

From the Lab

LABORATORY FOR AGGREGATE ECONOMICS AND FINANCE

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

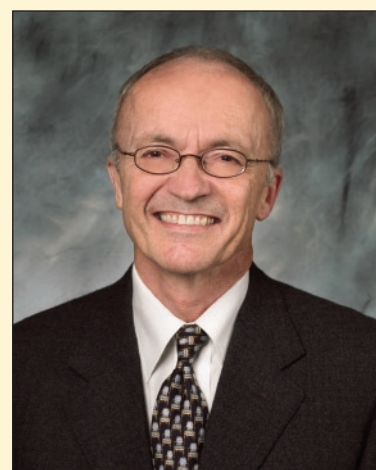
WINTER 2007

Director's Message

Two years ago, the donor of my chair, Jeffrey Henley, the chairman of the Oracle Corp., sprung the idea that UCSB ought to create an institute for macroeconomics. Our Chancellor, Henry Yang, liked the idea and has supported its creation financially and in other ways. The Laboratory for Aggregate Economics and Finance (LAEF) was established in July 2005. As you'll see in this issue, we recruited an outside advisory board of first-rate scholars. LAEF is located in North Hall on the UCSB campus, in the vicinity of the Economics Department. It provides an environment in which to conduct topical research in quantitative aggregate theory by resident and visiting scholars.

Our overall mission is to address important questions on growth and fluctuations in national, or aggregate, economies. For each activity under the auspices of LAEF, we aim to maintain a clear focus on a particular question or anomaly or puzzle. That is what will produce new findings and clarify where the profession stands on the respective issues. The activities may include:

- Workshops in which about ten scholars from anywhere in the world spend one-to-two weeks. During that period, the participants will make occasional presentations, but the focus will be on working on aspects of the issue at hand while in residence.
- Extremely focused two-to-three-day conferences with five or six presentations per day. The number of outside participants may be 15-20.
- An environment in which two or three researchers (one of whom could be from UCSB) get together for about a month or more (in some cases, possibly as part of a sabbatical) to work on a particular question or issue.
- Postdocs (and, under some circumstances, possibly even predocs) spending time at LAEF.
- Making modern research findings and approaches accessible in the class room, especially at undergraduate and master's levels. Such efforts may build upon the progress already made in co-operation with the Department of Information Science and Media Studies at the University of Bergen. So far, they fully support a closed-economy real-business-cycle model, with ability for students to produce tables of business-cycle statistics for data and model, along with plots of impulse responses. On a more limited basis, they also support an open-economy model, which adds focus on aggregates such as the terms of trade and the trade balance.



Finn Kydland

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We plan to report regularly to the profession. In this inaugural issue, we provide a detailed account of our first conference, "Macroeconomics of Imperfect Risk Sharing," and our first workshop, on "Housing." In addition, we co-sponsored, with the Department of Economics, a conference to celebrate the 20th anniversary of Mehra's and Prescott's influential article on the equity premium puzzle. Finally, we've had the pleasure of welcoming our first multiple-week visitor, Espen Henriksen of the University of Oslo.

LAEF ADVISORY BOARD, 2005-2007

The Laboratory for Aggregate Economics and Finance is privileged to have four leading macroeconomists serving in an advisory capacity. The role of the advisors is to identify economic questions, issues or anomalies which may be the subject of conferences and/or workshops sponsored by LAEF, with each advisor bringing his diverse research and professional experience into the decision-making process. Moreover, the advisors may suggest leaders of these events as well as participants who are likely to make the events as fruitful as possible from a scientific standpoint. In its initial year of existence, the advisors' efforts resulted in two very successful events: a two-day "Macroeconomics of Imperfect Risk Sharing" conference, and a week-long Housing Workshop. Between them, the two events brought thirty world-class macroeconomists to the UCSB campus, interacting professionally with Economics Department professors and graduate students. The advisors are Professors Gary Hansen (UCLA), Per Krusell (Princeton), Victor Ríos-Rull (University of Pennsylvania), and Richard Rogerson (Arizona State University).



Gary Hansen

Gary Hansen is currently Professor and Chair of the Department of Economics at UCLA, and Research Associate at the National Bureau of Economic Research. His past appointments include visiting professorates at the University of Brasilia (Brazil) and the University of Pennsylvania. He has been at UCLA since 1987.

Professor Hansen received his Ph.D. from the University of Minnesota. His fields of concentration include macroeconomic theory and policy, monetary economics, and aggregate labor economics. He has received numerous honors, awards, and grants during his professional career, including a William Fulbright Award, and several National Science Foundation Grants, among others. His professional service includes current and previous editorships of many academic journals.

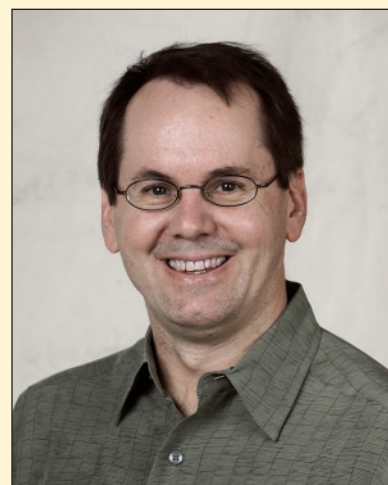
Professor Hansen's seminal work is "Indivisible Labor and the Business Cycle," originally printed in the *Journal of Monetary Economics* in 1985, and reprinted several times since. His most recent publications include "Capacity Constraints, Asymmetries, and the Business Cycle," with Edward G. Prescott, published in the *Review of Economic Dynamics* in 2005, and "Why Have Business Cycle Fluctuations Become Less Volatile?" with Andre Arias and Lee Ohanian, forthcoming in *Economic Theory* in 2007.

Richard Rogerson

Rondthaler Professor of Economics at Arizona State University, Richard Rogerson received his Ph.D. from the University of Minnesota. His past academic appointments include positions at the Universities of Pennsylvania, Minnesota and Rochester, as well as Stanford and New York Universities. He has been at ASU since 2001.

Professor Rogerson has received many National Science Foundation grants, the most recent to study "The European Employment Problem." His professional activities include organization of meetings and conferences in the United States, Canada and Europe, and current editorial positions at the *American Economic Review* and the *Review of Economic Dynamics*.

Professor Rogerson's teaching and research interests are in the areas of labor economics and macroeconomics. His publications have appeared in many of the most important journals in the Economics profession, including the *American Economic Review*, the *Journal of Political Economy*, and the *Review of Economic Studies*. His publications include papers on business cycle fluctuations, the effects of labor market regulations, financing of public education, and development; most notably, two pioneering works: "Indivisible Labor, Lotteries and Equilibrium" (*Journal of Monetary Economics*, 1988), and "Homework in Macroeconomics: Household Production and Aggregate Fluctuations," joint with Jess Benhabib and Randall Wright (*Journal of Political Economy*, 1991). This latter work spawned a large body of literature on the interaction of household and market production.



LAEF ADVISORY BOARD, 2005-2007



Per Krusell

Per Krusell has been Professor of Economics at Princeton University since 2004. He is also currently a part-time Professor at the Institute for International Economics Studies in Sweden, and Research Consultant at the Federal Reserve Bank of Richmond. His prior appointments include positions at the Universities of Rochester and Pennsylvania. He is also Research Affiliate with the National Bureau of Economic Research and the Centro de Altísimos Estudios Ríos-Perez (CAERP).

Professor Krusell received his Ph.D. in Economics from the University of Minnesota. His research interests include macroeconomics, economic growth, political economy, and inequality.

Professor Krusell serves as a member of the Scientific Advisory Boards for The Institute for Advanced Studies, Vienna, and for the Centro de Altísimos Estudios Ríos-Perez (CAERP). He is a member of the Royal Swedish Academy of Sciences, an adjunct member of the Prize Committee for The Bank of Sweden Prize of Economic Sciences in Memory of Alfred Nobel, and a Fellow of the Econometric Society. He has received numerous National Science Foundation grants over his professional career, as well as grants and awards from various other prestigious institutions. He is currently editor of *BE Journals in Macroeconomics* and foreign editor of the *Review of Economic Studies*. Professor Krusell has supervised many graduate students in the United States, Canada, and Europe.

Professor Krusell's 1998 article in the *Journal of Political Economy*, "Income and Wealth Heterogeneity in the Macroeconomy" (joint with Anthony Smith), was pioneering in the use of heterogeneous-agent models. His other more recent notable work includes "Consumption-Savings Decisions with Quasi-Geometric Discounting" (*Econometrica*, 2003), joint with Anthony Smith, and "The Dynamics of Government: A Positive Analysis" (*Journal of Monetary Economics*, 2005) joint with John Hassler, Kjetil Storesletten, and Fabrizio Zilibotti.

José-Víctor Ríos-Rull

Currently Professor of Economics at the University of Pennsylvania, José-Víctor Ríos-Rull received his Ph.D. in Economics from the University of Minnesota. Professor Ríos-Rull also served as Senior Economist at the Federal Reserve Bank of Minneapolis. His research interests include macroeconomics with special concerns about heterogeneity and bankruptcy; demographics, specifically, family formation, aging, fertility, and their interplay with macroeconomics; and optimal policy without commitment.

Professor Ríos-Rull has advised graduate students at Carnegie Mellon University, Universidad Carlos III de Madrid, and Universitat Pompeu Fabra, in addition to students at the University of Pennsylvania. He has received numerous grants from the National Science Foundation, among other sources. He was elected a member of the Board of the Spanish Economic Association, and is Research Affiliate of the Center for European Policy Research, and Research Associate of the National Bureau of Economic Research Program on Economic Fluctuations and Growth. He is also a Senior Researcher at the Centro de Análisis y Estudios Ríos Perez, (CAERP). His editorial activities include the *Review of Economic Studies* and the *International Economic Review*, among others.



Professor Ríos-Rull has had numerous publications in many academic journals. He has been a pioneer in the use of calibrated overlapping generations models for addressing important questions. His most notable publications in this area include "Working in the Market, Home Production and the Acquisition of Skills: A General Equilibrium Approach" (*American Economics Review*, 1993), and "Vested Interests in a Positive Theory of Stagnation and Growth," joint with Per Krusell (*Review of Economic Studies*, 1996). His additional important work includes "On the Size of the U.S. Government," joint with Per Krusell (*American Economics Review*, 1999); "Capital-Skill Complementarity and Inequality," joint with Per Krusell, Lee Ohanian, and Giovanni L. Violante (*Econometrica*, 2000); and "Accounting for Earnings and Wealth Inequality," joint with Ana Castañeda and Javier Díaz-Giménez (*Journal of Political Economy*, 2003).

Conference to Celebrate the 20th Anniversary of “The Equity Premium: A Puzzle”

by

Rajnish Mehra and Edward Prescott

October 28-29, 2005



Rajnish and Neeru Mehra, Edward Prescott, and Finn and Tonya Kydland enjoy conversation and refreshments at a reception following the conference.

On October 28-29, 2005, the Laboratory for Aggregate Economics and Finance and the UCSB Department of Economics co-sponsored a conference to celebrate the 20th anniversary of the publication of “The Equity Premium: A Puzzle.” This seminal paper is by Professors Rajnish Mehra of UCSB and Edward Prescott of Arizona State University, co-winner of the 2004 Nobel Prize in Economic Sciences. “The Equity Premium: A Puzzle” is one of the best known papers in financial economics, and has influenced the practice of portfolio management worldwide. The puzzle concerns the inability of standard economic models to replicate the magnitude of the average amount by which a well-diversified portfolio of stocks pays returns in excess of the risk-free rate: the equity premium. The conclusions reached by the authors challenged the accepted paradigms of financial economics

and have set the research agenda in the area for the past two decades. Finding a cogent solution to the equity premium puzzle remains an open question for financial theorists. The conference attracted approximately 30 scholars from all around the world, as well as UCSB Economics professors and graduate students. The conference agenda included the following presentations:

History and the Equity Risk Premium

William Goetzmann (*Yale*) and Roger Ibbotson (*Yale*)

Presenter: William Goetzmann

Discussant: Stephen LeRoy (*UCSB*)

Can Compensation for Cash Flow Risk and Discounting Risk Reconcile the Equity Premium Puzzle: A Quantitative Analysis

Zhiwu Chen (*Yale*) and Gurdip Bakshi (*Maryland*)

Presenter: Gurdip Bakshi

Discussant: Lior Menzly (*Vega*)

Asset Prices and Intergenerational Risk Sharing: The Role of Idiosyncratic Earnings Shocks

Kjetil Storesletten (*U Oslo*), Chris Telmer (*CMU*) and Amir Yaron (*Wharton*)

Presenter: Amir Yaron

Discussant: Stan Zin (*CMU*)

The Loss Aversion/Narrow Framing Approach to the Stock Market Pricing and Participation Puzzles

Nick Barberis (*Yale*) and Ming Huang (*Cornell*)

Presenter: Nick Barberis

Discussant: Ravi Jagannathan (*Northwestern*)

Risk Compensation in Equity Markets?

Ravi Bansal (*Duke*)

Discussant: John Heaton (*Chicago*)

Can Heterogeneity Undiversifiable Risk, and Trading Frictions Explain the Equity Premium?

John Heaton (*U Chicago*) and

Debbie Lucas (*Kellogg Northwestern*)

Presenter: Debbie Lucas

Discussant: Kjetil Storesletten (*Oslo*)

Understanding the Equity Risk Premium Puzzle

George Constantinides (*U Chicago*)

Discussant: Hanno Lustig (*UCLA*)

Panel Discussion

What have we learned in 20 years?

Chair: Edward Prescott

Panel: Lars Hansen (*Chicago*)

Rajnish Mehra (*UCSB*)

Martin Weitzman (*Harvard*)

The conference concluded with a formal dinner which was attended by the conference participants, the UCSB Chancellor and other UCSB administrators.

Macroeconomics of Imperfect Risk Sharing

May 11-13, 2006

On May 11-13, 2006, the Laboratory for Aggregate Economics and Finance sponsored a conference entitled “The Macroeconomics of Imperfect Risk Sharing.” The conference brought together some of the best junior macroeconomics researchers doing both applied and theoretical work on economic models of imperfect insurance. Examples of the issues investigated in this literature are: the welfare gains of eliminating uninsurable individual risk; human capital accumulation with imperfect insurance; the saving behavior of the retirees; the role of labor supply and female participation to the labor market as a self-insurance device; the scope for redistributive government policies; and the insurance mechanisms in developing economies where formal markets are largely absent. Professors Gianluca Violante (*NYU*) and Fabrizio Perri (*University of Minnesota*) acted as organizers of the conference.

The conference began with a kick-off dinner on May 11, and was followed by two full days of presentations on the UCSB campus. Luncheons and a formal dinner with the UCSB Chancellor were also included in the conference schedule.

Visiting participants at the conference were:

Flavio Cunha, *University of Chicago*
Maria Cristina De Nardi, *University of Minnesota*
Martin Gervais, *University of Western Ontario*
Jonathan Heathcote, *Georgetown*
Espen Henriksen, *University of Oslo*
Paul Klein, *University of Western Ontario*
Hamish Low, *University of Cambridge*
Hanno Lustig, *UCLA*
Maurizio Mazzocco, *University of Wisconsin*
Salvador Navarro, *University of Wisconsin*

Nicola Pavoni, *University College London*
Krishna Pendakur, *Simon Fraser University*
Fabrizio Perri, *University of Minnesota*
Luigi Pistaferri, *Stanford*
Chris Telmer, *Carnegie Mellon*
Thijs van Rens, *Universitat Pompeu Fabra, Barcelona*
Gustavo Ventura, *Penn State University*
Gianluca Violante, *New York University*
Ivan Werning, *MIT*
Amir Yaron, *University of Pennsylvania*

Interested UCSB Economics Professors and graduate students also attended the conference.

Summaries of each of the presentations follow. Note that speakers are highlighted in author listings

Session One: MEASURING INDIVIDUAL RISK

Moderator – Chris Telmer

Sources of Lifetime Inequality

Mark Huggett, **Gustavo Ventura** and Amir Yaron

The Evolution of Labor Earnings Risk in the U.S. Economy

Flavio Cunha and James Heckman

Wage Risk and Employment Risk Over the Life Cycle

Hamish Low, Costas Meghir and **Luigi Pistaferri**

Session Two: PRIVATE INFORMATION AND INCOMPLETE MARKETS

Moderator – Finn Kydland

Risk Sharing in Private Information Models with Asset Accumulation: Explaining the Excess Smoothness of Consumption

Orazio Attanasio and Nicola Pavoni

Capital Taxation: Quantitative Explorations of the Inverse Euler Equation

Emmanuel Farhi and **Ivan Werning**

The Irrelevance of Market Incompleteness for the Price of Aggregate Risk

Dirk Krueger and Hanno Lustig

Session Three: TESTING RISK SHARING

Moderator – Fabrizio Perri

Labor Supply and Consumption with Imperfect Risk Sharing: An Analytical Framework

Jonathan Heathcote, Kjetil Storesletten and Gianluca Violante

Measuring Consumption Smoothing in CEX Data

Martin Gervais and **Paul Klein**

Testing Efficient Risk Sharing with Heterogeneous Risk Preferences: Semi-parametric Tests with an Application to Village Economies

Maurizio Mazzocco and Shiv Saini

Session Four: RISK SHARING WITHIN THE FAMILY

Moderator – Gianluca Violante

Tricks with Hicks: The EASI Demand System

Arthur Lewbel and **Krishna Pendakur**

Differential Mortality, Uncertain Medical Expenses, and the Saving of Elderly Singles

Mariacristina De Nardi, Eric French and John Bailey Jones

Explaining Changes in Female Labour Supply in a Life-cycle Model

Orazio Attanasio, **Hamish Low** and Virginia Sanchez-Marcos

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by Orazio Attanasio, Hamish Low and Virginia Sanchez-Marcos

Sources of Lifetime Inequality

by Mark Huggett, Gustavo Ventura and Amir Yaron

“Is lifetime inequality mainly due to differences across people established early in life or to differences in luck experienced over the lifetime?” This is the main question the authors try to answer. To this end, they build a life-cycle general equilibrium model with incomplete markets, where the agents have different learning abilities, accumulate risky human capital, and are subject to idiosyncratic shocks to its accumulation. The authors use men’s data of the Panel Study of Income Dynamics (PSID) to calibrate the idiosyncratic shock process to human capital. Given this process, initial conditions on learning abilities, financial wealth, and human capital are chosen so that the predictions of the model on the mean earnings profiles and the dispersion of earnings over the life cycle match the empirical facts that the former is hump-shaped and the latter is increasing in age. The identification of the idiosyncratic shock process is possible by using data on working individuals who are close to retirement because the theory predicts that their optimal investment in human capital is close to zero.

The authors find that the majority of the variation in both lifetime utility and lifetime wealth can be explained by differences in the initial conditions, as opposed to shocks over the life cycle. Approximately 80% of the variation is explained by initial conditions in their benchmark case. Among the considered initial conditions, learning ability explains the majority of the variation in expected lifetime utility and wealth. This finding contrasts with the results of Storesletten, Telmer and Yaron (2004) whose model predicts that almost 50% of the variation in lifetime utility is due to shocks over the life cycle; however, in that model earnings are exogenous, among other differences. Issues yet to be addressed in this paper are the role of heterogeneity in sensitivity analysis, as well as quantifying the effects of social insurance in the wealth and utility decomposition.

During Ventura’s presentation, questions asked by the audience included the following topics: (1) the identification of the idiosyncratic shocks; (2) how to identify different initial conditions on human capital from initial learning abilities; and (3) the plausibility of the implicit assumption that the estimated process for idiosyncratic shocks is age-invariant and therefore identifiable from individuals who are close to retirement. Ventura responded to the aforementioned questions as follows: (1) Identification of shocks is possible due to the implication that optimal human capital accumulation is close to zero toward the end of the working years; thus, men older than 60 were used to identify that process. These shocks do not depend on the level of human capital. (2) For the identification of initial

conditions, different values for the variance of the shocks to human capital (σ) imply different initial conditions. (3) The authors have not performed any test to verify if the idiosyncratic shock process is age-invariant.

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The Evolution of Labor Earnings Risk in the U.S. Economy

By Flavio Cunha and James Heckman

It has been documented that during the 1970s and 1980s there was an increase in labor earnings inequality in the US. Some researchers have attributed this increase to technological progress that increased the demand for skilled workers more than supply, leading to an increase in the wage gap between skilled and unskilled workers (Juhn, Murphy and Pierce (1993)). Cunha and Heckman show that several of the necessary conditions for that study to be valid are too restrictive or have been challenged in the literature. Instead, the authors argue that uncertainty in the environment in which the individuals took the schooling decision could be a very important factor explaining inequality, which is a hypothesis consistent with the findings of Gottschalk and Moffitt (1994) that: (1) the distribution of ability has changed over time; and (2) an increase in the variance of transitory shocks to wages was observed from the 1970s through the 1980s.

The authors' main idea is to separate what they consider to be uncertainty from heterogeneity, where the former is interpreted as the part of lifetime inequality that is not forecastable when individuals were around ages 17-18 and deciding whether or not attend to college. Their methodology does not impose the information set that the agent had at the time of making the schooling decision, but it is estimated. The schooling and earnings decisions are modeled jointly in the presence of complete markets and allowing for the psychic costs to studying. For the empirical implementations, the authors find it necessary to pool data from two different sources: the National Longitudinal Survey (NLS)/1966, pooled with the Panel Study of Income Dynamics (PSID) for white males born on 1952 or before; and the NLS/1979, pooled with the PSID for white males born in or before 1969. They also use data on test scores to try to capture "ability," which is not unidimensional in this paper. The authors find that in 1966, about 78% of the variance in lifetime earnings for individuals with a high school education is forecastable, while only 55% is forecastable in 1979. For individuals with a college education, the authors find that the respective quantities are 67% and 65%. Thus, uncertainty seems to have significantly increased over the considered period for individuals with a high school education.

During the presentation, Cunha was asked about the importance of complete markets for their results, as well as if the distribution of abilities was conditional on schooling choices. Cunha said that other authors extend this methodology to incomplete market settings, and that indeed

the distribution of abilities was conditional on schooling choices. Finally, an extension of the methodology presented in this paper is to study how business cycle affects the variance of the idiosyncratic shocks in the different sectors of the economy.

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Professor Flavio Cunha presents "The Evolution of Labor Earnings Risk in the U.S. Economy" on the first day of the conference.

Wage Risk and Employment Risk Over the Life Cycle

by Hamish Low, Costas Meghir and Luigi Pistaferri

The authors identify two problems with the traditional methodology used in the literature of precautionary responses toward earnings risk. First, “earnings risk” is typically measured as the unexplained variation in earnings from an estimated univariate ARMA process, but it is not clear that this procedure identifies “risk,” nor what the sources of these risks are. Second, most of the previous models in the literature ignore the effect of governmental insurance programs on people’s behavior. The authors address these problems by (1) formulating and estimating a structural partial equilibrium model that allows for both exogenous and endogenous movements in earnings, with the aim of removing movements in measured risk due to the individual’s choice; and (2) incorporating into the model the most important features of three government programs—unemployment insurance, disability insurance, and food stamps. With this framework, the authors are able to impute the insurance value of each of these programs, as well as to provide a relevant distinction of “risk” into “employment” and “productivity” risks.

The model has individuals with two schooling levels who enter the labor force at age 25 and retire at age 65, live for 10 more years, and then die with certainty. The interest rate and wages are exogenous, while the insurance programs are funded by proportional taxation. There are several types of

shocks: working individuals can be fired or receive a job offer elsewhere; the unemployed may be offered a job; and all individuals receive uninsurable permanent shocks to their productivity. In the calibration stage, the authors directly estimate some parameters, taking into account selection effects (i.e., people don’t move at random), and calibrate others in order to fit participation profiles and unemployment durations. The data used is mainly from the 1993 Survey of Income and Program Participation (SIPP), and the Panel Study of Income Dynamics (PSID) is used for duration analysis. The main findings are that: (1) people are willing to pay more for insurance of productivity than for employment risk; (2) productivity risk is the main reason individuals hold assets in this model; and (3) of the government programs considered, food stamps is by far the most important because it addresses the productivity risk. The authors also find that if job mobility is not random, the variance of the permanent shocks is upward biased about 40%, and thus the estimates of savings attributed to precautionary motives are upward biased, too.

A few questions during Pistaferri’s presentation included the following topics: (1) if the duration of unemployment was the result of incorporating assets; (2) why there was a trough in mean unemployment duration; and (3) if the authors replicated the income/assets ratio. Pistaferri responded that: (1) the unemployment duration was the result of assets and disability insurance; (2) durations are censored at 62, resulting in a through; and (3) the authors did not replicate the income/assets ratio in the data.



Participants listen to a presentation on the second day of the conference.

Risk Sharing in Private Information Models with Asset Accumulation: Explaining the Excess Smoothness of Consumption

by *Orazio Attanasio and Nicola Pavoni*

Attanasio and Pavoni derive testable implications of two private information models for the study of consumption. These are the “adverse selection” model of Allen (1985) and Cole and Kocherlakota (2001), ACK hereafter; and the “action moral hazard” of Abraham and Pavoni (2002), AP hereafter. It has been shown that under access to “secret” credit markets, these models predict different consumption allocations. In ACK, the consumption allocation is equivalent to the allocation that the agents would get by self-insuring themselves with one risk-free asset, or as in a Bewley model, while AP allows for some extra insurance relative to ACK. This difference in predictions allows the authors to test which model better describes microeconomic data from the UK and the US. In addition, the authors show two specifications of the AP model for which there are closed-form solutions and give a structural interpretation to the “excess smooth” parameter linked to the severity of the moral hazard problem.

The additional insurance available in the AP economy leads to an equilibrium consumption that does not respond “enough” to innovations in permanent income as compared to Bewley models, displaying what Campbell and Deaton (1989) identified with aggregate data as the “excess smoothness” of consumption. The authors note the link between an Intertemporal Budget Constraint (IBC) based on the risk free asset and “excess smoothness” of consumption, so a test on the IBC can be a test on “excess smoothness.” The ACK allocation is consistent with the IBC holding for any income history, while the extra insurance in AP violates this constraint based on one asset in a way that gives agents more consumption if bad shocks are realized and less in the case of good shocks, thus implying that if the IBC doesn’t hold, there is “excess smoothness.” The authors use the IBC test proposed in Hansen, Roberds and Sargent (1991) with a synthetic panel data from the UK Family Expenditure Survey and from the Panel Study of Income Dynamics (PSID). The authors conclude that these microeconomic data sets exhibit “excess smoothness,” consistent with the AP model.

During his presentation, Pavoni was asked if he had a different model that nested both Bewley and complete markets/full insurance as special cases. When explaining the methodology for testing the IBC that has an equation relating changes in income to changes in consumption, the author was asked why it was necessary to change sides for the consumption and income terms. Another question was asked on the interpretation of the hidden storage technology. Pavoni responded that he did not have another model that spanned both Bewley and full insurance as special cases, and added that other models might imply an “excess sensitivity” of consumption. On why he changed sides for the consumption and income equation he referred to the formula in Hansen et al. Finally, he said that rather than a storage technology, we should think as “anonymous” access to an otherwise standard credit market. Future topics to address in this paper are attempts to test the implication of the model assuming a varying interest rate with data from the PSID.

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Capital Taxation: Quantitative Explorations of the Inverse Euler Equation

by *Emmanuel Fahri and Ivan Werning*

In dynamic Mirreleesian private-information economies, there is an optimality condition known as the “inverse Euler” equation which states that, at the optimum, the agents are savings-constrained. Some researchers have interpreted this result as a reason to optimally distort savings because the usual Euler equation can hold for these economies if individuals can save freely at a rate of return which is lower than the social rate of return, where the difference in rates of return is the “implicit tax.” In this paper, the authors provide a method that quantifies the welfare gains of optimally distorting savings for these types of economies. The method is very general because it does not consider the insurance-versus-incentives trade-offs in labor effort; instead, it focuses entirely on consumption by distorting any baseline allocation that is incentive compatible, and finds the best reform that leaves labor effort unchanged.

The method employed by Fahri and Werning proves to be tractable and flexible. For example, the authors derive the closed form solution of a general equilibrium problem with logarithmic preferences by showing that it can be decomposed into two well-known sub-problems: a deterministic growth problem, and a partial-equilibrium income-fluctuations problem. For general utility functions, the authors show how to decompose any allocation into an idiosyncratic

cratic and an aggregate component. When their method is applied in a partial equilibrium setting, the authors find significant welfare gains of distorting savings. In this context, they find that the results are very sensitive to the subjective discount factor and to the variance of the consumption process, and because the authors consider that there are no good estimates for the latter, they conclude that it is better to analyze allocations from models that are successful in matching both income and consumption. When the method is applied in a general equilibrium framework with a baseline allocation taken from the Aiyagari's (1994) incomplete markets model, the authors find that the welfare gains are much lower. This finding is related to Aiyagari's conclusion that in steady state, precautionary savings are small in the aggregate because interest rate and capital stock are close to their complete markets levels. The authors also show that, similar to Ramsey problems, optimal taxation depends on the specification of technology. Finally, the authors show that their methodology can also be applied to overlapping generation models.

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The Irrelevance of Market Incompleteness for the Price of Aggregate Risk

by Dirk Krueger and Hanno Lustig

In an attempt to solve the equity premium puzzle, some authors have introduced idiosyncratic risk into general equilibrium models. With few exceptions, those authors have generally relied on specific calibrations of their models, and found that there was not an important effect on the price of aggregate risk. This was generally attributed to agents smoothing consumption very well, in spite of the fact that there were only a few assets available in those models. Krueger and Lustig show in their paper that the degree of consumption smoothing is not important. They analytically derive the result that the absence of insurance markets for idiosyncratic labor income is irrelevant for pricing aggregate risk. That is, the Consumption-CAPM can price excess returns not only in complete markets economies, but in economies with incomplete markets.

The authors consider an economy with stochastic growth and a continuum of individuals who have CRRA preferences over consumption. They show how to transform this economy into another one with a constant endowment, labeled the "Bewley" economy, which in turn can be morphed into three growing economies with aggregate shocks: (1) an economy with idiosyncratic shocks and a full set of Arrow securities (the "Arrow" economy); (2)

an economy with idiosyncratic shocks where only a bond and a stock can be traded (the "IC" economy); and (3) a representative agent economy. The authors show that these models have a recursive competitive equilibrium that only has assets in the state space, and that there is no need to compute a law of motion for the wealth distribution in these economies because they are merely scaled versions of the stationary wealth distribution in the Bewley economy. The authors fully characterize asset prices in their models even though they allow for non-autarkic equilibrium allocations.

The authors prove that the aggregate risk premium in the three stochastic-growth economies is the same, but the level of the risk-free rate is different. This result implies that the equity premium holds in a much larger class of economies than the complete markets framework used by Mehra and Prescott (1985). Also, the authors conclude that aggregate data should be used to estimate parameters such as the elasticity of intertemporal substitution, especially when preferences are heterogeneous, and that Mankiw's (1986) identified mechanism for increasing risk premia, where there is time variation in the cross-sectional dispersion of equilibrium household consumption growth, cannot be the endogenous outcome of incomplete markets models. The results are robust, irrespective of the persistence of the idiosyncratic shocks and to the introduction of borrowing constraints, as long as the former are not permanent, and the latter allows for a stationary equilibrium.

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Labor Supply and Consumption with Imperfect Risk Sharing: An Analytical Framework

by Jonathan Heathcote, Kjetil Storesletten and Gianluca Violante

Heathcote, Storesletten and Violante develop a tractable general equilibrium model that can be used for studying the evolution of the second moments of wages, consumption and hours, at both the cross-sectional and the within-cohort level over the life cycle. These moments, which can be interpreted as measures of inequality, contain valuable information about risk. In particular, the within-cohort inequality can potentially reveal information on the degree of risk sharing and insurance possibilities of the data, as demonstrated by Storesletten, Telmer and Yaron (2004), while the cross-sectional inequality yields information on changes in the nature of risks over the life cycle, as shown in Blundell and

Preston (1998) and Krueger and Perri (2005). The model is estimated with the Panel Study of Income Dynamics (PSID) data and the Survey of Consumer Expenditures (CEX) data, and is used to address the following questions: (1) What percentage of inequality is due to heterogeneity at birth and what percentage is due to shocks during the life cycle? (2) Are those shocks insurable? (3) Which assumptions are needed to account for different features of the data?

The model is one of perpetual-youth with constant probability of dying and a labor supply decision. A continuum of individuals live in islands, and their preferences and productivity levels are heterogeneous. Complete markets hold within islands, but across them only a non-contingent bond is traded. The model has a closed-form solution which makes transparent the mapping of structural parameters into moments, and is flexible enough to nest both Bewley and complete markets arrangements as special cases. The authors obtain the wage, hours and earnings data from the PSID (1967-1996), while consumption is taken from the CEX (1980-1990). The main findings are: (1) heterogeneity at birth is the more important variable for the inequality in hours worked; (2) the most important variable for wages is shocks; and (3) both are important for consumption. With respect to the degree of insurability, the authors find that in the considered period, wage fluctuations and the increase in wage dispersion are mostly insurable. Finally, the authors find that preference heterogeneity is a required assumption for the model to be able to explain the dispersion in hours worked.

During Heathcote's presentation, questions asked by the audience included the following topics: (1) the role logarithmic preferences played for the results; (2) if the main idea in the paper is to test the assumption of insurability; (3) whether the authors included fringe benefits in the computations of total wages; (4) if normality in errors is needed for the results; (5) if there is insurance for the iid part of the preferences; and (6) the shape of the variance of log consumption after age 55 because the slides showed this variance until age 54. Heathcote responded as follows: (1) log utility is required in order to have a closed-form solution; (2) the model is to be used as a measuring device and not to test the assumption of insurability; (3) fringe benefits were not identified; (4) normality in the errors is not needed; (5) there is insurance for the iid part of preferences; and (6) regarding the shape of the variance of log consumption after 55, Ventura said it is flat. Lastly, Kydland stated that the 2.42 calibrated value for the risk aversion parameter is exactly what he calibrated in another study.

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Measuring Consumption Smoothing in CEX Data

by Martin Gervais and Paul Klein

Gervais and Klein are interested in measuring the degree of risk sharing in the data using the Consumer Expenditure Survey (CEX). Their methodology follows the line of research focused on the empirical response of consumption to idiosyncratic earnings shocks. In this literature, one test is to measure the response of the idiosyncratic change in consumption with respect to the idiosyncratic change in earnings. Under perfect risk sharing, this coefficient should be zero; under autarky it should be one; and intermediate values would in turn represent intermediate degrees of risk-sharing.

Gervais and Klein argue that the Instrumental variable estimator used by Dynarsky and Gruber (1997) is likely to be asymptotically inconsistent due to a non-classical measurement error in the independent variable, which is the change in the idiosyncratic component of earnings. The authors attempt to solve this problem by assuming an AR(1) structure on the income process, and then using the General Method of Moments (GMM) to estimate the parameters of the model. The authors show that OLS estimation tends to exaggerate the degree of risk sharing, while the IV estimator understates it. Also, they reject perfect risk sharing on the data, but still find a high degree of risk sharing. They also find that food expenditures can indeed be used as a good proxy for total consumption.

During Klein's presentation, the audience asked questions on the following topics: (1) the age composition of the sample; (2) the possibility of measurement error in the constructed income variable; (3) whether the unemployed were omitted from the sample; (4) the timing of the measurement of assets; and (5) if the authors had estimated an income process by education levels. In response, the authors stated that they: (1) did not omit people based on age; (2) did not yet consider the possibility of measurement error in their income variable; (3) omitted the unemployed if their income was not high enough to cover their food expenditures; (4) should indeed use assets at the beginning; and (5) included schooling dummies in their regressions to represent different income processes by education levels.

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Testing Efficient Risk Sharing with Heterogeneous Risk Preferences: Semi-Parametric Tests with an Application to Village Economies

by *Maurizio Mazzocco and Shiv Saini*

Mazzocco and Saini show that under heterogeneous risk preferences, previous empirical tests used in the literature can reject the null hypothesis of efficient risk-sharing in cases where it should not be rejected. Under preference heterogeneity, risk sharing can be decomposed into two components: “income pooling” and “mutual insurance,” where income pooling is the share of risk due to pooling resources in a household in order to eliminate idiosyncratic risk, and mutual insurance refers to the efficient trade of resources across states that arises from individuals with different preferences.

The authors show that previous tests are only valid if mutual insurance is not an important component of total risk-sharing, which would be the case if individuals have identical preferences. Mazzocco and Saini first test the hypothesis that households have the same preferences toward risk, which they reject. Then the authors develop and apply two new tests that take into account this heterogeneity in preferences. The intuition of the tests is derived from the implication that in equilibrium, less risk-averse households should have consumption paths that are more volatile. The data set used is from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), using information from villages in India. The results show that the authors cannot reject the hypothesis of efficient risk-sharing, contrary to previous findings that ignored preference heterogeneity.

Some comments and questions during the presentation concerned: (1) the consistency of the assumption of heterogeneity of preferences with other long-run facts; (2) why the authors chose to use heterogeneous risk parameters instead of different discount factors; (3) the assumption made in the study that villages are isolated from other villages because there might be risk sharing among them; and (4) the length of time this data set follows a household. Mazzocco responded to the comments as follows: (1) he would check implications of the heterogeneity for the long run; (2) using different discount factors would not work; (3) he did not consider the possibility of risk sharing among villages; and (4) the panel follows a household for 10 years. In his final comments, the author said that the next steps for this paper are to determine the statistical power of the tests, as well as to find other variables that could capture idiosyncratic shocks.

Tricks with Hicks: The EASI Demand System

by *Arthur Lewbel and Krishna Pendakur*

Lewbel and Pendakur offer a new methodology for the estimation of demand systems that exhibits a high degree of functional flexibility in Engel curves, allows for unobserved heterogeneity in preferences, and its computational implementation can be made cheaply. The main idea is to estimate Hicksian demands derived from cost functions where utility can be represented as a function of observables. The authors label the resulting demands as “Pseudo-Marshallian.” As an application of this new methodology, they propose the “Exact Affine Stone Index” class of cost functions where, instead of utility, an “affine function of Stone Index deflated log nominal expenditures” is used. These demands can be estimated directly from the data, instead of having to solve for the Marshallian demands or the indirect utility function.

The EASI demand system has many advantages: (1) budget shares are linear in parameters, in this sense being similar to the still popular Almost Ideal System (AID); (2) Engel curves are capable of accommodating almost any shape, contrasting with other state-of-the-art methods which allow only for quadratic functions in Engel curves; (3) it can accommodate heterogeneity in preferences, (4) it has a closed form solution for computations of the consumer surplus; (5) it can be estimated by GMM and a simpler version by linear regression methods, as the AID; (6) the error terms can be interpreted as random utility parameters in the context of heterogeneous preferences; and (7) it nests the AID and even more general demand systems. The authors show the flexibility of the EASI demand system by estimating an empirical model for housing rents with data from Canada. The estimated Engel curve with their new methodology cannot be fully captured by a quadratic or a linear Engel curve that is imposed in other demand systems.

During the Pendakur’s presentation, the audience asked how far this new demand system was from the state-of-the-art quadratic-Engel-curves demand systems, and if it yielded significantly more information than those systems. He was also asked if the EASI could handle discrete choice. Pendakur answered that the EASI demand system can nest the models that yield quadratic Engel curves, and is actually able to accommodate almost any shape in Engel curves. Also, the EASI demand system indeed handles discrete choice, but that implies that the results would not be as neat as in the continuous demand case.

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Differential Mortality, Uncertain Medical Expenses, and the Saving of Elderly Singles

by *Mariacristina De Nardi, Eric French and John B. Jones*

De Nardi, French and Jones study the savings decisions of the retired singles if the following factors are taken into account: (1) the mortality bias in the sample, which means that as age increases the composition of the sample of live individuals tends to be biased toward the rich, the healthy, and women; (2) more accurate out-of-pocket medical expenses than previously measured in the literature; and (3) the effects on savings decisions of social insurance programs like Medicaid and Supplemental Security Income. The authors formulate and estimate a structural model where agents optimally consume and save, face mortality, medical expense and health shocks, and in modeling social insurance programs, follow the literature in using a “consumption floor.” The dataset is RAND’s Assets and Health Dynamics of the Oldest Old (AHEAD), which is a panel that follows people older than 70 for several years between 1993 to 2002.

The simulated method of moments is used for the estimation of the structural model, in which there are two stages. In the first stage, the parameters that can be inferred directly from the data without imposing conditions of the structural model are estimated, such as survival probabilities that are conditional on the variable’s age, sex, perma-

nent income and health status. In the second stage, the parameters of the first stage are used for the estimation of the rest of the structural parameters with the General Method of Moments (GMM). The study abstracts from labor supply and retirement decisions by focusing only on retired individuals at the moment of the survey. The main findings are that: (1) incorporating their estimated medical expenses and consumption floor can explain very well the saving decisions of the elderly; (2) the absence of a consumption floor has a big effect on the saving decisions, even for the richest individuals (contrasting with the results of the paper by Hubbard, Skinner and Zeldes (1995), which do not find an important savings disincentive for college graduates); and (3) higher life expectation leads to higher savings as an optimal precautionary response. The authors conclude that any policy reform affecting saving decisions of the elderly should consider the quantitative effect that the consumption floor and the out-of-pocket medical expenses have on saving decisions.

Questions posed by the audience during De Nardi’s presentation included: (1) whether the market value of housing was taken into account for computing income, and how permanent income was measured in this paper; (2) if expenses of agents do not affect their health; (3) why the poor had a lower probability of surviving than the rich in the model; and (4) why bequests were not taken into account in the model. De Nardi replied that: (1) the market value of housing was indeed taken into account, and permanent income was approximated as the average income of all the observations of an individual; (2) expenses do not affect health in the model, by assumption; (3) as survival probabilities are empirically estimated, the model predicts that the poor have a lower probability to survive; and (4) she is considering the role of bequests in a different paper.

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Professors Marek Kapicka, Espen Henriksen, and Jonathan Heathcote during a break in the conference.

Explaining Changes in Female Labour Supply in a Life-cycle Model

by *Orazio Attanasio, Hamish Low and Virginia Sanchez-Marcos*

The authors study the differences in the life cycle labor participation of three cohorts of US women. In particular, they are interested in why: (1) the 1940 and 1950 cohorts, labeled, respectively, the “Hillary Clinton” and “Oprah Winfrey” cohorts, worked more than the “Elizabeth Dole” (1930) cohort; (2) the participation rate during the “fertility years” of Oprah’s cohort is bigger than Clinton’s; and (3) the participation profile of Clinton’s and Oprah’s cohorts is very similar after age 35. In order to evaluate possible explanations of these facts, the authors develop a life-cycle model that is calibrated to match the life cycle participation profile of the Clinton cohort (1940s). The authors then change the determinants of the female labor supply to explore which explanations are consistent with these facts. Three main candidate explanations are: (1) childcare costs have decreased over time; (2) returns to experience have increased; and (3) a decrease in the wage gap has occurred. The authors also explore the merits of an increase in human capital depreciation when a woman leaves the labor force and there is a higher level of uncertainty in the husband’s wage.

In the baseline model there is one household where the wages of both husband and wife are uncertain. Maternity is exogenously predetermined, and if the mother decides to work, there is a monetary cost resembling child care costs. Also, there are returns to experience and depreciation of skills when women decide to temporarily leave the labor force. Features not considered in previous literature are a human capital accumulation decision and the ability of using credit markets (borrowing and saving). Without savings, the model would impose household consumption equal to labor income, which implies that the only precautionary response to uncertainty is in the labor participation decision, as opposed to accumulation of assets. The authors use data primarily from the Panel Study of Income Dynamics (PSID). The simulations suggest that the childcare and wage gap explanations are consistent with the facts, while the simulations for the returns to experience are less convincing. On the other hand, the empirical evidence is consistent with the child-care hypothesis, but not with the returns-to-experience hypothesis. Also, the increase in depreciation rate cannot replicate the increase in participation rates, and though an increase in the uncertainty of the husband’s wage can, the degree of uncertainty needed is too high when compared to typical estimates in the literature. Future versions of the model could incorpo-

rate incentives to accumulate human capital, the possibility of working part time, and depreciation rates that increase with the duration of the exit from the labor force.

Discussion during Low’s presentation included the following points: (1) why the interest rate was set at 1.5% per year; (2) if female labor supply in the model could be considered another way of buffer-stock; and (3) if there was an education premium in the model. Low replied: (1) theirs was a partial equilibrium model, thus the interest rate was set at the average real return of the 3-month T-Bill in the US; (2) female labor supply could be used to help insure shocks, especially in the presence of credit constraints, because savings are usually a better mechanism for smoothing consumption; and (3) the model did not consider different levels of education, and therefore there was no education premium.

Housing Workshop

June 11-16, 2006

The Laboratory for Aggregate Economics and Finance sponsored a Housing Workshop on the UCSB campus the week of June 11-16, 2006. The workshop was structured to advance the study of the cyclical and secular behavior of the housing sector. The program included topics such as residential investment over the business cycle and housing price dynamics. A variety of frameworks, such as search/bargaining, representative agent, and life cycle, were used to help understand the role of housing in the aggregate economy; for example, the interesting empirical regularity that residential construction cyclically has tended to lead the business cycle by two to three quarters in the postwar United States. Dr. Peter Rupert (Federal Reserve Bank of Cleveland) acted as organizer of the workshop.



VISITING PARTICIPANTS THE FOLLOWING:

Morris Davis, *University of Wisconsin, Madison*
Jonas Fisher, *Federal Reserve Bank of Chicago*
Martin Gervais, *University of Western Ontario*
Paul Gomme, *Federal Reserve Bank of Cleveland*
Jonathan Heathcote, *Georgetown*
Tatyana Koreshkova, *Oberlin University*

Karen Kopecky, *University of Rochester*
Antonio Merlo, *University of Pennsylvania*
Peter Rupert, *Federal Reserve Bank of Cleveland*
José-Víctor Ríos-Rull, *University of Pennsylvania*
Alice Schoonbroodt, *University of Minnesota*
Etienne Wasmer, *University of Quebec, Montreal*

UCSB Economics Department faculty and interested graduate students also participated. Informal presentations were held each morning during the workshop, with scholarly interaction reserved for the afternoons. Several social events also took place during the week.

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Theory, Measurement and Calibration of Macroeconomic Models

by Paul Gomme and Peter Rupert

Since the publication Kydland's and Prescott's 1982 paper, the calibration of economic models has become an important part of the economist's toolkit. Gomme and Rupert attempt to refine its methodology by studying in detail each stage in the calibration process of a rich real business cycle (RBC) model that incorporates several types of capital stocks, market and home production sectors, stochastic shocks in the form of a Solow residual, shocks that are investment-specific, and distortionary taxation over labor and capital income. More specifically, Gomme and Rupert investigate the functional forms that are consistent with the restrictions imposed by balanced-growth facts, and discuss the best data series to use when the model allows for different moments to be calibrated, as well as the validity of some parameters and conclusions usually taken as given in the literature. The authors' findings and suggestions are as follows: (1) the capital share of income is .283, which is at the lower end of the values used in the literature; (2) for the

calibration of depreciation rates, it is a good idea to divide the observed depreciation by its respective capital stocks; (3) the use of investment/output ratios is preferable to capital/output ratios; (4) a very high pre-tax interest rate for the U.S. is calibrated, in turn implying a very high interest rate for home production models, and, contrary to "conventional wisdom" in the literature, high tax rates in home-production models are not needed in order to be consistent with balanced-growth facts; (5) the autoregressive and standard deviations coefficients of the estimated Solow residual process is roughly the same as the usual values used in the literature; (6) the investment-specific shocks are quite persistent and volatile; and (7) the market and home production functions have to be of the Cobb-Douglas type due to investment-specific technological change, not because of the usual justifications offered in the literature.

During Gomme's presentation, audience members asked a number of questions centered on what would be obtained from the exercise in this paper. Questions included: (1) why the calibrated capital share was smaller than the typical values in the literature; (2) if the productivity slowdown was taken into account for the estimation of the Solow residual; and (3) if the authors were recommending using these calibrated parameters for studying all sorts of questions that require those parameters in its calibration. Gomme responded: (1) some restrictions in the parameters would be derived from this exercise and that the parameter share was obtained transparently from the data, as opposed to Cooley and Prescott (1995) who did not clearly explain how they arrived at a calibrated value of 40% capital share; (2) the productivity slowdown was not taken into account, to which one audience member replied that this assumption was crucial for the autoregressive parameter, hence he suggested the use of a stochastic trend; and (3) other researchers do not necessarily have to use their calibrated values. Another audience member commented that because investment is the variable that is typically expected to respond to changes in tax rates, only by a miracle would the authors obtain the right answers due to fixing the tax rate in their calibration. One participant made several observations: (1) if the authors are considering balanced growth path restrictions, then Cobb-Douglas productions technology has to be assumed; (2) the authors might have gotten a very high interest rate of 13% in their baseline calibration because they did not consider factors like population growth, which could have depressed the interest rate; (3) the calibration target of hours spent in the home sector was set too high, to which Gomme replied that this number was obtained from the data; and (4) agreed with Gomme in stating that the practice of some researchers of choosing the subjective discount factor parameter of the utility function outside their model instead of calibrating it was a bad idea.

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Bargaining and Price Determination of Residential Real Estate

by Antonio Merlo, Francois Ortalo-Magne and John Rust

(very preliminary for presentation at the LAEF workshop)

In this paper, Antonio Merlo, Francois Ortalo-Magne and John Rust collect and analyze high-frequency microeconomic data from housing transactions in cities in England and the U.S. The dataset is very detailed, containing a wealth of information, including: (1) how list prices are adjusted over time; (2) visits by buyers; (3) the outcome of the bargaining process; and (4) variables of the community in which the house belongs. The authors intend to use this information for the construction of spatial models of housing markets, which in turn will be used for studying questions about the efficiency of the observed mechanisms for selling houses, the added value of having intermediaries, and the compensation of the real estate agents, among others. The authors develop a new equilibrium concept for these models, which they label as "temporary equilibrium." This concept attempts to capture the imbalances that may arise at any given time between supply and demand, as the terms "seller's market" and "buyer's market" may indicate. The authors hypothesize that the market clears relatively fast, due not only to adjustment of prices, but also because of endogenous adjustment in beliefs.

The authors argue that the best way to model the real estate bargaining process is as a dynamic game of two-sided incomplete information where a house is treated as a completely idiosyncratic asset. This type of game displays multiple equilibria, and in addition to the difficulty of computing any of them, the housing context makes the problem much more complicated as this is only a subgame of a larger problem faced by the seller. Because of the intractability of this problem, the authors instead rely on two models that are computationally tractable. First, they consider a "relaxed" approach in which the modeling strategy is to impose "reasonable beliefs" to sellers and buyers and then use agent-based simulation of the model in order to re-estimate their beliefs. This procedure is repeated until a fixed point is found, one of "self-confirming beliefs" or "rational-expectations." The resulting market is what the authors label a "temporary equilibrium." In their second approach, labeled as "kosher," the authors consider a dynamic bargaining one-sided incomplete information problem, which they show

has a unique Bayesian subgame perfect equilibrium. The authors plan to use the model that best describes the data.

Following are some questions and comments made by the audience during Merlo's presentation: (1) whether the problem being described in the paper applies only to housing markets; (2) whether the authors would compare different market arrangements when they could design the efficient mechanism; (3) if the authors would allow the correlations to differ across communities in the empirical part; (4) since some houses, like farms, are auctioned, perhaps offering another option to sellers; and (5) whether individuals can always auction their house in countries other than the U.K. and U.S. Merlo responded and commented as follows: (1) indeed, what he described includes any problem that incorporates two-sided incomplete valuations, which, in this case, is data for housing; (2) the theorem by Myerson and Satterthwaite states that, in general, there is no efficient mechanism for a two-sided incomplete valuation problem, and Merlo and his co-authors are instead interested in studying the relative efficiency of the different mechanisms observed in the data; (3) indeed this data set allows for the use of different correlations across communities; (4) auctions are a really strange event for the markets for which they have information; and (5) in Scotland at least, an individual can always auction his house.

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Suburbanization and the Automobile

by Karen Kopecky and Richard Suen

Suburbanization is defined as “the increased dispersion of urban population over land area,” and is a phenomenon that started in American cities during the second half of the 19th century with the introduction of the street railways. Early in the 20th century, the car was introduced, and a period of intensive suburbanization and increasing rates of car ownership followed. In this paper, Karen Kopecky and Richard Suen study the quantitative role that the invention and diffusion of the car has had on suburbanization trends in American cities. Hence, they develop a static general equilibrium model that, for the 1910-1970 period, attempts to explain the car-ownership rate and the quantitative increase in suburbanization, which is typically measured as the decline in the population density gradient of a function empirically estimated that relates population density to distance from the center.

The model considers agents who differ in their ability and who optimally solve the problem of where to live and also how to commute to the employment center in a linear city, either by buying a car that has a high fixed cost but low marginal cost, or by using a public-provided bus with the opposite characteristics. The equilibrium of the model yields the distribution of the population by ability in the city, the rate of car-ownership, and the equilibrium rental price of housing. The authors show that in this environment, the agents who choose to use the bus live closer to the employment center, while those with a car live farther away. The authors also show that optimal location is a strictly increasing function of ability. Given the static nature of the model, the authors attempt to explain the trends in car-ownership rates and in the population density gradient by solving the model for several steady states, one for each decade from 1910 to 1970, where the data used corresponds to averages of American cities for the years considered. These averages reflect the following facts: (i) rising income; (ii) declining price of cars, measured as the time needed to work in order to be able to pay for a car; (iii) declining costs of commuting by car; and (iv) rising costs of public transportation. For the period considered, the model captures 77% of the increase in suburbanization, and 86% of the rise in car ownership. Future versions of the model could incorporate different uses for the car, a more explicit role for the participation of the government in the construction of highways, provision of public goods, and female labor participation.

Some questions, comments and suggestions made during Kopecky's presentation include the following: (1) if building new cities was an alternative to suburbanization in the model; (2) if the bus market cleared; and (3) if the model

assumed that everybody bought a Ford model “T” whose price decreased over time. Kopecky replied and commented as follows: (1) the model did not provide the alternative of building new cities; (2) in this version of the model, there is no bus market, though this market could be incorporated later; and (3) indeed, everyone bought the same car whose price decreased over time. A workshop participant suggested that the location of firms over time could be an important factor to consider in the model, especially if the theory is about commuting, and data exists that can be used to look at the distribution of locations versus the distribution of employment. Another suggestion was made to report the population density gradients as a way to test the theory, to which Kopecky replied that no aggregate data exists to do so. Yet another participant suggested that a reason people move from city centers is because of taxes, so suggested a check for more predictions of the model, and, in order to use a more general utility function, said that the model could be discretized. The author replied that she thinks the higher the income, the newer the house an individual wants, that she could study the predictions in the rent gradient, and also said that she did not know if a solution would exist for more general preferences.

Redistributive Shocks and Productivity Shocks

by José-Víctor Ríos-Rull and Raul Santaella-Llopis

The Real Business Cycle (RBC) literature typically assumes a Cobb-Douglas technology for the aggregate production function, which implies that the income shares of the factors of production should be constant for any frequency of the data. However, Victor Ríos-Rull and Raúl Santaella-Llopis show that this is not the case for the U.S. For this reason, they ask how important the assumption of constant shares is for the findings in the literature. They attempt to answer this question with a simple theory of labor share fluctuations where a second shock, called the “redistributive shock,” is added to the production function of an otherwise standard RBC model. This small variation in technology has very important implications for the findings of the RBC literature, thus the authors conclude that the literature is in need of a good theory of cyclically-moving factor shares.

Regarding the identification of the two shocks in the data, the authors choose units such that the redistributive one does not affect productivity, thus they can be structurally estimated with a vector autoregression (VAR). They show that the claim of RBC researchers that productivity shocks account for two-thirds of the variation in hours is not true, and in the simulations of their model they account for a mere 13%. Also, the model with the two shocks predicts that consump-

tion is more volatile relative to the one-shock case, and the interest rate is now off-synchronized. When the authors perform a variance decomposition to see how the shocks affect different macroeconomic variables, they find that the redistributive shock affects mainly consumption and the interest rate, while other variables are almost exclusively affected by the multiplicative shock. The findings are not affected if the model considers preferences of the Hansen-Rogerson type.

Some questions and comments during Ríos-Rull's presentation included the following: (1) whether this paper was serious about the connection between real wages and productivity, and if the correlation of labor share with GNP of -.24 was significant; (2) movements in the factor shares could also be obtained if a constant-elasticity-of-substitution (CES) production function was assumed instead of a Cobb-Douglas augmented by exogenous shocks to shares, to which a participant replied that in the CES case, some movements in the income shares are endogenous; (3) if the shocks were identified by choosing the units; (4) why the second shock affected consumption; and (5) what would happen to the results if the estimated coefficients for the shocks were different, and why investment fell so much in the bivariate model. Ríos-Rull replied: (1) indeed, this paper is serious about the connection of real wages and productivity, and that the second was a bad question: (2) regarding the CES production function, the authors intended to put this shock in the RBC tradition, that is, to add this variation to shares in Cobb-Douglas technology; (3) units do matter for identification and there is no unique way to identify the shocks; (4) the second shock affects consumption because of the implied changes in prices that agents face; (5) in the bivariate model, a shock to productivity increases future interest rate by a little, so the extra wealth implied by the shock is consumed quite fast. Ríos-Rull also mentioned that obviously the behavior of the model is very different depending on the VAR coefficients, but their empirical counterparts were estimated with great precision and therefore robustness analysis was not conducted. Finally, investment fell so much because in this world firms do not want to invest due to the labor response.

Land

by Morris Davis, Jonathan Heathcote and Peter Rupert

Morris Davis and Jonathan Heathcote (2004) develop a method for computing residential land prices in the U.S. With this series, they are able to estimate that the price of residential land has increased almost fourfold since 1982. Among other results, the authors find that the majority of house price fluctuations at business cycle frequencies

are driven by changes in land price. In the current paper, Davis and Heathcote joint with Peter Rupert attempt to explain the trend in residential land prices. In particular, they propose a model to study what role, if any, the rising wage inequality plays for explaining this phenomenon. The authors hypothesize that inequality affects land prices via its effects on the demand for shorter commuting times, which is likely to be a major determinant of land prices.

The authors develop a model of the Bewley-Imrohorglou-Hugget-Aiyagari type with some additional features. A house is a location, and households purchase exactly one house-location. There is no renting available, and the several types of locations differ by commuting time, where there are a fixed number of "good" commute locations. Moving to another house is costly. Labor productivity is random, and agents choose how much to work, how much capital to accumulate, and where to live. In future extensions of the model, the authors could incorporate, among other factors, the rise of female labor participation, the effects of a rise in wage inequality on the demand for superior-good components of land (big yards, etc.), the effect of the decline in family size on schools and other amenities, and the role of average income growth.

Questions and comments during the author's presentation included the following: (1) why the authors should care about residential land; (2) if there was large population growth in the "glamorous cities" described in the presentation; (3) why the "obvious" candidates for explaining rising land prices are not used, such as increasing household wages and shrinking family size, before attempting to use wage inequality; (4) the role of the logarithmic specification of utility in the model; and (5) if the measures of wage inequality included fringe benefits. Heathcote and Davis responded as follows: (1) the value of farm land is very small compared to its residential counterpart; (2) population growth in "glamorous cities" was unknown, but worth looking at; (3) many explanations will be investigated besides income inequality; (4) the log utility specification was only an example; and (5) since their measures of income-inequality are from self-reported wages, they probably does not include fringe benefits.

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First-Time Home Buyers and the Volatility of Residential Investment

by Jonas Fisher and Martin Gervais

Jonas Fisher and Martin Gervais are interested in explaining why there has been a decrease in the volatility of residential investment in the U.S. since the middle of the 1980s. The authors focus their attention on the role of first-time home buyers. These buyers represent between 35% and 45% of the total of new-home buyers, and have financial constraints such that, if tightened or relaxed after a shock hits the economy, could help to explain volatility. The authors document the characteristics and behavior of these buyers, as well as possible structural changes that could drive new cohorts to display different behavior. Among this documentation is the trend to marry later in life that the authors observe in their microeconomic data set, financial innovation in the mortgage market, and the change in demographic structure over time, especially the aging of the baby boomers. The authors then propose a stochastic partial equilibrium model that is intended to be used as a measurement device in order to determine the quantitative impact of each of the changes considered.

Several data sources are used in this study: the National Longitudinal Survey of Youth (NLSY), the Panel Study of Income Dynamics (PSID), the American Housing Survey (AHS), and the Current Population Survey (CPS). Fisher's and Gervais's data analysis shows that close to the date when a household buys a home for the first time, people tend to get married or have a newborn child, their working hours and income rise, and their net assets accumulate faster than their income. The authors find that marriage has an important effect on the probability of buying a home for the first time; other variables that also matter for this decision are income, net assets, mortgage rates, and GDP growth. The study shows that homeownership by age fell from the 1970s to the mid-1990s, when it started to rise again. The authors infer that the increase in the marriage age could explain the former result, while mortgage innovation could explain the latter. In the model, agents can rent or own a house, where they face credit constraints in the form of a down-payment and mortgage payments. It is also assumed that at each stage in the life cycle there is a subsistence level of housing and work efficiency.

During the presentation, questions and comments include the following: (1) what the differences are between a first-time home buyer and someone who is "moving up;" (2) the housing and marriage decision should be modeled jointly, instead of assuming an exogenous marriage decision; (3) if the price of housing is endogenous in the model; (4) if the analysis takes into account the effects of immigration; and (5) if this paper could be an interpretation of the "adjust-

ments costs" story in the literature. Also, an audience member mentioned that the authors were assuming an infinitely elastic supply, but supply depends on the labor market and construction of new housing. Another audience member stated that one of the reasons people postpone marriage is to pursue higher education. The authors replied: (1) first-time homebuyers must save for a down payment, while later generations of buyers do not; (2) the interpretation of the estimated probit on the decision to buy a home would be very different if marriage is endogenous and therefore they assume an exogenous marriage decision; (3) that they will not be endogenizing prices because this model does not intend to explain them; (4) immigration is not taken into account (due to the aforementioned explanation (3)); and (5), they do not know if this paper can be an interpretation of the "adjustments costs" story.

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House Price Movements

by José-Víctor Ríos-Rull and Virginia Sanchez-Marcos

Victor Ríos-Rull and Virginia Sanchez-Marcos document two interesting properties of the U.S. and Canadian housing markets. First, housing prices in both countries are much more volatile than GDP. Second, the units sold fluctuate together with prices, but the volatility for units sold is higher. The authors note that the housing market has many frictions that affect prices, such as transaction costs and adjusting the size of a house (i.e., moving). There are also advantages of owning a home, and a mortgage loan is typically needed in order to buy a house. The authors hypothesize that some "suitably chosen frictions" could explain the described features of the data, and hence, they develop a stochastic general equilibrium model that incorporates housing and which is calibrated to match several moments of the data.

The model is of the Bewley-Imrohoroglu-Huggett-Aiyagari type with idiosyncratic uncertainty in earnings, but also allows for aggregate uncertainty in dividends, demographics and earnings. Population grows exponentially. Some of the frictions include: (1) borrowing constraints; (2) the interest rate on borrowing which commands a premium; (3) the requirement of a down payment to purchase a house; (4) the use of the house as collateral for borrowing; and (5) the existence of adjustment costs associated with buying and/or selling a house. Only two types of properties are available in the model: flats and houses, where it is assumed that houses yield more utility than flats. The model is calibrated to match the annual population turnover and the share of the population living in each type of dwelling, and the processes of earn-

ings and financial assets are chosen jointly. Because of the high computational complexity of the model, the authors solve it with a method similar to that developed by Krusell and Smith (1997). In their initial experiments, the authors model a switch from recession to expansion, going from a - 5% to a +5% variation in earnings and dividends, and using the calibrated TFP shocks. They find that the prices of flats and houses increase between 25% to 30%, or, in other words, the increase in housing prices is about 2.5 times the increase in fundamentals. Also, housing prices and financial assets move together, but housing prices increase almost 50% more than financial assets. Sales of houses predicted by the model are not procyclical.

The audience posed the following questions and comments during the presentation: (1) if the agents in the model could buy stocks of a Lucas “tree” for housing; (2) if the price of rental-buildings and owned-buildings move together; and (3) the meaning and justification of the 1% premium over the interest rate. It was also suggested to calibrate the land, given that the supply of housing is assumed fixed. Ríos-Rull replied as follows: (1) in this economy, individuals cannot buy stocks of a housing “tree”; (2) it was easier to look at the stock market than calibrating land; and (3) the 1% premium represents bank paperwork and/or points. This premium may be a rationale to pay the mortgage fast because the authors want to capture changes that make housing better relative to other assets. The author noted that future issues to address in this paper are to check if the data shows that reallocations of people are procyclical, the joint behavior of t-bills and the S&P 500, as well as including an aggregate shock to preferences in order to study how price changes get propagated in this case.

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Imperfections in Rental Housing Markets

by Etienne Wasmer

Rental housing markets and labor markets share many similarities. For example, the quality of tenants is largely unobserved, as is the case of employees; separation of the rental unit (job) may be costly and time-consuming; there might be rigidities in the nominal prices of rental housing markets (ceiling prices) and in wages (minimum wages); and the job/dwelling characteristics might be unknown ex-ante. Etienne Wasmer exploits this fact by developing a model for studying the effects of certain regulations on rental housing markets by adapting tools from the field of labor economics. The model incorporates frictions

that remain largely unexplored in the housing literature: search frictions in the matching process between landlords and tenants, uncertainty and asymmetric information in the post-match contractual relation, and finally, the costly “firing” of tenants in terms of time and legal costs when terminating a contract.

The author uses the model to study some reasons that could explain the inefficiency of the French rental housing market. A brief comparison between Quebec and France help to shed light on this. In France, a tenant typically has to pay four months’ rent in advance. The tenant needs a guarantor to secure his rental unit. Rental contracts are signed for three years, and a typical lease has 20 pages with a font of size eight. By contrast, in Quebec, only one month of rent is requested in advance, no security deposit is required, and the typical lease contains five pages with font size 14. The vacancy rate in Paris is 10%, while Quebec’s is only 1.4%. The eviction processes in France are long and complex, and, in general, there is a “consensus that obtaining eviction of a bad tenant is random, costly and time-consuming.” It is on the effects of the duration of the eviction process on the market equilibrium that the author focuses his analysis. Similar to conclusions in labor economics, the model predicts that a slower eviction procedure decreases the asset value of rental housing, decreases the supply of housing in the long run, and leads to more screening by landlords and, hence, discrimination on prospective tenants based on observable characteristics like race, ethnicity, gender, etc. Current work by the author joint with Francis Kramarz is the empirical test of some of the implications of the model by using eight years of data on eviction cases from 471 French courts. This dataset contains information on how satisfied tenants are with their rental unit and with the distance from work, hedonic characteristics like size of the unit, number of rooms, presence of a garden, and so on. Also, the data set contains tenant and landlord information on the various costs of rent they face, if the tenant (landlord) had difficulty in paying “his” rent (mortgage) in the past year, and a self-assessment of financial burden.

One audience member asked that Wasmer define the main question that was being investigated in this paper. The author responded that his paper asked why the rental housing market in France is so inefficient. Another member of the audience suggested that Wasmer check the length of time houses stay on the market by size in France, because the model has some implications for that factor.

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Espen Henriksen Visits LAEF



Professor Espen Henriksen of the University of Oslo, Norway, was a visitor at LAEF for two weeks in May 2006. Professor Henriksen received his Ph.D. from Carnegie Mellon University in 2005. His current research interests include:

- Low- and medium-frequency movements in the current account, and net foreign asset positions.
- Macroeconomic implications of international demographic dynamics.
- Portfolio choice over the life cycle in a production economy; restrictions on the macro production function.
- Co-movements of domestic and international monetary aggregates at business cycle frequencies.

While at LAEF, Espen participated in the “Macroeconomics of Imperfect Risk Sharing” conference. He also presented a seminar to the UCSB Department of Economics professors and graduate students. The title of his presentation was “Post-War Capital Restrictions, Demographics and Welfare Costs.”

A PREVIEW OF THE YEAR AHEAD

LAEF's second year promises to offer more in the way of longer-term visitors, conferences and workshops. Already in the planning stages are a two-day conference entitled “Households, Gender and Fertility: Macroeconomic Perspectives” and a possible Latin American working group meeting. Look for a detailed report of activities in the next issue of “From the Lab.”



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Special thanks go to Armando Lopez-Velasco, UCSB Ph.D. student, for his accurate and concise summaries of each conference and workshop presentation.



About the University of California, Santa Barbara

The University of California, Santa Barbara, is a leading research institution that also provides a comprehensive liberal arts learning experience. UCSB is part of the ten-campus University of California system. The preeminent scholarship, instruction and public service that define UCSB have helped shape its identity as a place of enormous and exceptional possibility – a magnet for innovation. UCSB's 1000-member faculty includes five Nobel Laureates and scores of elected members or fellows of prestigious academies and societies. Enrollment of almost 20,000 students includes approximately 15% at the graduate level. The university offers more than 200 majors, degrees and credentials through five schools and the Graduate Division. More information about UCSB may be found at the campus website: <http://www.ucsb.edu/>.

* The above is quoted from the UCSB General Catalog and campus website.

Economics at UCSB

The Laboratory for Aggregate Economics and Finance is closely allied with the UCSB Economics Department. The department is composed of 59 professors, lecturers, visiting professors and researchers, emeriti faculty, and affiliated faculty. Economics is the most popular undergraduate major on the UCSB campus, boasting 2,400 students as declared majors in the 2005-06 academic year. The graduate program has 99 students enrolled for the 2006-07 academic year at either the Ph.D. or M.A. level. Information on the department may be found at: <http://www.econ.ucsb.edu/>.



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