nake

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Netwerk Algemene en Kwantitatieve Economie

Netherlands Network of Economics

NAKE Secretariat

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PREFACE

As most of you probably already know, your fearless leader of the past three years, Casper van Ewijk, has moved on to even greener pastures and has completed his term as NAKE director. I am very honoured that I have been chosen to be his successor. Casper has been a very dedicated and successful NAKE director. I am sure that Casper will also be very successful in his new position as Vice Dean of the Faculty of Economics and Econometrics and Professor of Macroeconomics at the University of Amsterdam. Casper leaves behind a healthy organisation. Since the NAKE office will continue to be based in the University of Amsterdam, the transition problems due to the change of directorship should be minimal. I am very pleased that José Dijkzeul will continue to be the NAKE secretary. She has been an invaluable "silent force" behind the smooth running of the NAKE, and will continue to be so.

Please allow me to introduce myself ... Apart from being the opening sentence to one of the better songs by *The Rolling Stones*, it also expresses a relevant intention here. I studied economics at the Erasmus University from 1975-1980, after which I went to Canada to do my Ph.D. My stay at Simon Fraser University in Vancouver from 1980-1984, was followed by a first teaching appointment in the University of Tasmania, Australia. Tasmania is the small island (only thrice the size of the Netherlands) south of the mainland of Australia, and is famous for at least four reasons: (i) the Tasmanian devil originates from there. This extremely vicious and tenacious animal looks like a cross between a small pig and a dog and has very sharp teeth; (ii) Abel Tasman "discovered" the island for the Dutch United East-India Company (VOC) but was too scared of the Tasmanian aboriginals to even set foot on it; (iii) Errol Flynn, the swash-buckling Robin Hood actor of the thirties and forties was born and raised there, and his father was Professor of Botany at the University of Tasmania; (iv) Field Marshall Montgomery spent his youth in Tasmania.

Why all these details about Tasmania? The reason is clear. I intend to combine most noteworthy features of Tasmania in my directorship of the NAKE. I will attempt to chart new waters **and** land on any newly discovered islands, I will be as insistent as the Tasmanian devil if needed, and will steal from the rich to give to the poor. Furthermore, I will follow this intended strategy to its bitter end.

Since 1990 I have made a succession of moves in northerly direction. From 1990-91 I worked at Monash University in Melbourne, from 1991-93 at the Erasmus University, and since 1993 I have been at the University of Amsterdam. As my brief introduction shows, I have a little bit of experience with various education systems. The Canadian system is very similar to the U.S. system, whilst the Australian systems looks a lot more like that used in the United Kingdom. My previous experience should be of some use in my new position as NAKE director.

Enough about myself. Next month will present us with the workshop "The Economics of Finance" in Utrecht. This workshop is jointly organized by the Netherlands Network of Business Administration (LNBE) and the NAKE. Casper and the director of the LNBE, Elmer Sterken, have managed to attract some really big names in the field and this workshop promises to be a very interesting one indeed. Professor **Michael Brennan** of the University of California, at Los Angeles, will give a series of lectures entitled "Information, trade, and price setting in securities markets." The lectures by Professor **Sudipto Bhattacharya** of CORE, are on "The economics of financial intermediation." Finally, Professor **Lars Peter Hansen**, of the University of Chicago, will deal with the econometric issues in his series of lectures entitled "The econometrics of financial markets."

I am also pleased to announce the speakers for the June 1996 general workshop. Our microeconomics lecturer will be Professor James Mirrlees of the University of Cambridge. Who does not know his seminal work on optimal taxation? For macroeconomics we have managed to attract one of the foremost New Keynesians, Professor David Romer of the University of California at Berkeley. Professor Romer will presumably prove to us that the rumours about Keynes' intellectual death are vastly exaggerated. As if it is not enough already, Professor David Hendry of the University of Oxford has agreed to give the econometrics lectures. Professor Hendry is a gifted and inspiring teacher, as all participants of the June 1996 workshop will find out for themselves. Last but not least, Professor Jan de Vries, also of the University of California at Berkeley, will give lectures on economic history. Professor de Vries has recently co-authored a provocative book on Dutch economic history and will teach us both about the development of our own country and about how to do economic history.

This nake nieuws contains three excellent reports on last June's workshop. Youdi Schipper (VU) reports on the course "Topics in international economic history" by Barry Eichengreen, Jos Jansen on John Moore's course "Debt, aggregate fluctuations, and financial intermediation," and Govert Bijwaard on Thomas Stoker's lectures on "Semiparametric econometrics with applications."

Enclosed in this nake nieuws is a registration form for blocks III and IV of the Utrecht courses. The outlines of the different courses are found in the nake nieuws of July, 1995. Please contact the NAKE secretary if any further details are required.

nake-lnbe workshop

The Economics of Finance

11 - 15 December 1995

University of Utrecht

During the week from Monday 11 to Friday 15 December the Netherlands Network of Economics (NAKE) and the Netherlands Network of Business Adminisration (LNBE) will jointly organize a Ph.D. workshop on the *Economics of Finance*. Three distinguished professors will teach intensive courses on different aspects of this theme. Each course consists of five lectures.

Courses

Professor Sudipto Bhattacharya, CORE, University of Louvain

"Financial Intermediation"

Professor Michael Brennan, University of California, Los Angeles

"Information, Trade, and Price Setting in Securities Markets"

Professor Lars Peter Hansen, University of Chicago

"The Observable Implications of Asset Pricing Models"

Register by filling out the form on the middle page and returning it to the nake secretariat <u>before 24 November 1995</u>.

Provisional Programme NAKE - Workshop
Utrecht, 11 - 15 December 1995

Monday December 11	**Tuesday December 12**
09.30 - 10.30 *registration/ coffee/tea* 10.30 - 12.30 Brennan 12.30 - 13.30 *Lunch* 13.30 - 15.30 Bhattacharya 15.30 - 15.45 *coffee/tea* 15.45 - 17.45 Hansen 17.45 - 18.45 *reception*	09.00 - 11.00 Bhattacharya 11.00 - 11.15 *coffee/tea* 11.15 - 13.15 Hansen 13.15 - 14.15 *Lunch* 14.15 - 16.15 Brennan
Wednesday December 13	**Thursday December 14**
09.00 - 11.00 Hansen 11.00 - 11.15 *coffee/tea* 11.15 - 13.15 Brennan 13.15 - 14.15 *Lunch* 14.15 - 16.15 Bhattacharya	09.00 - 11.00 Brennan 11.00 - 11.15 *coffee/tea* 11.15 - 13.15 Bhattacharya 13.15 - 14.15 *Lunch* 14.15 - 16.15 Hansen 20.00 *Workshop dinner*
Friday December 15	
09.00 - 11.00 Bhattacharya 11.00 - 11.15 *coffee/tea* 11.15 - 13.15 Hansen 13.15 - 14.15 *Lunch* 14.15 - 16.15 Brennan 16.15 - *Closing drinks*	

.... Registration ....

Participation in the workshop is free for AIO's/OIO's of the institutions participating in nake or lnbe, and includes tea, coffee, lunches, reception, as well as dinner on Thursday. The participants cover the costs of accommodation and breakfast. These costs, together with travel expenses, can however be declared at the faculties. Hotel rooms are available in the Tulip Inn Hotel, Janskerkhof 10, 3512 BL Utrecht. It is possible to share a room. Approximate prices are ƒ 130,-- (single room) and ƒ 170,-- (double room).

The number of participants in the workshop is limited. nake- and lnbe-students have precedence, and the date of receipt of the registration form is also taken into consideration. Since firm arrangements must be made for lunches, dinner, accommodation etc., we would like you to notify the nake secretariat in case of any alterations to your plans. You register by filling out the form on the middle page (as completely as possible) and returning it to the nake secretariat <u>before 24 November 1995</u>. Upon registration you will receive written confirmation together with readers for the courses, hotel information, etc.

A number of AIO's/OIO's will be presented with the nake diploma during the workshop-dinner on Thursday evening.

.... Private Consultations ....

During the workshop it is possible for PhD students to have a one-to-one talk with one (or more) of the lecturers. Students who wish to confer with one of the lecturers about their research are invited to hand in a brief (one page) description of the research (-proposal) they would like to discuss. Each consultation will be approx. 30 minutes.

.........................Method of Assessment and Credits ....

The nake-workshops are obligatory for all first- and second-year graduate students following the nake-programme. So, each student has to attend at least four workshops. For three workshops the student should write a summary of the lectures of one course based on both the notes taken during the workshop and the assigned literature. These reports are assessed by the organiser(s) of the workshop. All (nake-) students are expected to attend all sessions on offer during the workshop.

With regard to study intensity, participation in the workshop (including the assessment by means of the written report) is worth 2 "Study Points" (SP); 1 SP = 40 hours.

................................*Addresses and Information*......................................

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Financial Intermediation

Sudipto Bhattacharya

Lecture 1. Introduction: Asset Services

Lecture 2. Liability Services: Banks and Markets

Lecture 3. Regulation of Financial Intermediation

Lecture 4. Intermediation, Corporate Governance, and Innovation

Lecture 5. Comparative Financial Systems: an Agenda for Research

Information, Trade, and Price Setting in Securities Markets

Michael Brennan

Preparatory Reading

’Financial Markets with Differential Information’, Chapter 9 of Foundations for Financial Economics, Chi-fu Huang and Robert H. Litzenberger, North-Holland, 1988.

L.R. Glosten and P.R. Milgrom, ’Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders’, Journal of Financial Economics, 14 (1985), 71-100.

A.S Kyle, ‘Continuous Auctions and Insider Trading’, Econometrica, 53 (1985), 1315-1335.

A useful survey:

A. Admati, ‘The Informational Role of Prices: a Review Essay’, Journal of Monetary Economics, 28 (1991), 347-361.

Session 1: Models of Dealer Markets

*L.R. Glosten and P.R. Milgrom, op.cit.
*A.S. Kyle, op.cit.
Admati, A.R. and P. Pfleiderer, ‘A theory of intraday patterns: volume and price variability’, Review of Financial Studies, 1 (1988), 1-30

A.S. Kyle, ‘Informed Speculation with Imperfect Competition’, Review of Economic Studies, 56 (1989), 317-356.

C.W. Holden and A. Subrahmanyam, ‘ Long-lived Private Information and Imperfect Competition’, Journal of Finance, 47, 247-270.

M.J. Brennan and A. Subrahmanyam, ‘Investment Analysis and Price Formation in Securities Markets’, UCLA Working Paper #23-93, 1994.

M.J. Brennan and A. Subrahmanyam, ‘ The Determinants of Average Trade Size’, UCLA Working Paper #7-95, 1995.

M.J. Brennan, N. Jegadeesh, and B. Swaminathan, ‘Investment Analysis and the Adjustment of Prices to Common Information’, Review of Financial Studies, 6 (1993), 799-824.

Session 2: Competitive Rational Expectations and the Informational Role of Prices

*Huang and Litzenberger, op.cit.
*M.F. Hellwig, ‘ On the Aggregation of Information in Competitive Markets’, Journal of Economic Theory, 22 (1980), 477-498.

D.W. Diamond and R.E. Verrecchia, ‘Information Aggregation in a Noisy Rational Expectations Economy’, Journal of Financial Economics, 9 (1981).

J. Wang, ‘A Model of Intertemporal Asset Prices under Asymmetric Information’, Review of Economic Studies, 60 (1993), 249-282.

Session 3: Information and Trading Volume

Varian
Grundy and McNicholls
Harris and Raviv
O. Kim and R.E Verrecchia, ‘ Trading Volume and Price Reactions to Public Announcements’, Journal of Accounting Research, 29, 302-321.

*M.J. Brennan and H. H. Cao, ‘Information, Trade and Derivative Securities’, Review of Financial Studies, forthcoming.

J. Wang, ‘A Model of Competitive Stock Trading Volume, Journal of Political Economy, 102 (1994), 127-168.

Session 4: Acquisition and Sale of Information

*S.J. Grossman and J.E. Stiglitz, ‘ On the Impossibility of Informationally Efficient Markets’, American Economic Review, 70 (1980), 393-408.

*R.E. Verrecchia, ‘Information Acquisition in a Noisy Rational expectations Economy’, Econometrica, 50, (1982), 1415-1430.

A.R Admati and P. Pfleiderer, ‘A theory of intraday patterns: volume and price variability’, Review of Financial Studies, 1 (1988), 1-30

A.R Admati and P. Pfleiderer, ‘Direct and Indirect Sale of Information’, Econometrica, 58 (1990), 901-928.

M.J. Brennan and T. Chordia, ‘Brokerage Commission Schedules’, Journal of Finance, 48 (1993), 1379-1402.

Session 5: Corporate Finance, Asset Pricing and Securities Markets

*Huang and Litzenberger op.cit. pp283-295.
*H.E.Leland, ‘Insider Trading: Should it be Prohibited?’, Journal of Political Economy, 100 (1992), 859-887.

B. Holmstrom and J. Tirole, ‘Market Liquidity and Performance Monitoring’, Journal of Political Economy, 101 (1993), 678-709.

*M.J. Brennan and A. Subrahmanyam, ‘Market Microstructure and Asset Pricing: on the Compensation for Market Illiquidity in Stock Returns’, Journal of Financial Economics, forthcoming.

*The articles marked with * will be distributed to the participants in advance.

Observable Implications of Asset Pricing Models

Lars Peter Hansen

I. Diagnosing Discrete-time Asset Pricing Models (3 lectures)

A. Stochastic Discount Factor Representations

Hansen, L.P. and S.F. Richard, "The role of Conditioning Information in Deducing Testable Restrictions Implied by Dynamic Asset Pricing Models," *Econometrica* 55, May 1987, 587-613.

Harrison, J.M. and D.M. Kreps, "Martingales and Arbitrage in Multiperiod Securities Markets," *Journal of Economic Theory* 20, June 1979, 381-408.

Rubinstein, M. "The Valuation of Uncertain Income Streams and the Pricing of Options," *Bell Journal of Economics* 7, Autumn 1976, 407-425.

B. Testing Pricing Errors

Bakshi, G.S. and Z. Chen, "The Spirit of Capitalism and Stock Market Prices," forthcoming in *The American Economic Review*, 1995.

Brown, D.P. and M.R. Gibbons, "A Simple Econometric Approach for Utility-based Asset Pricing Models," *Journal of Finance* 40, June 1985, 359-381.

Epstein, L.G. and S.E. Zin, "Substitution, Risk Aversion, and Temporal Behavior of Consumption and Asset Returns II: An Empirical Analysis," *Journal of Political Economy* 99, 1991, 263-286.

Hansen, L.P., "Large Sample Properties of Generalized Method of Moments Estimators," *Econometrica* 50, 1982, 1029-1054.

Hansen, L.P., J. Heaton and E.G.J. Luttmer, "Econometric Evaluation of Asset Pricing Models," *The Review of Financial Studies* 8:2, 1995, 237-274.

Hansen, L.P. and R. Jagannathan, "Assessing Specification Errors in Stochastic Discount Factor Models," manuscript, November 1995.

Hansen, L.P. and K.J. Singleton, "Generalized Instrumental Variables Estimation of Nonlinear Rational Expectations Models," *Econometrica* 50, September 1982, 1269-86.

MacKinley, A.C. and M.P. Richardson, "Using Generalized Method of Moments to Test Mean-Variance Efficiency," *The Journal of Finance*, 46:2, June 1991, 511-527.

C. Volatility Bounds

Campbell, J. and J. Cochrane, "By Force of Habit: A Consumption-Based Explanation of Aggregate Stock Market Behavior," National Bureau of Economic Research Working Paper 4995.

Cochrane, J.H. and L.P. Hansen, "Asset Pricing Explorations for Macroeconomics," *NBER Macroeconomics Annual 1992*, MIT Press, Cambridge, MA, 1992, 115-165.

Hansen, L.P. and R. Jagannathan, "Implications of Security Market Data for Models of Dynamic Economies," *Journal of Political Economy* 99:2, 1991, 225-262.

D. Market Frictions

Bewley, T., "The Optimum Quantity of Money," J.H. Kareken and N. Wallace, eds., *Models of Monetary Economies*, Federal Reserve Bank of Minneapolis, 169-210.

He, H. and D.M. Modest, "Market Frictions and Consumption-Based Asset Pricing," *Journal of Political Economics* 103:1, 94-117.

Jouni, E. and H. Kallel, "Martingales and Arbitrage in Securities Markets with Transaction Costs," *Journal of Economic Theory*, 66, 1995, 178-197.

Luttmer, E.G.J., "Asset Pricing in Economies with Frictions," Northwestern University, Department of Finance Working Paper #151.

Townsend, R.M., "Models of Money with Spatially Separated Agents," J.H. Kareken and N. Wallace, eds., *Models of Monetary Economics*, Federal Reserve Bank of Minneapolis, 265-303.

II. Estimating Continuous-Time Models from Discrete-Time Data

A. Scalar Diffusions

Karlin, S. and H.M. Taylor, *A Second Course in Stochastic Processes*, Academic Press, Inc., New York, Chapter 15, 157-397.

B. Identification from Discrete Time Data

Ait-Sahalia, Y., "Nonparametric Pricing of Interest Rate Derivative Securities," manuscript, forthcoming in *Econometrica*, 1995.

Bannon, G., "Nonparametric Indetification for Diffusion Processes," *Siam J. Control and Optimization*, 16:3, May 1978, 380-395

Cobb, L., P. Kopstein and N.H. Chen, "Estimation and Moment Recursion Relations for Multimodel Distributions of the Exponential Family," *Journal of American Statistical Association*, 78, 1983, 124-130.

Dohnal, G., "On Estimating The Diffusion Coefficient," *Journal of Applied Probability*, 24, 1987, 104-114.

Hansen, L.P. and J.A. Scheinkman, "Back to the Future: Generating Moment Implications for Continuous-Time Markov Processes," *Econometrica*, 63:4, July 1995, 767-804.

C. Application to Short Term Interest Rates

Ait-Sahalia, Y., "Nonparametric Pricing of Interest Rate Derivative Securities," manuscript, forthcoming in *Econometrica*, 1995.

Chan, K.C., G.A. Karolyi, F.A. Longstaff and A.B. Sanders, "An Empirical Comparison of Alternative Models of the Short-Term Interest Rate," *The Journal of Finance*, 67:3, July 1992, 1209-1227.

Conley, T.G., L.P. Hansen, E.G.J. Luttmer and J.A. Scheinkman, "Short-Term Interest Rates as Subordinated Diffusions," manuscript, 1995.

D. Estimation Methods for More General Models

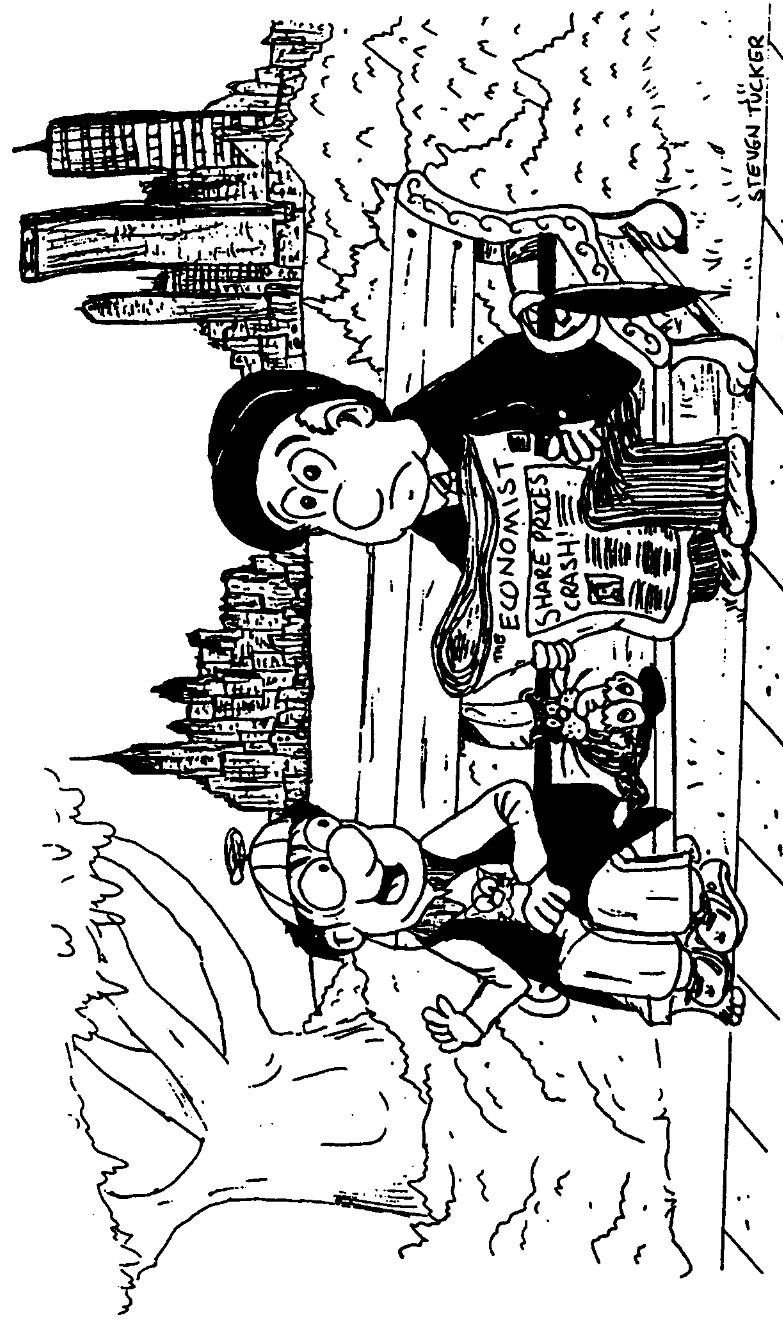
Buraschi, A., "The Nominal Term Structure, Stock Prices and Consumption Dynamics with Nonneutral Inflation," University of Chicago Ph.D. Dissertation, 1995.

Foster, D.P. and D.B. Nelson, "Continuous Record Asymptotics for Rolling SampleVariance Estimators," forthcoming in *Econometrica*, 1995.

Gourieroux, C., A. Monfort, and E. Renault, "Indirect Inference," *Journal of Applied Econometrics* 8, 1993, S85-S118.

Tauchen, G., "New Minimum chi-Square Methods in Empirical Finance," Duke University manuscript, August 1995.

Taken from: Snowdon, B., H. Vane, and P. Wynarczyk. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. Aldershot, UK: Edward Elgar, 1994.



"My PhD thesis was a pioneering attempt to create a new synthesis by constructing a new-classical over-lapping generations equilibrium business cycle model with Austrian roots which nevertheless contained Keynesian price rigidities, neutrality properties, involuntary unemployment, outsider power, decreasing returns to scale, irrational expectations and maximising agents operating in a world of fundamentalist uncertainty, repeatedly hit by endogenous technical progress. When the model generated neo-Marxian predictions I just flipped!"

(Cartoon drawn by Steven Tucker, aged 12¼)

....Utrecht Courses.......................................

To register fill out the form in the middle of this booklet.

Block III: Fridays February 2, 09, 16 and 23; March 1 and 8 (reserve date)

Location: to be announced

10.00 - 12.00, room t.b.a.	Morgan "History of Economic Ideas"
10.00 - 12.00, room t.b.a.	van Winden "Behavioral Modelling of Government Decision Making"
12.30 - 14.30, room t.b.a.	de Zeeuw "Differential Games in Economics"
15.00 - 17.00, room t.b.a.	Ridder/Wansbeek "Panel Data"
15.00 - 17.00, room t.b.a.	Jager/de Jong "Exchange Rate Economics"

Block IV: Fridays March 22 and 29; April 12, 19 and 28; May 3 (reserve date)

12.30 - 14.30, room t.b.a.	Ellman "Analytical Aspects of the Transition from State Socialism to Modern Capitalism"
12.30 - 14.30, room t.b.a.	Peters/Storcken "Social Choice Theory" (An Introduction)
15.00 - 17.00, room t.b.a.	Ridder/Wansbeek "Panel Data"
15.00 - 17.00, room t.b.a.	Viaene/de Vries "The Theory of International Trade"
t.b.a.*	Olson/Schram and van Winden "Experimental Economics and the Design of Mechanism"

* *This course will not be given on Friday (probably on Wednesday) in Amsterdam at the CREED Laboratory.*

TOPICS IN INTERNATIONAL ECONOMIC HISTORY
Barry Eichengreen

Report by Youdi Schipper (TI/VU Amsterdam)

1. Introduction

Barry Eichengreen (University of California at Berkeley) is an economic historian, whose work covers a wide range of themes in the field of international economics, running from the 18th century and before up till European Monetary Unification. His lectures during the NAKE workshop in Leiden addressed five topics in a chronological order: the first two were the operation of the Gold Standard (the system of fixed exchange rates until the mid-1930's) and the integration of the world economy in the 19th and early 20th century. The Gold Standard can be seen as one of the stabilizing factors that explain the integration of the world economy (see the next section). The third topic, discussed in section 3, is the debate about the causes of the Great Depression. Eichengreen presents a revisionist view, combining structural economic weaknesses and the lack of policy coordination as reasons behind the crisis. The period of growth after World War II and the role of the Marshall Aid (topic 4) is addressed in section 4. Again, Eichengreen presents a synthetic view, taking a stand between the view of the Marshall Administration (the Marshall Plan was a critical input in the post-war growth) and the critical view of revisionists like Milward (Marshall Aid made only a small contribution). The final topic (section 5) is the functioning and the demise of the Bretton Woods system of fixed exchange rates. It is clear that the lectures on economic history differed from the three other series in format: few equations here, but more attention for economic institutions and policy. While this approach, combined with the economic historian's struggle for data, may render empirical testing harder, the historic perspective offers a valuable view on (recurring) economic events and mechanisms.

2. The Gold Standard and Globalization

The Gold Standard (GS) consisted of three basic features: a fixed domestic price of gold, unrestricted international capital movements, and a rule linking domestic money supply to gold reserves. This system, which amounted to the fixing of exchange rates, was introduced first in Great Britain in 1717 (as a result of the Newtonian miscalculation of the relative gold price), but was certainly not a global system at once. However, the fact that Great Britain, the major economic power at the time, got on the GS, was a driving force behind the gradual switch from the widely operated bimetallic systems to the GS. Because of the important network externalities associated with a uniform system, trading partners induced each other to go on the GS, which consequently became a truly international system.

How did the GS function? Eichengreen presents two equilibrium inducing mechanisms. In the first case, economic growth would raise relative gold prices, and thus stimulate gold supply (mining) and increase money supply, restoring the equilibrium price level (MV=PT). Critical assumptions are, however, the constant V, the upward sloping gold supply curve, and the equal growth rates of money and gold. The latter relation became increasingly less strict, due to the use of other kinds of reserves as base money, and the replacement of coins by deposits. A second mechanism was based on Hume’s *price specie flow* model, in which the restoration of equilibrium should be enhanced by Central Banks obeying the ’rules of the game’. If there is a trade deficit (gold reserves flow out), banks should tighten money supply or raise interest rates, thus restoring equilibrium more smoothly and preventing more gold from flowing out. In the words of Bloomfield (1959), national and international assets should move in the same direction.

Although banks violated the ’rules’ during the interwar years, three stabilizing factors helped the system work nevertheless. First there was the credibility of policy: as there was no doubt about the long run monetary policy intentions (which was in the hands of trustworthy, wealthy men who did not pursue other than monetary objectives), central banks could violate the rules in the short run. Secondly, central banks cooperated in order to prevent financial crises. Thirdly, there were linkages: capital outflows were balanced by increased exports, like in the case of UK railroad investments. After the first world war, however, the credibility of policy and linkages (the UK lost markets to new competitors) became weaker, which destabilized the system.

Up till the 19th century, the world economy could be divided into four blocks, viz., the Atlantic block (UK and North America), continental Europe and the overseas settlements, Russia and the Baltics, and Japan. In this system, surpluses and deficits were settled multilaterally within blocks, whereas equilibrium prevailed between blocks. In the course of the 19th century, the blocks broke down and the world economy became more multilateral. Contrary to popular opinion, integration in terms of net capital flows as a percentage of GNP then was often larger than today. Compare, e.g., capital imports for European settlements like Canada or Australia of over 10%, which they managed to repay, with the figure for Mexico of 8% in 1992. As another sign of globalization, Eichengreen mentions the huge migration flows, amounting to one per hundred in the late 19th century. Migration and subsequent ’population sensitive’ investment have been mentioned as a factor causing the 20 year cycle discovered by Simon Kuznets; a full explanation of the cyclical pattern, however, remains problematic.

The large size of lending had several reasons: first, the expansion of overseas investment needed finance. Secondly, the lowering of trade barriers stimulated the expansion of international trade. As explained above, investment was often balanced by capital goods exports, so these reasons are linked. Also, the Gold Standard with its currency stability provided a favourable environment for international lending.

Who were the parties involved? The largest creditor at the time was no doubt Great Britain, with a capital export averaging 5% (peaks of 10%) of GNP in the four decades prior to 1913, accounting for 50% of world capital exports; France and Germany both provided 20%. These figures reflect the high concentration of capital markets in the 19th century. The borrowers consisted primarily of the relatively rich overseas countries c.q. settlements with ample investment opportunities in infrastructure and in the growing agricultural sector: Australia, Canada, the US, Argentina, Brazil, etc.

Fishlow (1986) distinguishes between lending by Great Britain on the one hand, and France and Germany on the other. The much smaller investments of the latter to a.o. Russia, the Middle East, and Eastern Europe were often made for strategic reasons. As these were political and not necessarily productive investments, there was no mechanism which guaranteed debt servicing without defaults. The political nature of such investment is an important factor explaining the waves of defaults (a.o. by Egypt, Turkey, Latin American countries) experienced by creditors during the 19th century. The investments of Great Britain were, however, primarily market driven: the production induced by capital investments ensured debt servicing and stable lending.

The bond market was the principal way of lending. Collective action in Great Britain was taken by the counsel of foreign bondholders, representing bondholders in debt repayment settlements. The counsel also acted as an important advisor to the London stock exchange: if a country refused to negotiate with the counsel, a negative advice would prevent new loans from being underscribed. In Great Britain, the counsel was more effective than in other countries, and managed to achieve a return on foreign investment (after default costs) equal to domestic investment.

A final point: how does the stability of economic growth for the 1870-1913 period compare to the post 1945 period? This question highlights some difficulties with respect to historical statistics: using official statistics, the ratio of standard deviations of growth for the two periods amounts to 1,8. Surveys for the former period are, however, based on commodity production. Therefore, by underestimating the less volatile service sector production, the instability of growth for the late 19th century may be overstated. Using pseudo estimates of service sector production for the latter period, Romer (1986) finds a ratio of 1,3.

3. The Great Depression

Eichengreen views the Great Depression not as some special case, but as a part of economic history which can be explained in terms of mainstream economics. He makes a distinction between three periods: the onset (1929-30), the deepening of the crisis (1931-33), and the recovery phase (1934-37). From 1921 to 1929, the US experienced an unprecedented period of sustained growth. This expansion was based on a construction boom and the consumer durables revolution, both interest sensitive phenomena. When the Fed saw the ratio of gold to liabilities go down, long and short term interest rates were raised slowly. As a result, liquidity still grew but at a slower rate. At this point, the crucial role of the Gold Standard becomes clear: in order to defend the GS in the face of the huge debts and deficits on the European-US capital account, European countries had to engage in contractionary monetary policies as well. To make things worse, European companies had lost export markets to US and Japanese competitors during World War I. These factors caused European countries to fall into recession, while heavy debtors like Australia and Argentina were affected severely too; in turn, import cuts by debtors hit on a primary source of US income, causing production and consumption of the world's major creditor to fall. Eichengreen concludes that in this pre-Keynesian world, the only policy option - stimulation by means of monetary expansion - was blocked by the Gold Standard, which eventually would be set aside.

From 1931 to 1933, the crisis deepened, for which Eichengreen mentions two explanations: on the one hand, wage rigidity caused unemployment, and on the other, bank failures had negative monetary (reduction in money supply) and real effects (disruption of intermediation affected output). As for the recovery phase (1934-37), Eichengreen shows the strong correlation between the timing of devaluation and the timing and pace of recovery: countries that left the GS could reduce interest rates and became more competitive exporters. The alternative for unilateral devaluation, i.e. coordinated monetary policy, was not feasible because of the diverging views on economic policy. There are various partial explanations for the variance in timing of devaluation among countries, e.g., differences in (union) opposition against policy changes, differences in leadership and economic advisors, and different economic experiences (inflation) in the 1920's.

The revisionist policy conclusion regarding the Great Depression is that unilateral devaluation was necessary in order to stimulate the national economy. However, such a disconnection from the world economy did have negative (beggar-thy-neighbour) trade effects, which induced protectionist trade policies, caused exports to fall even more, and triggered a debt crisis.

4. The Marshall Plan and post-war growth

In the literature on the Marshall Plan (MP), two views are found: the first one, generally put forward by former MP administrators, presents the aid as a critical input needed for the reconstruction of the devastated European economy. From the 1970's onwards, revisionists (e.g. Milward 1984) have argued that the MP was too small to make a real difference, and that growth had already picked up before the MP started.

Eichengreen takes a stand between these two views, presenting the following arguments. Although it is true that capital markets did not function, and neither national savings nor international lending (IMF, World Bank) were significant, the MP only made a small contribution: 15% of investment, 2½% of GNP. Furthermore, evidence suggests that physical infrastructure already had recovered before the MP. A possibly important contribution may have been the increase in the capacity to import. The effect of any technological transfer through the MP has not been detected empirically. The importance of the MP may, however, be attributed to the conditions on which it was provided. On the one hand, these conditions served to solidify European market economies by constraining government spending, lifting price controls, and on the other, they helped to create institutions needed for European economic integration. (The political influence of these MP conditions may be illustrated by the fact that they forced communist majorities in Italy and France to step down!).

A number of factors help to explain the high European growth rates during the post-war period until 1973, but many of these are not totally satisfactory. First, there is the ’catch up’ argument: growth arose because European production caught up with the more advanced US technological frontier, but this does not account for US growth. Secondly, aggregate (labour) supply is elastic because of migration, underemployment in agriculture and harmonious labour relations. Thirdly, raw materials were available at low prices. Furthermore, investment rates doubled after the war, but these cannot explain the post-1973 period. The welfare system explains stability, but does not disappear after 1973. Trade is an engine of growth after World War II, but keeps on growing faster than income after 1973. Finally, the system of Bretton Woods brought international monetary stability. Deceleration of growth in the late 1960’s has been explained in terms of the closing technological gap, the increasingly tense factor (labour) markets and growing protectionism.

5. Bretton Woods

In the face of current problems as regards maintaining a system of fixed exchange rates in Europe, a comparison with such systems in the past seems worthwhile. Eichengreen points out three factors that enhanced the working of fixed exchange rate systems like Bretton Woods (BW) and the Gold Standard: the credibility of policy and the greater extent of international cooperation have already been mentioned; a third factor is the greater flexibility of prices and wages. It should, however, be mentioned that the interwar GS already worked less smoothly, and that the strength and benefits of BW should not be overstated: it lasted effectively only from 1959 (after European countries restored current account convertibility) until 1968 (when US convertibility was suspended). During BW, capital controls could be reinstalled if stability was threatened, but the deregulation of domestic financial markets made international capital flows increasingly difficult to control. The restoration of convertibility was slow for three reasons. These are the enormous disruption of the European economies after the war, the fact that capital controls were the only politically feasible instruments to achieve external balance (exchange or interest rate policy were not), and the coordination problem: countries should restore convertibility simultaneously, but restoration was possible only step by step through a code of liberalization within the European Payments Union.

During BW, exchange rates were hardly adjusted, a.o. because of the vaguely defined condition of 'fundamental disequilibrium' and political unwillingness, so there was a great need for financing BoP imbalances. The US dollar became the international key currency, but US trade deficits gradually created an enormous amount of dollar reserves in the world, and turned the BW system into a *de facto* dollar standard. As most countries needed dollars, the US could neglect the BoP discipline, a *privilege exorbitant* as De Gaulle termed it, but the huge dollar liabilities put an enormous pressure on the credibility of gold convertibility (the Triffin-problem). Special Drawing Rights (SDR's) were meant to replace the dollar as an international reserve, but at the time they were issued (1970's) world liquidity was already too high. The reasons for their delayed introduction were political: the US were afraid to lose their privilege, Germany was afraid of inflationary pressure, and there was also a dispute about the North-South distribution of the SDR's.

One may conclude that it is more surprising that the BW system held so long, than that it finally blew up. The end came when international support for the system stopped: the gold pool was suspended, the US kept on refusing to devalue and other countries (Germany) refused to intervene any longer, while the markets rushed out of the dollar. The persistent overvaluation of the dollar - a 'fundamental disequilibrium' - caused the system to break down. These experiences have shown on the one hand the difficulty of operating a system of pegged rates, in the face of high capital mobility which impedes any controls on international flows. On the other hand, they have shown that such a system needs a high level of international political and financial cooperation, which broke down during the late 1960's.

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Summary by Jos Jansen (CentER) on:

John Moore
'Debt, Aggregate Fluctuations and Financial Intermediation'

In his three lectures John Moore illustrated the theory of incomplete contracts by discussing models of debt contracts. Complete contracts are contracts in which payments can be made dependent on all relevant contingencies. Complete contracts are not renegotiated along the equilibrium path. In a lot of real life situations it is not possible to write or enforce complete contracts. The impossibility to write complete contracts can be caused by the fact that some contingencies could only be observed by the parties that write the contract at high cost. The impossibility to enforce a contract can be a result of the fact that not all contingencies are observable to a third party like a court: these are nonverifiable contingencies. In those instances only incomplete contracts can be written. Although one can model more realistic situations by using incomplete contracts, the assumptions concerning the contingencies that are contractible will be ad hoc assumptions. John Moore's research strategy is to accept the ad hoccery of the incomplete contract assumption, and develop a theory given a realistic sort of incomplete contract.

Lecture 1: Theories of Financial Contracting and Debt

John Moore's first lecture gave an introduction to a theory of incomplete debt contracts. He is interested in the following debt contracts. An entrepreneur borrows money from an investor to finance a project that yields nonverifiable monetary returns, and promises to make certain repayments. Unless the entrepreneur defaults, he retains control of the project assets. If he defaults, (a fraction of) his project assets will be liquidated.

The problem is that liquidation of the assets gives a lower monetary return than continuing the project. The monetary returns from liquidation accrue to the investor, while the returns from continuing the project are nonverifiable and can be diverted (or 'stolen') by the entrepreneur. The entrepreneur has all the bargaining power in the renegotiation over debt contracts, which means that he can bribe the investor to accept an unfavourable settlement, once the contract is signed. This could make the investor decide not to sign the debt contract in the first place. Liquidation (or the threat of liquidation) is often necessary to secure the investor against entrepreneurial default. That is, the project assets are used as a collateral in the debt contract.

This problem is illustrated in a basic two-period diversion model. An entrepreneur wants to borrow money from an investor to finance his project. In a *debt contract* an entrepreneur and an investor agree on a loan and a repayment for the first period. If the entrepreneur repays the agreed amount, he keeps control and has the right to carry on with his project until period 2. If he does not make the repayment, the investor has the right to liquidate the project's assets. The project yields an nonverifiable monetary return in the first period. Dependent on the repayment made after the first period, a fraction of the project's assets might be liquidated. The entrepreneur can, however, propose to renegotiate the contract. The fraction of the project's assets that has not been liquidated yield a nonverifiable monetary return in the second period. The (threat of) liquidation of the project's assets and loss of second-period monetary returns that accompanies liquidation, could provide the entrepreneur with a sufficient incentive to repay his debt.

To make the model nontrivial, Moore assumes that it is always first-best not to liquidate the project assets, the project has positive net present value, and the assets depreciate. Then the entrepreneur has the incentive to repay as much as possible from his first-period monetary return and as little as possible from liquidation of his assets. Because the entrepreneur has all the bargaining power in the contract renegotiations, the contract will be such that the investor breaks even on his investment - that is, the loan equals the debt repayment - and the debt repayment can never be more than the first-period liquidation value of the project's assets (the *entrepreneur's no-default constraint*). And the loan must be big enough to cover the cost of starting the project. Thus, the first necessary condition under which a debt contract is signed is that the cost of starting the project should not exceed the project's first-period returns to liquidation of its assets. If this inequality is a strict one, then there is a continuum of first-best debt contracts. The second necessary condition is the *entrepreneur's participation constraint*: he will only sign a debt contract if it yields a positive net present value, given the fraction of liquidation. Under these conditions, ex-post inefficient contracts (contracts under which liquidation of a fraction of the project's assets occurs) are signed if the first-period monetary return is too small to cover the debt payment, because the entrepreneur cannot credibly commit to repaying any debt from second-period returns. Ex-ante inefficiency (not signing a contract despite the fact that the project's present value exceeds its cost) occurs if the required loan exceeds the liquidation value of the project's assets, because the entrepreneur will renegotiate the debt repayment down to the project asset's liquidation value.

The following *extensions* are made to this two-period model. First, the project can yield monetary returns for finite number of periods. Again there could be a continuum of first-best contracts. In particular, if there is a continuum of first-best contracts, there is a fastest repayment path (the entrepreneur's participation constraint is binding), and a slowest repayment path (the entrepreneur's no-default constraint is binding). Second, the multiplicity of first-best debt contracts is reduced when the monetary returns to the project and its liquidation values are uncertain. This was illustrated by two examples. Third, borrowing from multiple investors can make strategic default less attractive, because renegotiation is more likely to break down. With multiple investors an individual investor could take a free ride on the other investors' willingness to renegotiate the contract by refusing to renegotiate the contract himself. If every investor thinks this way, this reduces the entrepreneur's opportunities to renegotiate his debt contract. Not only strategic default but also productive renegotiation will become less attractive. Fourth, strategic default can also be discouraged by borrowing under different debt contracts. One could, for example allow for long- and short-term debt contracts. In each period different investors will have different (conflicting) incentives concerning renegotiating the entrepreneur's debt.

Lecture 2: Credit Cycles

The second lecture examined the possibility that a small, temporary productivity shock to entrepreneurs can cause large, persistent fluctuations in output and asset prices. The special feature of the model, compared to the model(s) of the first lecture, is that it introduces a market for collateralized assets. In this setting the entrepreneur's credit limits are affected by the price of the project's assets. And these prices are affected by the size of the credit limits. That is, in this lecture the credit limits are *endogenously* determined and interact with the asset prices. Another difference with the model of the first lecture is that there is an infinite number of periods, and investors and entrepreneurs can write debt contracts in each period. Production today yields output tomorrow. There is a fixed amount of asset supply in the economy. Entrepreneurs have a constant returns to scale production function that depends on the amount of assets only, and which is such that they will consume a fixed non-tradeable proportion of their production. The other portion of production is tradeable. As in the first lecture, the entrepreneur's technology is idiosyncratic: by taking away the entrepreneur's control over (a fraction of) the project the investor can only get the liquidation value of (a fraction of) the project's assets. Entrepreneurs need a loan to finance their projects. Investors are not credit-constrained and produce only tradeable output from assets with an increasing, concave production function. As before, investors will be creditors to entrepreneurs.

The interdependency of credit limits and asset prices give rise to an intertemporal multiplier process after a temporary, negative productivity shock occurs. This process consists of two multiplier effects. First, there is a *static multiplier effect*.

The productivity shock reduces the net present value of the asset's monetary returns to the entrepreneurs. This reduces their net worth and the loan they can get to finance their project. Because entrepreneurs are credit-constrained, they are forced to reduce their demand for assets. To clear the market, investor's asset demand must increase. This happens when their opportunity cost of owning assets falls. Keeping the future constant, investors' opportunity cost decreases if the price of current assets decreases. But a decrease in today's asset price reduces the entrepreneurs' net worth still further. Second, there is a *dynamic multiplier effect*. For the static multiplier effect we kept the future constant, but the future is not constant. Because the negative productivity shock causes a reduction in the entrepreneurs' demand for assets, this hurts them in the next period. Their next-period's monetary returns drop, which reduces their credit-worthiness and, consequently, their next-period's demand for assets. To clear the next-period's asset market, the asset price must fall. The effect emerges for all subsequent periods. After linearizing around the steady state, the dynamic multiplier effect appears to exceed the static multiplier effect. The relative percentage change in the price of assets is not very different from the productivity shock. The relative percentage change in the entrepreneurs' holdings of the asset exceeds the shock. This means that a temporary productivity shock causes significant and persistent changes in asset prices and entrepreneurs' asset holdings. These effects are not present in the a first-best economy without credit constraints.

John Moore extends this model in two directions. The first extension to the model is made by introducing *ex-post heterogeneity* of entrepreneurs. This is done by assuming that only a fraction of the entrepreneurs have the opportunity to buy assets. An entrepreneur who cannot invest in a certain period will pay off his debt, and an entrepreneur who can invest, will invest. If there is a nontrivial heterogeneity of entrepreneurs, this will give rise to damped oscillations and decays of output and asset prices around the steady state. This can be explained by observing the following. A rise in yesterday's asset holdings gives an entrepreneur more assets today, which enables him to borrow more. However, if the entrepreneur borrowed more yesterday, he will have a greater debt today, which restricts his ability to buy more assets today. Moore's second extension to his model is to allow, besides irreproducible assets, for *reproducible assets* in the entrepreneurs' production function. Entrepreneurs can use a fraction of their output to obtain reproducible assets. Reproducible assets depreciates and are idiosyncratic (it cannot be used as a collateral in a debt contract). The presence of reproducible assets reduces entrepreneurs' dependency for irreproducible assets. This has two sources. First, the entrepreneurs' net worth includes the value of yesterday's investments in reproducible assets. Second, entrepreneurs' demand for irreproducible assets becomes less sensitive to a rise in investors' future opportunity cost of holding irreproducible assets. This increases the degree of persistence and reduces the volatility caused by the shock. On top of that, it shifts the volatility from asset holdings to asset prices. This means that it is possible to generate persistent cyclical movements of aggregate output and asset prices in a deterministic model from a temporary productivity shock.

Lecture 3: Bank Runs, Liquidity Provision and Credit Chains

Moore's third lecture concerned financial intermediation by banks. The role of banks is restricted to the provision of demand deposits. The usefulness of demand deposits to the economy was illustrated in a three-period *adverse selection* model. The model is composed as follows. There are two types of consumers: short- and long-living consumers. The fraction of short-living consumers in the economy is fixed and exogenously determined. Short-living consumers can only consume goods in the second period. Long-living consumers can only consume in the third period, and can store second-period goods (without depreciation) for third-period consumption. In the first period each consumer, ignorant of his type, puts in one unit of asset. At the beginning of the second period each consumer privately observes his own type. The production process can be interrupted at the second period, yielding one unit of a consumption good in that period, or can be continued, yielding more than one unit of consumption in the third period. Consumers are risk averse. If there are only competitive (non-insurance) markets in claims on future consumption goods, then the final allocation is the same as in autarky. This allocation is not optimal, because consumers would be better off if they were able to get insurance against the outcome of being a short-living consumer. Because consumers' types are only privately observable (and nonverifiable), complete markets with state-contingent claims are ruled out. If there were insurance possibilities, the optimal allocation would be attainable and incentive compatible: due to the production technology the short-living consumers never have an incentive to pretend to be long-living consumers, and the optimal allocation is such that long-living consumers strictly prefer to claim that they enjoy long lives. This means that the state-contingent claims outcome can be implemented by a revelation mechanism. The optimal allocation can also be implemented by introducing a bank in the economy that issues the following demand deposits. Each consumer can deposit one unit in the first period. The consumers that withdraw in the second period, receive at least one unit of the good, on a first-come-first-serve basis until the bank's resources dry up. Any resources that are left at the bank in the third period are allocated to the remaining depositors. In this setting the optimal allocation is implemented as a Nash equilibrium: all short-living consumers withdraw in the second period, and all long-living consumers withdraw in the third period. There is, however, a second Nash equilibrium in which there is a bank run: all consumers withdraw in the second period. This second Nash equilibrium is Pareto dominated by the autarky allocation. There are two ways to rule out bank runs. First, the government could provide savings-and-loans insurance against bank runs. If bank managers incur a nonverifiable effort to improve the bank's liquidity, a government's guarantee would give them incentives to choose low incentives. Second, banks can suspend convertibility of their deposits by committing to a maximum fraction of first-period withdrawals. Bank runs are ruled out and the optimal allocation is implemented if this fraction is (1) higher than the fraction of short-living consumers, and (2) small enough such that the bank will have enough money to serve the long-living, not-withdrawing consumers in the third period, after the maximum first-period fraction of consumers have withdrawn in the second period.

Demand deposits need not always be useful to the economy. Moore illustrated this by slightly changing the model of the previous paragraph by introducing problems of *moral hazard*. Again there are risk averse short- and long-living consumers who want to make optimal investment decisions. The investment opportunities have changed in the following sense. In the first period each consumer, ignorant of his type, can divide his initial endowment between short- and long-term investments. The short- and long-term investment yield a short- and long-term rate of return, respectively. The liquidation value of the long-term project is smaller than the short-term rate of return. A long-living consumer can reinvest a short-term investment. The rate of return to this second-period short-term investment is not known in the first period, and this reinvestment is not observable to others. The first-best allocation is such that no liquidation of long-term investment occurs. There will always be enough long-living consumers whose short-term investment can be used to provide for the needs of short-living consumers. Given the rate of return on short-term investments, the choice between consumption and investment in the second period depends on the realization of the third-period return to short-term investments. The third-period short-term rate of return determines the tradeoff between the aggregate second- and third-period consumption. This first-best allocation need, however, not be incentive compatible: given the fist-best allocation, long-living consumers could prefer to pretend that they are short-living consumers (and reinvest their returns from short-term first-period investments). The second-best allocation may provide for premature liquidations of long-term investments. Again this second-best can be implemented by introducing competitive banks that offer deposits, and the bank run equilibrium can be ruled out by suspension of convertibility. Such a solution gives the following allocation of risk. Short-living consumers bear the valuation risk of long-term investments, and long-living consumers bear the reinvestment-opportunity risk of third-period short-term investment.

After this Moore discussed some preliminary work on credit chains.

John Moore's lectures were very intense and instructive. I am grateful that I have had the opportunity to see such a great economist in action.

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Semi–Parametric Econometrics *

Thomas M. Stoker

Report by Govert Bijwaard (VU, TI)

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In his lectures professor Thomas Stoker gave a broad overview of semi– and non–parametric methods used in econometrics. Many different applications were used to illustrate the concepts. The first lecture was concerned with the motivation for semi–parametric methods in econometrics. The basic benefits and drawbacks of parametric, semi–parametric and non–parametric methods were provided and illustrated with some applications. The second lecture gave a overview of today's non–parametric methods and the problems involved, with an application to CO_2 emissions. The third lecture was devoted to examples of index models and their semi–parametric estimation. In the fourth lecture professor Stoker focused on Average Derivatives Estimation (ADE), the different ways of estimation and other related concepts. Finally, in the last lecture a framework for specification testing using non–parametric and semi–parametric methods was presented. Stoker showed how Semi–parametric methods can be used in all kinds of applications to reveal the data structure and the underlying generating process.

Motivation for Semi–Parametric Estimation

Loosely speaking semi–parametric (SP) methods maintain an interpretable structure on the parameters of most concern, but do not rely on specific assumptions about features of secondary importance.

Although interpretation and summary under parametric assumptions are usually very easy to make, the restricted functional relations may be very wrong. So wrong, that even 'good' parametric results can be very misleading. However, for non–parametric approaches, although of greatest flexibility with minimal assumptions, interpretation and summary can be difficult or even impossible. Another disadvantage of non–parametric (NP) methods is the 'curse of dimensionality', the rate of convergence of NP estimates declines rapidly with the number of predictors included.

In SP methods flexibility is introduced in a controlled way, focusing on relationships of primary interest. Interpretation and summary is maintained through limited parameterization. The main impediment of NP methods, the

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One of the first SP methods applied was the Least Absolute Deviation estimator, which is the natural estimator under conditional median independence assumption. The only assumption on the error term used for estimation is a median of zero. This method still focuses on the distribution of the disturbance. However, we can consider more general relationships among variables, like the single index model; $y_i = G(x_i'\beta) + \epsilon_i$, where $\mathrm{E}(\epsilon|x) = 0$ and the function G is unknown.

Stoker spent most of the time on applications of single index models and variations thereof, especially the partial index model ($y_i = G(x_{1i}, x_{2i}'\beta_2) + \epsilon_i$). He also pointed out that SP methods can be used to guide the choice of the functional form of the parametric modelling, or to test the parametric model. The NP and SP methods were illustrated by data on rice prices in Thailand and household gasoline demand in the United States.

Local Averages and other Non–Parametric Methods

Before turning to SP estimation professor Stoker gave a brief overview of NP regression methods. He considered three different types. First, the Global expansions, like polynomial–, Hermite polynomial–, and Fourier series approximations. Second, local average smoothing methods, like kernel–, nearest neighbour– and local linear regression. Finally, he mentioned other local methods, like Splines and wavelets. The methods differ in ability to approximate different features. In SP procedures first order asymptotics are invariant to the NP method used, although second order asymptotics, goodness–of–fit test, depend on the NP method.

The main focus was on the local average estimation methods. The most broadly used local average method in econometrics is kernel regression. In kernel estimation the regression value at a certain point, x_0, is calculated by a weighted average of the dependent variable around that point. The weights depend on the proximity of the observed data points, x_i, to x_0, relative to a window width, h and a kernel function. The bias and variance of this estimation method are inversely related. An 'optimal' bandwidth can be chosen that minimizes the mean squared error.

Professor Stoker briefly mentioned the nearest neighbour estimators and locally linear regression methods and their relation with kernel estimation. The main disadvantage of all local these methods is that NP estimators typically display a rate of convergence slower than averages based on the full sample, or parametric methods. In fact, the convergence of local average estimation depends on the dimension of the problem. This 'curse of dimensionality' can be deflected by SP estimators.

The use of NP methods was illustrated with data on CO_2 emissions. Another disadvantage of NP methods was shown very clearly with these data; out—of–sample prediction depends heavily on the method used.

Index Models and Various SP Methods

Models that employ linearity restrictions are often inappropriate when responses are limited, such as discrete and bounded choices. Limited Dependent Variables (LDV) models address these problems. These models are nonlinear by necessity and depends explicitly on the stochastic features of the model. Consequently, for such models, SP methods have a natural appeal, as ways of measuring parameters that are robust to the stochastic features.

Typical LDV models are the binary response models, in which the dependent variable takes only the value 1 or 0, and we assume that the actual value is the response to a choice decision. When we assign utilities to each decision, then option 1 is chosen if the utility associated with 1 is greater than the utility associated with 0. If utility is given a stochastic formulation conditional on some, observed, covariates, the empirical model can be based on the conditional mean $\mathrm{E}(y|x) = F[\phi(x)]$, where F is the c.d.f. of the disturbance term in the utility representation and $\phi(x)$ is the utility difference.

Parametric examples include the probit and logit formulation with $\phi(x) = x'\beta$ and a normal or a logistic F. An example of a SP approach is the index model that arises when $F[\phi(x)]$ is modelled as $G(x'\beta)$. A SP estimator that measures β up to scale would applicable to problems of this kind.

An alternative SP approach is to base inference on conditional median restrictions, which leads to least absolute deviations (LAD) estimation, which was proposed as one of the first SP methods to be studied. But the LAD has many unappealing features; the estimator is not unique, the identification issues are delicate and, the LAD estimator is not $\sqrt{N}$ consistent. However, the basic motivation for estimators on median restriction, or more general quantile restrictions, is based on how the median operator commutes with monotonic functions. If $\gamma(x)$ is the conditional median of y and $w(.)$ is a nondecreasing function that is continuous at $\gamma(x)$, then $w(\gamma(x))$ is the conditional median of $w(y)$.

A natural extension of the binary response model is a models with multinomial responses or ordered responses. Another type of LDV models are censored and truncated regression models. A variable that varies continuously but has several observations at a bound is modeled as a censored model. A variable that is only observed when it obeys a bounding condition is modeled as a truncated model. The same SP methods can be applied to these bounded continuous response models. Alternatives methods are symmetric trimming and pairwise differencing, both methods that try to circumvent the estimation problems due to asymmetry of the residuals. The symmetric trimming method uses the symmetry of the error distribution to restore symmetry by censoring or deleting at the mirror bound. Pairwise differencing restores the symmetry by defining a transformation $e_{ij}(b)$ such that e_{ij} has the same distribution as e_{ji} when $b = \beta$.

To round the third lecture professor Stoker discussed various general ideas directed to estimation of index models. A Least squares estimation, or projection pursuit, tries to minimize $\sum[y_i - G(x'_i\beta)]^2$. This approach is computational very demanding, because we minimize with respect to G and β simultaneously.

An alternative approach is to use the smoothness information on the distribution of the regressors x. Work on these procedures was originally stimulated by the following remarkable fact:

> If the model is in index form $\mathrm{E}(y|x) = G(x'\beta)$, and x has a joint normal distribution, then the least squares coefficients of y regressed on x (and a constant) consistently estimate β up to scale.

Average Derivatives; Concepts and Applications

Assume that the index model form $m(x) = \mathrm{E}(y|x) = G(x'\beta)$ has G almost everywhere differentiable, and x is a continuously distributed vector with density $f(x)$, that vanishes on the boundary of x values. The local effects of changing x on y are given as the derivative $m'(x) = \partial m/\partial x$, and the (unweighted) average derivative is the mean of these effects over the population; $\delta = \mathrm{E}_x[m'(x)]$. In index models the average derivative is a concept of practical interest, since $\delta = \mathrm{E}[dG/d(x'\beta)]\beta = \gamma\beta$ is proportional to β. We can equivalently replace β by δ, redefining G so that $m(x) = G(x'\delta)$ which has G obeying the normalisation $\mathrm{E}[dG/d(x'\delta)] = 1$, or that δ is scaled so that y and $x'\delta$ are, on average, related in a 1–1 manner. This says that the values of δ are interpretable as 'generalised' effect or coefficients.

Among the various applications of average derivative are the weights of SP index model, optimal tax formulae, 'income effects' matrix and, test of derivative constraints. In partial index models average derivatives are easily implemented.

With this motivation in hand we turn to the estimation of average derivatives. Let $l(x) = -f'(x)/f(x)$, or the (translation) score vector. Then the average derivative is $\delta = \mathrm{Cov}[l(x), y] = \{\mathrm{Cov}[l(x), x]\}^{-1}\mathrm{Cov}[l(x), y]$. Let $\hat{m}'(x)$, $\hat{m}(x)$, $\hat{f}(x)$ and $\hat{l}(x) = -\hat{f}'(x)/\hat{f}(x)$ be consistent NP estimators (typically kernel estimators) of $m'(x), m(x), f(x)$ and $l(x)$. Then we could define the following Average derivative estimators:

- Direct ADE

$$\hat{\delta} = n^{-1}\sum_{i=1}^{n} \hat{m}'(x_i),$$

- IV estimator

$$\hat{d} = \left[\sum_{i=1}^{n} \hat{l}(x_i)(x_i - \bar{x})\right]^{-1} \sum_{i=1}^{n} \hat{l}(x_i)(y_i - \bar{y})$$

- Density weighted IV estimator

$$\hat{d}_f = \left[\sum_{i=1}^{n} \hat{f}'(x_i)(x_i - \bar{x})\right]^{-1} \sum_{i=1}^{n} \hat{f}'(x_i)(y_i - \bar{y})$$

The asymptotic distribution theory of the above estimators can be derived using U–statistics (for kernel density estimators). All these estimators are asymptotically normal and do not depend on the NP method used for estimation of the densities.

The ADE techniques were illustrated with some applications. First collision data was considered, for which a probit specification was rejected. Another empirical example was on the effect of air pollution on Boston housing prices. Finally, Stoker analysed the price effects in household gasoline data

Specification Testing Using NP and SP methods

The last lecture was primarily based on the paper Stoker wrote jointly with Aït–Sahalia and Bickel[1] in which goodness-of-fit differences between restricted and general regression were analysed. The basic question they tried to answer was whether a dimension reduction can be achieved by omitting a variable from the model. The general model they considered is NP and the restricted model can either be parametric, SP or (reduced dimension) NP.

Suppose we can split the vector of regressors x into two vectors $x = (w, v)$. The basic question is whether we can omit v from the regression of y on x. For this case they derived a goodness-of-fit statistic of beauty simplicity

$$\hat{\Gamma} = \frac{1}{n} \sum_{i=1}^{n} \left[\hat{m}(w_i, v_i) - \hat{M}(w_i) \right]^2 \omega(\hat{f}(w_i, v_i)),$$

where $\hat{m}$ and $\hat{M}$ are regression estimators of the general and the restricted regression and $\omega(.)$ is a weighting function for trimming on low density. Under the null hypothesis that v can be omitted $\hat{\Gamma}$ goes to zero.

The distribution of this test statistic can be derived using von Mises expansion. A singularity in the statistic occurs because the dominating terms in the expansion differ under the alternative hypotheses. Under fairly assumption Aït–Sahalia, Bickel and Stoker showed that $\hat{\Gamma}$ can be transformed to a standard normal distributed variable. Stoker pointed out that the advantages of this approach are twofold. First, it covers general testing situations, where kernel regression is used and, second, the goodness-of-fit statistic is easy to interpret.

In an empirical illustration Stoker considered testing the Black–Scholes formula in option prices models. The Black–Scholes formula assumes a certain parametric relation between the call price and the strike price of an option, in which the volatility parameter defines the relation. Stoker tested the normal parametric Black–Scholes model against a SP formulation for data on daily S & P index options from CBOE and found that the parametric model would be rejected.

[1] Y. Aït–Sahalia, P. J. Bickel and T.M. Stoker,(1994), *Goodness-of-fit tests for regression using kernel methods*

New AIO's/OIO's

Drs. D.J.C. (Dick) van Dijk (EUR)

Begeleider: Dr. P.H.B.F. Franses
Onderwerp: Model selection in nonlinear time series analysis

Ing. J. (Jan) Fidrmuc, MA (CentER, KUB)

Begeleiders: Prof. H. Uhlig, Dr L. Meijdam, Prof. J. James
Onderwerp: Economics of Transition

Drs. F.J.G.M. (Franc) Klaassen (KUB)

Begeleiders: Prof.dr H. Huizinga, Dr F. de Jong
Onderwerp: Effecten van wisselkoersrisico op handel

Drs. H.L. (Hans) van Kranenburg (RL)

Begeleiders: Prof.dr F.C. Palm, Dr G.A. Pfann
Onderwerp: Intertemporal industry models with entry and exit and factor market imperfections

Drs. A. (Alexandre) Possajennikov (CentER, KUB)

Begeleider: Prof.dr E.E.C. van Damme
Onderwerp: Dynamic Game Theory

Drs. M. (Marieke) Rensman (RUG)

Begeleiders: Prof.dr S. Kuipers, Prof.dr R.R. Fremdling, dr B. van Ark, dr G. Kuper
Onderwerp: Produktiviteitsverschillen en schaaleffecten in Europa, 1870-1990

Drs. P. (Ping) Zhang (KUB)

Begeleider: Dr M. Steel
Onderwerp: Nonlinear time series models in a Bayesian framework

Ph.D. Completions

Rudy Douven

Policy Coordination and Convergence in the EU
Katholieke Universiteit Brabant, 20 september 1995

Klaas Knot

Fiscal Policy and Interest Rates in the European Community
Rijksuniversiteit Groningen, 12 oktober 1995

Ronald Mahieu

Financial Market Volatility - Statistical Models and Empirical Analysis
Rijksuniversiteit Limburg, 24 november 1995

agenda

03-11-1993 ↓ 08-12-1995	Block II, Utrecht-courses
11-12-1995 ↓ 15-12-1995	nake-workshop
02-02-1996 ↓ 08-03-1996	Block III, Utrecht-courses
15-03-1996	AIO-Presentation Day
22-03-1996 ↓ 03-05-1996	Block IV, Utrecht-courses
03-06-1996 ↓ 07-06-1996	nake-workshop

REGISTRATION FORM

nake - lnbe workshop 11 - 15 December 1995, Utrecht

Name ....

Department ....

Institute ....

Address ....

Postal code/Place..

Phone: .... E-mail: ....

AIO/OIO/Otherwise..

(Please circle what is applicable)

Would like to have a private consultation with:Bhattacharya, Brennan, Hansen

Will write a report on the lectures by: Bhattacharya, Brennan, Hansen

Will attend:

the courses on:Monday / Tuesday / Wednesday / Thursday / Friday

reception (Monday)	yes / no
workshop dinner (Thursday)	yes / no
Are you a vegetarian?	yes / no

Wants a hotel room for: Mon/Tues Tues/Wedn Wedn/Thurs Thurs/Fri

Will share a room: yes / no *(Single room ± ƒ 130, double ± ƒ 170)*

with..

Remarks:

Please return this form <u>before 24 November 1995</u> to the nake-secretary.

Registration form Utrecht courses

Block III and IV, 1996

Name: ....

Department: ....

University: ....

Address: ....

....

Phone no. ....

Email ....

I will attend the following courses (please encircle):

<u>Block III</u>

1. Morgan
2. van Winden
3. de Zeeuw
4. Ridder/Wansbeek
5. Jager/de Jong

<u>Block IV</u>

6. Ellman
7. Peters/Storcken
8. Ridder/Wansbeek
9. Viaene/de Vries
10. Olson/Schram/van Winden

Please return this form as soon as possible (preferably before) to the nake secretary: José Dijkzeul
Secretariaat NAKE
Roetersstraat 11
1018 WB Amsterdam