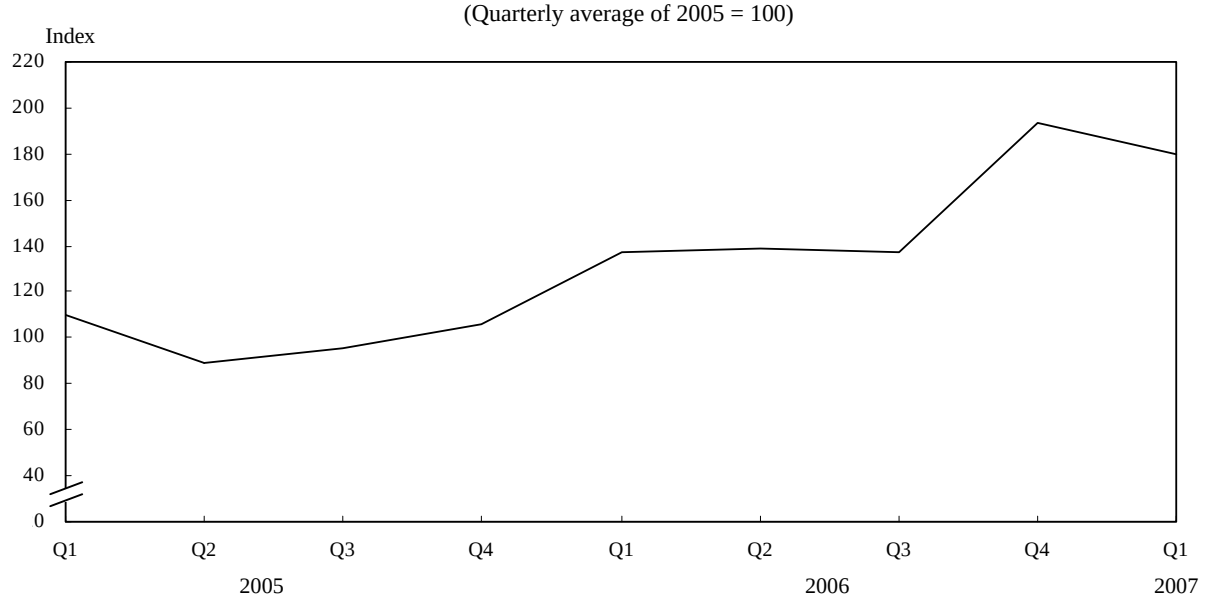
(Quarterly average of 2005 = 100)

		BRI	Year-on-year change
2005	Q1	109.8	-
	Q2	88.8	-
	Q3	95.3	-
	Q4	106.0	-
2006	Q1	137.6	+25.3%
	Q2	138.5	+55.9%
	Q3	137.6	+44.4%
	Q4	193.5	+82.4%
2007	Q1	179.8	+30.7%
2005	***Entire year***	***100.0***	**-**
2006	***Entire year***	***151.8***	***+51.8%***

Note : - Not applicable

Chart 1 Quarterly Business Receipts Index of the AM industry, Q1 2005 to Q1 2007

(Quarterly average of 2005 = 100)



News

Public Lecture by Professor Granger, the Nobel Laureate in Economics in 2003

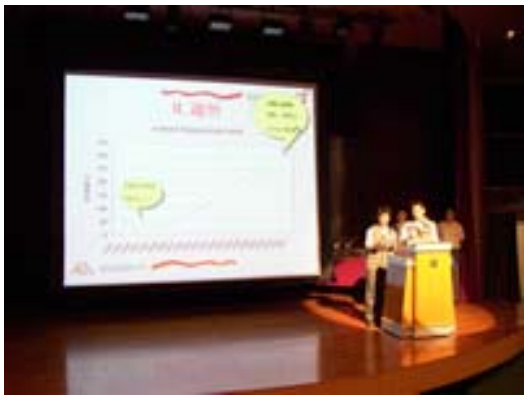
The public lecture by Professor Granger was held on 16 May 2007 as one of the activities to commemorate the 30th anniversary of the Hong Kong Statistical Society. The event was jointly organised with the Department of Applied Mathematics and the School of Accounting and Finance of the Polytechnic of Hong Kong.

Professor Granger and Mr. Leslie Tang, President of the Society, took a photo after the lecture

2006/07 Statistical Project Competition

The 2006/07 Statistical Project Competition was successfully completed. In this round, some 222 projects were received from 989 students of 65 secondary schools. The Prize Presentation Ceremony was held on 28 April 2007.

The First Prize winning team of the Junior Section took a photo with the Honorary Guests of the Prize Presentation Ceremony and the President of the Society



The First Prize winning team of the Junior Section made a presentation to introduce their project during the Prize Presentation Ceremony

The First Prize winning team of the Senior Section received the Prize from Mr. HW Fung, Commissioner for Census and Statistics

Public Seminar on the Proper Conduct of Sample Survey on 20 November 2007

A public seminar would be organized jointly by the Society, the Census and Statistics Department and the Education Bureau of the Hong Kong Government on 20th November at the Hong Kong Central Library. The aims of the seminar are to advocate the proper conduct of sample surveys.

Census and Statistics Department

With effect from 5 September 2007, Mr. SIU Yiu-choi assumes the office of Assistant Commissioner (Economic)2 of Census and Statistics Department vice Dr LUK Chi-ming on pre-retirement leave.