

Director's Message

by Finn Kydland

Much of this issue is devoted to the LAEF conference on *Dynamic Political Economy and Optimal Taxation*. The aim of the conference was to examine the determinants of a wide range of government policies, both from a positive and a normative perspective, relying on the tools of dynamic contracting and mechanism design. The political economy segment of the conference used these new tools to analyze a variety of important long-standing questions. What is the link between political polarization and growth? How does lack of commitment influence the emergence of war? How does competition between different tax authorities influence redistribution? How do fiscal constitutions shape taxation over the business cycle? The remainder of the conference used the same tools to explore the design of optimal tax and social insurance systems. How should the government set capital, or, generally, asset taxes when faced with endogenous constraints on fiscal instruments or trading arrangements? What role do incentive problems play in the design of social security? What are the quantitative impacts of private information on optimal income taxation? What are the properties of robust optimal social insurance systems? Taken together, these contributions shape the new frontier in the literature on dynamic political economy and optimal taxation.



Dynamic Political Economy and Optimal Taxation conference participants

I thought I'd report also on two exciting trips. Fred Kavli, who contributed to creating UCSB's Kavli Institute for Theoretical Physics, has instituted three Kavli prizes, analogous to the Nobel prizes, to be awarded biannually in the fields of nanoscience, neuroscience, and astrophysics. The first awards were presented in Oslo in September. My wife, Tonya, and I had been invited by Fred to attend. It was a glorious event – an interesting combination of award ceremony with a program of talks in the three areas. Tonya and I focused on neuroscience, obviously not my field of expertise, although some economists now draw on it. Tonya, whose research area is indeed neuroscience (with focus on Alzheimer's disease), has had to sit through many of my presentations over the past few years. This was the one occasion when the talks were in her area, with me as an interested by-stander.

In Denmark, *Copenhagen Consensus 2008* set out to rank solutions to world problems in terms of their benefit/cost ratios. In other words, suppose the question is: If we were to spend \$50 billion a year for the welfare of people over the next five years, then how best to do so? The process was as follows. For each of ten problem areas, experts had been assigned in advance the task of proposing the most beneficial solutions. In each area, another expert was to challenge the solution paper, possibly proposing alternative solutions. The panel, consisting of five Nobel laureates (Mundell, North, Schelling, Smith, and me) and three additional leading economists (Bhagwati, Bourguignon, and Stokey), was asked to rank all the solutions – in the end, on the order of 30 of them!

The high-ranking solutions largely reflect the needs of extremely poor nations. It is not always so obvious what the *long-term* benefits of these solutions are for the nation as a whole. Still, the needs were judged by the experts to be so profound and, in some cases, the costs so low, that the benefit/cost ratios were estimated to be extremely high.

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**LAEF hosted a conference entitled "Payments and Networks" in December 2008.
Look for the proceedings of that conference in the next issue of "From the Lab."**

LAEF Visitors



José de Anchorena

José de Anchorena spent part of June 2008 as a research visitor at LAEF. Dr. de Anchorena received his Ph.D. from Carnegie Mellon University in 2008, and is currently a Researcher at the University of Oslo. While in residence at LAEF, de Anchorena presented a paper at the Economics Department Seminar Series entitled “Social Ties and Economic Development,” a joint work with Fernando Anjos. The paper’s central idea is to incorporate social ties as a consumer commodity, as well as an input for transaction of other commodities. The model clarifies some aspects of the so-called social capital, and provides predictions about the behavior of both sociological and economic variables in the process of economic development. Those predictions are compared with actual data, both in a cross-section of countries and in a time series for the United States.



Hernan Moscoso Boedo

Hernan Moscoso Boedo, an Assistant Professor at the University of Virginia, was a visitor at LAEF for one week in March 2008. Boedo received his Ph.D. from the University of Wisconsin – Madison in 2006. His current research interests include:

- Income differences across countries
- Endogenous technology adoption
- The effects of institutions on income levels
- The income distribution implication of endogenous technology adoption

While at LAEF, Boedo presented a seminar in the Department of Economics Seminar Series entitled “Irreversible Investment, Informal Sectors and International Income Differences.” The paper, joint with Toshihiko Mukoyama, analyzes the effects of observed entry and exit regulations on aggregate total factor productivity by looking at an industry dynamics model.



Roman Sustek

Roman Sustek (Bank of England) and **Eric Young** (University of Virginia) made a return visit to LAEF in May. While at LAEF, Sustek and Young worked on a project that explores whether a model with heterogeneous agents can be simultaneously made consistent with aggregate business cycle facts (volatility and comovement of output, consumption, investment, and hours) and asset pricing regularities (mean and variance of equity and bond returns).

Sustek presented a paper in the Economics Department Seminar Series entitled “The High Correlations of Prices and Interest Rates across Nations,” on which he has been working with Espen Henriksen (University of Oslo) and Finn Kydland since his last visit to LAEF. The authors document that, at business cycle frequencies, fluctuations in nominal variables, such as aggregate price levels and nominal interest rates, are substantially more synchronized than are fluctuations in real output. To the extent that domestic nominal variables are determined by domestic monetary policy, and central banks generally attempt to keep the domestic nominal environment stable, this may seem surprising. The authors ask if a prototypical international business cycle model can account for this aspect of cross-country aggregate fluctuations. It can. Due to spillovers (even modest ones) of technology shocks across nations, expected future responses of national central banks to fluctuations in domestic output and inflation generate movements in current prices and interest rates that are synchronized across countries even when output is not.



Eric Young

Young presented the paper “Information Heterogeneity in the Macroeconomy,” which is joint work with his graduate student Ponpoje Porapakkarm. The authors study a

LAEF Visitors, continued

model of business cycles in which households experience aggregate productivity shocks as well as uninsurable idiosyncratic shocks to wages and asset returns. Households do not know whether a given movement in their wage (or their asset return) is due to an aggregate or an idiosyncratic shock, leading each individual to infer different values for aggregate productivity and aggregate capital. That is, they have different beliefs about future asset returns. Young and Porapakkarm show that a model with belief heterogeneity delivers more volatile investment relative to a benchmark economy with full information. Their main contribution is methodological – they show how to write down a coherent model in which agents can (and do) disagree about the expected returns to saving. Ongoing work is extending this model to allow for elastic labor supply and additional asset choices to determine the role of higher-order expectations (expectations of the average expectation of productivity) in pricing assets.



Kenji Wada

Kenji Wada, a professor at the Graduate School of Business Administration at Keio University, spent a week as a visiting scholar at LAEF in February 2008. Wada received his Ph.D. from the University of Chicago in 1999. His current research interests include:

- The long-term relation between demographic change and asset returns in Japan
- The equity-premium, the risk-free-rate, and the currency-premium puzzles in incomplete markets in the United Kingdom and the United States
- The pricing of an U.K. index bond in incomplete markets
- The predictability of individual stocks and portfolio returns in Japan
- The effect of job training for criminals on their behavior after release

While in residence at LAEF, Wada presented a paper in the Economics Department Seminar Series related to the last topic. The title of his presentation was “Cop and the Anthem: How could Soapy have avoided being jailed?” In this paper, Wada considers what type of job-training program will lower the probability of re-entry into jail and lengthen the period between release from and re-entry into jail.



Yoonsoo Lee

Yoonsoo Lee, an Economist at the Federal Reserve Bank of Cleveland, was a visitor at LAEF for one week in April 2008. Lee received his Ph.D. from the University of Rochester in 2005. His research focuses on the implication of dynamic behaviors of heterogeneous firms for the aggregate economy. His current research interests include the investigation of:

- Entry, exit, and employment dynamics of manufacturing plants over the business cycle
- Cyclical behavior of aggregate productivity and the effects of cyclical reallocations across plants
- Differences in job creation and destruction patterns across local labor markets
- Sectoral-differences in firm-level volatility

While at LAEF, Lee presented a seminar to the Department of Economics professors and graduate students, entitled “Entry, Exit, and Plant-level Dynamics over the Business Cycle.” The paper, which is joint work with Toshihiko Mukoyama of University of Virginia, develops a dynamic general equilibrium model to explain a new finding about the patterns of entry and exit over the business cycle. Using plant-level data from the U.S. Census Bureau, this paper finds that plants entering the marketplace during recessions are very different in terms of employment and productivity from those that enter during booms, whereas exiting plants are rather similar in both phases of the business cycle. On average, plants that enter during recessions are larger (for example, they hire more workers) and are more productive than plants that enter during booms. Such differences are relatively small for plants exiting in booms or recessions. In the model, plants enter and exit endogenously, and the size and productivity of entering and exiting plants are also determined endogenously.

Dynamic Political Economy and Optimal Taxation

May 1-3, 2008

The “Dynamic Political Economy and Optimal Taxation” conference was held on the UCSB campus in May 2008. Stefania Albanesi of Columbia and Peter Rupert, Associate Director of the Laboratory for Aggregate Economics and Finance, were the academic coordinators of the event.

The conference began with a kick-off dinner on May 1, 2008, followed by twelve presentations over two days. UCSB Economics Department faculty and graduate students participated.

Visiting conference participants were:

Stefania Albanesi, *Columbia*

Laurence Ales, *University of Minnesota*

Roc Armenter, *Federal Reserve Bank of New York*

Marina Azzimonti, *University of Texas, Austin*

Marco Battaglini, *Princeton*

Steve Coate, *Cornell*

Emmanuel Farhi, *Harvard*

Mike Golosov, *MIT*

Marek Kapicka, *University of California, Santa Barbara*

Narayana Kocherlakota, *University of Minnesota*

Massimo Morelli, *Columbia*

Christopher Phelan, *University of Minnesota*

Vincenzo Quadrini, *University of Southern California*

Christopher Sleet, *Carnegie Mellon University*

Pierre Yared, *Columbia*

Sevin Yeltekin, *Carnegie Mellon University*

Eric Young, *University of Virginia*

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

May 2, 2008

On the Case for a Balanced Budget Amendment to the U.S. Constitution

Marina Azzimonti, Marco Battaglini and Stephen Coate

Fiscal Policy over the Real Business Cycle: A Positive Theory

Marco Battaglini and **Stephen Coate**

Political Economy and the Structure of Taxation

Daron Acemoglu, **Mike Golosov** and Aleh Tsyvinski

Competitive Nonlinear Taxation and Constitutional Choice

Massimo Morelli, Huanxing Yang and Lixin Ye

A Dynamic Theory of Concessions and War

Pierre Yared

Growth, Inequality and Taxation in Uncommitted Societies

Chris Sleet and **Sevin Yeltekin**

May 3, 2008

Intertemporal Distortions in the Second Best

Stefania Albanesi and Roc Armenter

The Dynamics of Optimal Taxation when Human Capital is Endogenous

Marek Kapicka

The Political Economy of Nonlinear Capital Taxation

Emmanuel Farhi and Iván Werning

Accounting for Private Information

Laurence Ales and Pricila Maziero

Nonseparable Preferences and Optimal Social Security Systems

Borys Grochulski and **Narayana Kocherlakota**

On the Robustness of Laissez-Faire

Narayana Kocherlakota and **Christopher Phelan**

PRESENTATION SUMMARIES

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Recently, there has been a growing literature regarding the possible inclusion of a balanced budget amendment in the United States Constitution. Azzimonti, Battaglini, and Coate began the conference by presenting an analysis of the debate. They concentrate on the possible effects such an amendment would have on fiscal policy. It has been shown that a legally required balanced budget could restrict the government from enacting optimal fiscal policy. However, according to the authors, these past theoretical findings have omitted political economy effects. They believe the absence of these effects could be downplaying the benefits of a balanced budget. In theory, incorporating the political economy effects with the economic effects results in lower debt, but also lowers short term public welfare. The latter is caused by a government which tries to rapidly cut costs to meet its budget. The short term welfare loss is partially balanced by long term welfare gain, due to higher public spending and lower taxes. However, the lack of flexibility can cause problems, such as the absence of a tool to smooth taxes. When the model is calibrated to the U.S. economy, the debt to GDP ratio under the balanced budget amendment is cut nearly in half, while welfare responds as predicted by theory. Balanced budget debates often center around fiscal responsibility vs. government flexibility, and the authors believe their results emphasize the importance of flexibility. All impacts considered, volatile taxes and short terms welfare losses seem to override the long term gains.

The model is based on that of Battaglini and Coate (2008). Agents receive utility from a non-storable private good and a government-provided public good. They maximize utility while providing labor in a linear production function. There is a stochastic shock which determines the amount agents value the public good. This can be interpreted as the public favoring more military spending during a war. On the political side, agents live in a finite number of districts, and send one representative to the legislature. The legislature votes on policy, which consists of a tax rate, net bonds, public spending, and transfers to specific districts which are interpreted as pork barrel spending. The authors' findings indicate that a high shock to the valuation of the public good increases taxes, and nobody gets any "pork." In addition, when debt is low, fewer taxes are used to pay for interest, and pork barrel spending occurs.

After calibrating the model to the U.S. economy, the authors find that public-good-to-GDP variance is lower, representing a slower response to preference changes for the public good. Average taxes, average public goods, and the debt-to-GDP ratio are all lower.

During her presentation, Azzimonti fielded several questions about the calibration. One conference participant was concerned that the stochastic periods labeled “war” - which led to much higher levels of public spending - were calibrated to be only 2%. The Vietnam War alone would beat this mark. Azzimonti responded by saying that “war-time” spending was estimated to be a time during which the public-funding-to-GDP ratio was much higher than average, such as during World War II.

Conference participants raised questions about the endogeneity of war in fiscal decision-making. One of Azzimonti’s co-authors added that an argument for a balanced budget is to prevent governments from going to war too often. That fact is not captured in the model. As for a question regarding the flexibility of the amendment during emergencies, Azzimonti showed that as an extension, emergency overrides to the amendment actually do nothing to fiscal policies and citizen welfare.

Fiscal Policy over the Real Business Cycle: A Positive Theory

by Marco Battaglini and Stephen Coate

Economists Marco Battaglini and Stephen Coate were featured again in the second presentation of the conference. Their paper, “Fiscal Policy over the Real Business Cycle: A Positive Theory,” constructs a model to match data on the fiscal policies of developed countries over business cycles. Their goal is to provide an understanding of the way large groups and institutions respond to business cycle productivity shocks. Traditionally, the literature has concentrated on individual agent responses to shocks. Here, their model is one that includes political economy, and therefore the responses to fiscal policies are those of the government, not individuals. Their main results show that in the short run, fiscal policy is pro-cyclical, while in the long run it is counter-cyclical. By fiscal policy, they refer to government spending and debt levels.

The model has agents which value a public and a private good. The agents receive labor productivity shocks, and are paid wages accordingly. The government chooses policies on public spending, debt levels, tax rates, and pork barrel spending. The social planner’s solution centers around the marginal cost of public spending, or the welfare cost of raising one more dollar of tax revenue. Theoretically, in the short run, if the economy is in a recession, the future can only get better. Better economic performance generally means lower tax rates, which in turn lowers the marginal cost of public spending. Therefore, in recessions, the social planner raises debt levels, which will be paid back in the future when tax rates can be raised to pay back interest. The opposite occurs when the economy is in a boom. Over

the long run, the government will eventually accumulate enough assets to pay for public funding through interest revenue alone. This causes taxes to converge to zero, underscoring the authors’ point that without perfectly anticipated productivity shocks, tax smoothing policies have a hard time explaining long term fiscal policies.

A conference participant asked if there was a specific reason why capital accumulation was not included in the model. Coate pointed out that once capital accumulation is included, the model runs into problems with time inconsistency in terms of the taxation of capital. The authors did not want to consider that additional complication. Another participant asked about the linearity of the public good in the utility function, and how it would affect the distribution of the political equilibrium. Coate pointed out the solution is general, and not dependent on the linearity. However, an exact characterization of the equilibrium is unknown, and the authors continue to study the model to better understand it.

Political Economy and the Structure of Taxation

by Daron Acemoglu, Mike Golosov and Aleh Tsyvinski

At the time of the conference, Golosov’s paper was in the preliminary stages of completion, thus could not be summarized. Below is the abstract of the paper, current as of September 2008.

“We study the constrained Pareto efficient allocations in a dynamic production economy in which the group in political power decides the allocation of resources. We show that Pareto efficient allocations take a quasi-Markovian structure and can be represented recursively as a function of the identity of the group in power and updated Pareto weights. For high discount factors, the economy ultimately converges to a first-best allocation in which there may be transfers between groups, but labor supply decisions are not distorted and the levels of labor supply and consumption do not fluctuate over time. When discount factors are low, the economy converges to an invariant stochastic distribution in which distortions do not disappear and labor supply and consumption levels fluctuate over time. In these allocations with distortions, the labor supply of individuals from groups that are not in power are taxed, while the labor supply of those in power is subsidized. The subsidies are useful to relax the political economy/sustainability constraints.

We also show that the set of sustainable first-best allocations for high enough discount factors are independent of the Markov process for power change. This result contradicts a common conjecture that there will be fewer distortions when the political system creates a “stable ruling group”. The

reason why this conjecture is incorrect is that social groups can be rewarded not only when they hold power, but also when they engage in production. Consequently, the probability of power switches does not directly affect “effective discount factors”. Nevertheless, it remains true that distortions decrease along sample paths where a particular group remains in power for a longer span of time.

Finally, we demonstrate that the constrained efficient allocation can only be decentralized using distortionary taxes (even when the political system has access to lump-sum taxes), so that the results about fluctuations of distortions, consumption and labor supply levels correspond to fluctuations in taxes and redistribution.”

Competitive Nonlinear Taxation and Constitutional Choice

by Massimo Morelli, Huanxing Yang, and Lixin Ye

Morelli, Yang, and Ye compare two types of tax systems, a unified tax system and an independent competitive tax system. The unified system is constructed by the federal government and maximizes the society’s welfare as a whole.

Agents are endowed with one of three types of earnings ability: low, middle, or high. All agents have location preferences which lie on a closed interval. The extreme ends of the interval represent the locations of the two states, and the distance from an agent’s preferred state causes disutility.

In the case of a competing tax structure, the two states simultaneously announce tax rates for each of the three agent types. Given these tax rates, the agents maximize utility and decide in which state they wish to live. The authors restrict attention to symmetric equilibria. In this case, the states want to persuade high ability agents to move to their state in order to subsidize the poor. However, the low taxes needed to attract the high ability agents reduce revenue, preventing states from subsidizing as much as they would like. Welfare is relatively lower compared to a unified system. The tax schedule is much flatter, and the progressive nature of taxes is subdued.

In the end, the prospect of lower taxes slightly outweighs that of higher subsidies, and middle ability agents favor the competitive system. The results are sensitive to the weight placed on location preference, and the proportion of the population each ability type encompasses. This is especially true for the middle ability type.

During the presentation, a conference participant asked if the equilibrium in the independent tax case was Pareto-efficient. Morelli responded by saying that since the paper concentrates only on symmetric equilibrium, he cannot



Massimo Morelli presenting at the conference

be sure if they are indeed efficient. During an extension where Morelli went over the case with a continuous ability variable, a participant asked what would happen if the distribution and median ability changed. Morelli stated that depending on the median agent, he will probably prefer to have a decentralized tax system over a unified one.

A Dynamic Theory of Concessions and War

by Pierre Yared

Yared studies the decisions of quarrelling countries in an application of dynamic imperfect information games with history dependence in “A Dynamic Theory of Concessions and War.” In his paper, Yared attempts to build a framework to explain the constant military clashes certain countries seem to engage in over long periods of time. Specifically, he is interested in how war escalates, and why some opposing countries seem to embark on endless cycles of peace and temporary war. He constructs a dynamic game between two countries: a dominant, militarily aggressive country, and a more passive country. Due to the countries’ lacks of reliable information involving their opposition’s motives involving concessions, war turns out to be necessary. This result contradicts and expands on several proposed theories in the literature.

The game starts off every period with the two countries mentioned. The aggressive country chooses to declare war or ask for a concession. Choosing war leads to exactly that, and the passive country has no choice but to engage. If this is the choice, then both countries receive some small valued payoff. The aggressive country’s payoff is positive, as its military dominance is assumed, while the passive country receives a negative payoff. The aggressor’s other option, asking for a concession, represents demanding

some payoff from the passive country. At this point, the decision-making moves to the passive country, which can choose to pay the concession or not. Either way, the game moves to the next period where it is played over again. The game is set up with limited information: if the passive country does not pay, it is either by choice, or some stochastic event that exogenously prevents it from doing so. The latter case represents the passive country earnestly trying to fulfill the demand (such as turning over a POW), but is unable to for some reason (such as an internal uprising). This lack of information is the impetus of war in Yared's model, because war acts as punishment, sometimes for both countries.

Yared presents several types of efficient sequential equilibria. One is escalation, or repeated denials to concede on the passive country's part, being met with higher and higher concession demands. Eventually with repeated denials, the aggressive country will declare war as punishment, although not necessarily total war, as is predicted by some of the literature. Instead, Yared presents situations in which periods of concession refusal are met with temporary wars, leading to peace again. Here, war is necessary as a credible threat. In addition, the aggressive country doesn't want to declare total war because it may have made a mistake in deciding the passive country's motives.

A conference participant asked a question regarding the necessity of war interpreted as the aggressive country declaring a probability of war at the beginning of the period. Yared explains that there exists a public randomization device that formally defines a probabilistic war. Another participant wanted to know the difference between a low probability of total war and a high probability of temporary war. Both lead to the same equilibrium in the model, and an adjustment could be made to arrive at a unique equilibrium. The response was that the paper is asking a specific question: "Why do some countries consistently involve themselves in temporary wars?" So the model is not aimed at finding a unique equilibrium, but instead at seeing how equilibrium can be achieved by mimicking realistic situations in the real world.

Growth, Inequality and Taxation in Uncommitted Societies

by Christopher Sleet and Sevin Yeltekin

The lack of societal commitment is introduced into an economic setting with private information in "Growth, Inequality, and Taxation in Uncommitted Societies" by Christopher Sleet and Sevin Yeltekin. The authors study optimal allocations chosen by a planner, and how to implement these allocations through tax schedules in such

an environment. Agents in their economy have private information regarding how much they dislike working. The authors find that if a central planner tries to induce the truth out of agents by rewarding them with future utility, it could lead to some undesirable outcomes such as increased inequality. The inequality at future dates can be reduced by the central planner; however, deviating from earlier promises could lead to situations where the agents no longer find the planner's promises of rewards credible. The equilibrium the authors want to find is one where both agents tell the truth and the planner sticks to his promises.

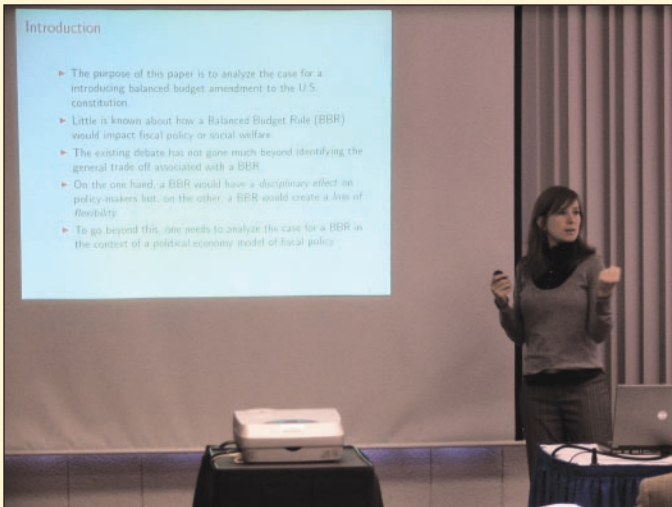
The model consists of infinitely lived agents who receive a shock describing their disutility from work. The planner rewards truth telling with future promised utility. At the time the utility is to be rewarded however, the planner is motivated to deviate to reduce inequality in the economy. To solve this problem, the authors introduce what they call credible allocations, or allocations that are subject to the constraint that they are believable to all parties involved. This makes the future allocations proposed by the central planner credible in the eyes of the agents. The planner is no longer motivated to deviate.

During the presentation, a participant asked what would happen if capital accumulation was not included in the examples. Yeltekin responded by saying the examples she gave regarding lack of commitment would be isomorphic to many previous papers. Another participant asked about the constant referral to log linear and Cobb-Douglas utility cases, which were prominently featured during the presentation. Yeltekin pointed out the results from the model are more general, but the sharpest results occur with the log linear case.

Intertemporal Distortions in the Second Best

by Stefania Albanesi and Roc Armenter

Albanesi and Armenter study the problem of public finance models with permanent intertemporal distortions at the optimum. Different types of public finance problems often have contradicting characteristics involving intertemporal distortions. Many taxation models have no distortions, while private information economies tend to have permanent intertemporal ones. In a study of a wide class of models, the authors try to sort out what leads to these differences. Their basic result is that if an allocation converges to the first best steady state, then intertemporal distortions are all temporary in the second best. By "second best," the authors are referring to economies where constraints outside of technology and feasibility must be satisfied. These can include restrictions on the ability to



Marina Azzimonti's presentation

trade, or the access to the space of assets. These additional restrictions are referred to as admissibility constraints.

Specific admissibility constraints needed include limited history dependence and having clear definitions of first and second best feasible allocations. The latter can be achieved by introducing additional restrictions on agents and governments, depending on the framework. Models with incomplete markets that satisfy these constraints, and whose equilibria converge to a steady state, will have no intertemporal distortions. In addition, they state technical conditions to make sure their analysis is tractable. In proving their sufficient condition, they split the problem into two parts: finding the optimal allocations subject to their conditions and given auxiliary conditions, and then finding the optimal path for the auxiliary variables.

A conference participant asked what the precise meaning of the word “permanent” was in terms of their research. Albanesi responded that it meant the intertemporal distortions existed in steady states and limiting distributions. There were also several questions about assumptions regarding the existence of second best allocations. Albanesi said that they assumed these allocations exist as existence results.

The Dynamics of Optimal Taxation when Human Capital is Endogenous

by Marek Kapicka

Marek Kapicka contributes to the optimal taxation literature by focusing on agents' private information regarding their human capital accumulation. He continues the line of research extending the Mirrleesian framework into dynamic economies. His paper analyzes efficient allocations when ability and human capital accumulation is unobserved by the government. As a resolution to the generally

recognized difficulty of solving dynamic private information economies, Kapicka breaks down the problem into two subproblems: one of redistribution, and another of finding sequences of human capital and labor supply allocations. He finds the government can maximize social welfare by increasing the marginal tax rate over time. This results in significant changes to total welfare, with little additional agent effort: consumption increases by about 17% while the long term labor supply and schooling increases by only a tenth of a percent.

Agents in the economy are given initial permanent ability. In addition, they also have the choice of splitting their time between increasing human capital (schooling), working, or obtaining leisure. Ability, human capital, and labor supply all contribute to agents' total productivity. All information is known privately to the agent, and unknown by the governing body (social planner or government). Kapicka finds efficient allocations of the economy. Then, using the subproblem method, he finds a way to implement it in a market economy by changing tax rates. Using recursive methods, he finds that at the beginning of time, the government should increase marginal taxes to high levels in order to encourage schooling. This works since schooling and working are substitutes early in life. Later, when the two are more complementary, the government should relax marginal taxes a bit. While this results in increased welfare, almost all of it is derived from more efficient allocations of schooling and labor across different ability types, with only a small increase in general non-leisure activities.

Several participants asked about the observability of the initial permanent ability shock. Kapicka explained that the ability parameter is initially the same for everyone and is observed by the government, but in the calibration, this assumption is relaxed and agents receive unobserved shocks. Another participant asked if the welfare gain was a steady state welfare gain or if it included transition gains. Kapicka responded that it included transition gains, but the model is specialized to a point where utility is the same in every period so that transition and steady state welfare gains will be the same.

The Political Economy of Nonlinear Capital Taxation

by Emmanuel Farhi and Iván Werning

Research regarding the optimal level of taxes in an economy often shows an absence of a capital income tax. If any tax is to be levied, it is often regressive. However, reality doesn't match these results: almost all developed economies do the exact opposite. Emmanuel Farhi and Iván Werning want

to resolve this reality vs. research problem by offering an environment where progressive taxes can be optimal. They show that if limited commitment to future tax policies leads to a motivation to keep inequality down, then this results in an optimum with a progressive tax schedule. As mentioned by other presenters at the conference, the optimal taxation literature has often ignored political economy considerations. Farhi and Werning use a probabilistic voting model, where agents vote to satisfy personal taste shocks, as well as to maximize self interest. A fixed cost preventing full commitment to tax policies leads to politicians wanting to keep inequality down in order to maximize their reputations. This leads to progressivity in taxation.

The authors study a two period model as well as an infinite horizon one. The infinite horizon model consists of heterogeneity in political taste and disutility of labor. The revelation principle allows the authors to limit the equilibria studied to those where agents tell the truth, even though in the setup agents' information is private. On the political side, there are two candidates every period who vie for votes. They announce tax policies. When the winning candidate is announced, the tax policy in place is given as what it was last period. It costs a fixed amount to change the policy, and the candidate has the option to do so or not. The fixed cost limits the commitment. If the fixed cost were infinite, then all tax policy would be the same forever. When credibility requires inequality to be kept under control, a progressive tax policy results.

During the presentation, there was clash of opinions between Farhi and a conference participant. The participant insisted that the probabilistic voting model was very restrictive in terms of the type of equilibria it could deliver. Farhi disagreed. The participant then pointed out that in probabilistic voting models there are many situations where equilibria do not exist. There was quite a debate regarding the truth

of this statement, with multiple literature references made by both sides. In the end, Farhi insisted the assumption of a probabilistic voting model was no more restrictive than any other assumption he and his co-author had made.

Accounting for Private Information *by Laurence Ales and Pricila Maziero*

Ales and Maziero ask if the level of insurance observed in data could be a constrained efficient allocation under the presence of private information. They introduce two shocks to labor productivity: one is public information and the other is known only to the agent. The optimal contract depends on the fraction of private shocks. A Mirrlees type economy is considered, and the authors find consumption dispersion increases over the lifecycle even if the variance of the shocks does not. In the absence of private information, consumption would be fully insured against idiosyncratic productivity shocks. In this environment, full insurance against productivity shocks is not incentive compatible, as agents would lie about their private shock.

The model is calibrated to match the data, which shows increasing consumption inequality without increasing variation in hours worked. The authors show that private shocks are persistent, indicating the lack of full insurance can be attributed to the asymmetry of productivity knowledge. Important policy implications follow, as any policy addressing inequality and redistribution should take into account the incentive effects of private information.

A changing marginal rate of substitution between consumption and leisure over the life cycle is another attribute that must be taken into account in the optimal contract. As agents age, the provision of incentives of the contract must change. In early life, continuation utility carries more weight, but as the agent ages, incentives should be less tied to future promises. High shock agents must be compensated with more leisure or consumption. The result of this paper is the importance of the private information friction when designing contracts. The authors also discuss interesting extensions involving investment in human capital under asymmetric information.

During his presentation, Laurence Ales was asked if the independence of productivity shocks was realistic. He responded by saying that in the paper they allow for persistence in public shocks in order to capture the persistence of wages, which is what is actually measured in the data.



Nonseparable Preferences and Optimal Social Security Systems

by *Borys Grochulski and Narayana Kocherlakota*

Private information has become an important consideration in policy formation, and most work has considered the case of additively separable preferences over time. Grochulski and Kocherlakota argue that separable preferences over time, and between consumption and leisure, are severe restrictions. They characterize optimal taxation under private information and nonseparable preferences.

Optimal asset taxes depend on future labor income, which leads the authors to consider a system where asset taxes are imposed at retirement. Since the optimal asset tax depends on the agent's entire labor income history, it is similar to a social security system. At every date before retirement, agents pay a flat tax on their labor income. In every period after retirement, agents receive a payment that is conditional on their labor income history.

The optimal system in this model deviates from the system in the United States in two ways. First, agents are allowed to borrow against their future social security transfers. Second, the asset income taxes are paid at retirement and are conditional on their labor income history. The optimal asset income taxes may provide an extra incentive to save. Also, it is optimal to not tax post-retirement asset income, as agents can not be deterred from working less. A numerical example is given demonstrating the potentially large effect of intertemporal nonseparabilities on optimal taxes. Then the authors prove that the average optimal asset tax is zero across agents, making asset income taxes a pure income redistribution.

There was discussion between Kocherlakota and a conference participant about the applications of his model. It was emphasized that the authors are not trying to completely duplicate the complicated United States tax system. Instead, they wanted to show the often criticized complication of the Mirleesian tax systems are not as complex when observing real world policies. In addition, it was also emphasized that the application of the model to Social Security was used as an example, and that the model could be applied to much broader tax systems.

On the Robustness of Laissez-Faire

by *Narayana Kocherlakota and Christopher Phelan*

In their paper, Kocherlakota and Phelan attempt to resolve the problem of centralization in private information economies. In economies where certain characteristics of agents are only observed on a private scale, the optimal outcome leads to complete centralization: a social planner who controls everything. An argument for this outcome

is the availability of insurance. The authors take a different viewpoint: they want to return these economies to the world of open markets. They do this by constructing a framework where agents have several stochastic shocks that determine their endowments and preferences. The two are correlated, and both are also privately observed. With this environment in place, the central planner faces the obstacle of being uncertain about the joint distribution of the shocks. Specifically, the planner cannot form a Bayesian prior regarding the distributions. The results directly contradict previous work. The authors are very direct in making their point: in this framework there is a unique, optimal social contract, and it is for the economy to be completely decentralized.

The agents in the economy receive shocks to their total endowment, as well as to the way in which this total is distributed across all available goods. The agents receive similar shocks describing how soon they want to consume in general, as well as how soon they want to consume specific goods. All shocks describe an agent's type. In the paper, an "environment" is described as a particular distribution of types. All this is private information, and agents can send any message they want publicly (including the truth). The central planner faces the problem of not being able to form a prior over all types, including characteristics and messages, as well as not knowing which equilibrium, out of several available, could result from a particular mechanism. The authors then describe a laissez-faire mechanism which is resource feasible, and produces the same expected utility for any marginal distribution of total endowments and urgency preferences.

Kocherlakota and Phelan prove that the laissez-faire mechanism is the unique and optimal solution. First, they describe an environment as "complete" if there is another environment in which enforcing laissez-faire makes social welfare worse. Then they show that for any non-laissez-faire mechanism in an environment, the laissez-faire mechanism provides strictly higher social welfare. If one can find an equivalent environment (in terms of marginal distributions) where laissez-faire is worse, then the original non-laissez-faire environment must have a corresponding laissez-faire mechanism that makes it strictly better.

During Phelan's presentation, there was a question regarding the definition of "completeness" which is critical for the theorem to work. Phelan responded that simply put, completeness means for every environment, there is another environment with the same marginal distribution, but in which laissez-faire policy is worse off than the original. Responding to other questions, Phelan stated that everyone in the economy is treated anonymously, and that by "optimal" he means maximizing the social welfare function.

Director's Message *(continued from page 1)*

We concluded that there would be extraordinarily high benefits from providing micronutrients – particularly vitamin A and zinc – to undernourished children in South Asia and Sub-Saharan Africa. These measures help prevent neonatal death. The cost is tiny: Reaching 80% of the 140 million or so undernourished children in the world would require a commitment of around \$60 million annually, and the economic gains would eventually clear \$1 billion a year. Similarly, providing iron and iodized salt is another top investment. Fortifying products with iron costs as little as twelve cents per person per year. We know that iron deficiency leads to stunting and cognitive and developmental problems. For \$286 million we could get iodized salt and fortified basic food items to eighty percent of those in the worst-affected areas. The benefits are estimated to be somewhere around nine times the costs.

Among other top-ranked solutions in the health area were interventions such as de-worming and other nutritional programs in school, which would allow children to be better nourished, and expanded immunization coverage for children. To a considerable extent, these solutions promote education as well, making the children healthier and fit to learn. Moreover, alleviating these health problems may free up time for the parents, especially for the mothers, perhaps, to engage in gainful pursuits. In this respect, of course, focusing on direct measures to further education is likely to be more effective strictly from that perspective. For that reason, in the ranking after the health-related solutions came solutions such as lowering the price of schooling, and increasing and improving girls' schooling by paying mothers to send their children to school.

These health solutions are often rather short run in nature, in the sense that if we were to return five years after a country has implemented them, chances are the needs in the next cohort of children would be almost as great. Some solutions have benefits in terms of raising, primarily through better education, the nation's stock of human capital, with sizable potential benefits in the longer run. A solution that really emphasizes the long run is the removal of trade barriers. Even if one were to figure in the costs to those who may lose in the short run, a large and convincing body of theoretical and empirical economics, as summarized by the experts, supports the idea that the nations' long-run benefits can be very large. Without growth, they will still be mired in the same problems of poverty five or ten years down the road. By reducing trade barriers, income per capita will grow, enabling the currently poor countries themselves to take care of some of these other problems, for example those involving health and education.

More information on Copenhagen Consensus 2008 and on the 2008 Kavli Prizes is on the Internet.



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