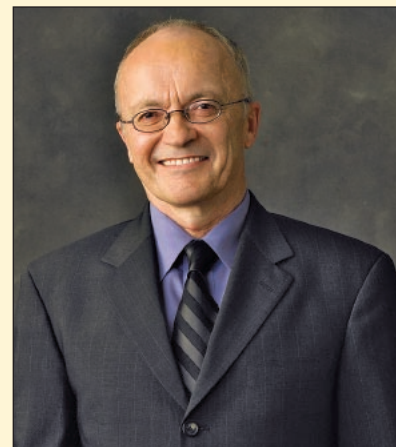


Director's Message

Since World War II, GDP per capita of the typical Latin American country has remained quite stagnant, while much of the rest of the world has experienced an unprecedented improvement in living standards. Respected scholars have identified the low productivity of Latin American economies as the main culprit for that lackluster performance. Attempts to address the productivity problem with privatization programs and free-market-oriented reforms in the late 1980s and in the 1990s seemingly ended in failure, as many governments in the area are currently in the process of reversing those reforms on the grounds that they delivered more unemployment and poverty instead of the promised prosperity. The unusually high rates of economic growth the region is currently experiencing are typically attributed to favorable international conditions rather than to any substantial progress of Latin American economies at permanently lifting their productivity. If that interpretation is correct, the recent turmoil and volatility in international markets suggests that Latin America may again face—and sooner, rather than later—its old, seemingly intractable, low-productivity problem. Accordingly, we deemed it timely to gather a small group of scholars and policymakers whose current and/or past research can shed light on the following question: *What is (are) the source(s) of Latin America's low-productivity (Total-Factor-Productivity) problem and what can be done about it?* The conference organizers, Lee Ohanian (UCLA) and Carlos Zarazaga (Dallas Fed), selected papers that examine aspects of this question with models in the dynamic, general equilibrium tradition that, in the spirit of LAEF, emphasize the quantitative implications of theory and their correspondence (or lack thereof) with the relevant data. This newsletter summarizes the proceedings of that conference. The participants included economists and policymakers affiliated with international organizations, central banks, and academic institutions from the United States as well as Latin American countries.



Finn Kydland

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Special thanks go to Bryan Lim, UCSB Economics Ph.D. student, for his accurate and concise summaries of each of the conference presentations, Michael Oliva for the photography, and UCSB Artworks for newsletter design and production.

On a personal note, ever since I took the position at UCSB in 2004, my wife and I had our residence in Vancouver, Canada, with me commuting to Santa Barbara for about half the weeks of the year. I'm delighted now that everyone in the household has moved to Santa Barbara. With no need to commute any longer, and with Peter Rupert on board as the Associate Director of LAEF, much more time can now be devoted to planning LAEF activities, especially conferences and workshops. At the same time, I'd like to take the opportunity to thank the Department of Economics at the University of British Columbia for providing me with a courtesy office for three years. I especially thank the then Head, Angela Redish, who took the initiative, as well as her successor, Brian Copeland, who continued to let me use that office.

LAEF sponsored a conference entitled "Trading Frictions in Asset Markets" December 6-8, 2007. Look for the conference proceedings in the forthcoming Spring 2008 edition of "From the Lab."

Latin America's Total Factor Productivity Puzzle

September 20-22, 2007

As described in the Director's Message, The Laboratory for Aggregate Economics and Finance (LAEF) sponsored a conference entitled "Latin America's Total Factor Productivity Puzzle" September 20-22, 2007 on the UCSB campus. Lee Ohanian of UCLA and Carlos Zarazaga of the Federal Reserve Bank of Dallas were the academic coordinators of the event. UCSB Economics Department faculty and interested graduate students participated. The conference began with a kick-off dinner on September 20, 2007, followed by two full days of presentations.



Conference participants gather near the lagoon.

Visiting conference participants were:

Mark Aguiar, *University of Rochester*

Pedro Amaral, *Southern Methodist University*

Omar Bello, *Economic Commission for
Latin America and the Caribbean*

Michele Boldrin, *Washington University*

Francisco Buera, *Northwestern University*

Pedro Cavalcanti Ferreira, *Getulio Vargas
Foundation, Brazil*

José de Anchorena, *Carnegie Mellon University*

José De Gregorio, *Central Bank of Chile,
Vice President*

Gary Hansen, *UCLA*

Hugo Hopenhayn, *UCLA*

Ayse Imrohoroglu, *USC*

David Kaplan, *ITAM, World Bank*

Timothy Kehoe, *University of Minnesota*

David Lagakos, *UCLA*

Rodolfo Manuelli, *University of Wisconsin*

Andrés Neumeyer, *Universidad Torcuato di Tella*

Lee Ohanian, *UCLA*

Edward Prescott, *Arizona State University and
Federal Reserve Bank of Minneapolis*

Diego Restuccia, *University of Toronto*

Richard Rogerson, *Arizona State University*

Kim Ruhl, *University of Texas, Austin*

Yongseok Shin, *University of Wisconsin*

Carlos Urrutia, *ITAM*

Mark L.J. Wright, *UCLA*

Carlos Zarazaga, *Federal Reserve Bank of Dallas*

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

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GROWTH AND/OR BUSINESS CYCLE IMPLICATIONS OF ALTERNATIVE MEASURES AND MODELS OF TFP

TFP in Latin America

Pedro Cavalcanti Ferreira, Samuel Pessôa and Fernando Veloso

The Role of Interest Rates and Productivity Shocks in Emerging Market Fluctuations

Mark Aguiar and Gita Gopinath

Session Two

TFP AND OPEN ECONOMY/INTERNATIONAL ISSUES

Are Shocks to the Terms of Trade Shocks to Productivity?

Timothy J. Kehoe and Kim J. Ruhl

The Terms of Trade and Latin America's Lost Decade

Andrés Neumeyer, José Azar and Javier Cravino

Where Did Capital Flow? Fifty Years of International Rate of Return Differentials and Capital Flows

Lee E. Ohanian and Mark L.J. Wright

Explaining Cross-Country Productivity Differences in Retailing

David Lagakos

SEPTEMBER 22, 2007

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TFP AND FINANCIAL FRICTIONS/OCCUPATIONAL CHOICE

East Asia vs. Latin America: TFP and Human Capital Policies

Rodolfo E. Manuelli and Ananth Seshadri

Financial Frictions and the Persistence of History: A Quantitative Exploration

Francisco J. Buera and Yongseok Shin

Financial Intermediation and Economic Development: A Quantitative Assessment

Pedro S. Amaral and Erwan Quintin

Session Four

TFP: MICROECONOMIC EVIDENCE AND GOVERNMENT REGULATION

Policy Distortions and Aggregate Productivity with Heterogeneous Plants

Diego Restuccia and Richard Rogerson

Entry Regulations and Business Start-ups: Evidence from Mexico

David S. Kaplan, Eduardo Piedra and Enrique Seira

PANEL DISCUSSION

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José De Gregorio	Carlos Zarazaga

TFP in Latin America

by Pedro Cavalcanti Ferreira, Samuel Pessôa and Fernando Veloso

Due to an array of problems ranging from widespread government intervention to policy mistakes to political instability, the common assumption is that total factor productivity (TFP) in Latin America lagged behind other regions during its entire development process. Recent papers by Hopenhayn and Neumeyer (2004) and Cole *et al.* (2005) present evidence that would appear to confirm this perception: the former finds average Latin American TFP growth to be slightly negative between 1960 and 1985, and the latter finds average TFP levels in Latin America to be roughly half of U.S. levels between 1950 and 2000. In this paper, however, Ferreira, Pessôa, and Veloso calculate that until the mid-1970s, Latin American countries had high productivity levels relative to much of the developed world. TFP in Latin America was in fact higher than a sample of Western European countries between 1960 and 1975, and competitive with U.S. levels as late as 1980. Only after the mid-1970s does the relative TFP in Latin America drop to 72% of western Europe's and 62% of the United States's TFP by the year 2000.

Using a basic Cobb-Douglas production function and data from the Penn World Table, the authors estimate that over the period 1960-1975, average TFP in Latin America increased from 87% to 93% of U.S. productivity before trending downward thereafter. Thus, while East Asian and Western European countries converged toward U.S. productivity levels between 1960 and 2000, in Latin America there was an increasing divergence relative to U.S. TFP. Based on these results, the authors conclude that until the mid-1970s, TFP was not the cause of the relative poverty in the region. Rather, the factors of production – physical and human capital – were to blame. How the region could have maintained the relatively high TFP despite the numerous distortions – like import-substitution industrialization, high inflation, budget deficits, and corruption – remains unresolved.

During his presentation, Ferreira was asked about the depreciation rate potentially increasing over time, as it has in the United States. A participant noted that the increasing rate is a consequence of more capital, particularly of the high-tech variety. Ferreira explained that while their estimate of 3.5% was the average, there was little fluctuation over the sample period. A participant questioned the reliability of the data, given that the Penn World Tables oftentimes rely on regressions to impute values. Moreover, it was noted, there may be biases that systematically make poor countries seem richer than they actually are. Several

participants noted discrepancies in the results compared to Ohanian and Wright (2007), particularly those pertaining to human capital. The results for both papers are similar until the 1980s, at which point they diverge. Ferreira suggested parameterization as a potential explanation.

BIBLIOGRAPHY

Cole, H. L., L. E. Ohanian, A. Riascos, and J. A. Schmitz Jr. (2005) "Latin America in the Rearview Mirror." *Journal of Monetary Economics*, 52: 69-107.

Hopenhayn, H. A. and P.A. Neumeyer (2004) "Latin America in the 20th Century: Stagnation, then Collapse." Working Paper.

Ohanian, L.E. and Mark L.J. Wright (2007) "Where Did Capital Flow? Fifty Years of International Rate of Return Differentials and Capital Flows." Working Paper.

The Role of Interest Rates and Productivity Shocks in Emerging Market Fluctuations

by Mark Aguiar and Gita Gopinath

Relative to small, developed, open economies, emerging markets are characterized by high volatility in income and consumption as well as large countercyclicality in net exports. Additionally, emerging markets face a volatile interest-rate process that is negatively correlated with the level of GDP. Attempting to explain the behavior of emerging markets, Aguiar and Gopinath model an economy driven by productivity shocks with both short- and long-term effects as well as by shocks in the interest rate.

Three specifications for a stochastic interest-rate process are considered: in the first, the interest rate is hit with exogenous shocks independent of productivity shocks; in the second, in addition to the independent shocks, the interest rate responds to transitory productivity shocks; and in the third, in addition to the independent shocks, the interest rate responds to trend productivity shocks. The first specification does poorly in explaining the behavior of emerging markets, as it is unable to generate the large counter-cyclicality in the current accounts as well as the larger responsiveness of consumption relative to income. When the interest rate covaries with productivity shocks, as in the latter two specifications, the model is able to match better the observed data. In particular, with interest rates and productivity co-moving, net exports are countercyclical, a key feature of the emerging markets data. The authors estimate the parameters of the model by matching moments of the data: the standard deviations of income, consumption, and net exports, as well as the covariance of net exports with income. For the benchmark model using Mexican data, they find that the variance of permanent



Mark Aguiar

productivity shocks is greater than that of temporary productivity shocks. They find that the sensitivity of interest rates to temporary productivity shocks is negative but that this value is not significant. With respect to both Canada and Mexico, the parameterized model does well to match key features of the data.

A seminar participant pointed out that the correlations between net exports and output were similar over the 60s and 70s, but changed in the 80s and 90s, while the trade policies in the 80s were similar to those in the 70s. Aguiar attributed this apparent discrepancy to changes in the restrictions on goods and capital flows in and out of the countries. Aguiar was asked why the shock is more persistent in developing countries. He explained that the model suggests that there are a lot of big shocks and that people expect them to last. When a shock occurs, agents anticipate being the "next Korea" (high growth) and adjust their consumption accordingly. In response to a question regarding the calibration with Canada, Aguiar explained that, in the context of their model, Canada has small but persistent policy shocks. The estimates suggest that big shocks are rare but last for a long time. A participant noted that nationalization occurred in the 50s and 60s, so one would have expected to see declines in TFP in the 60s and 70s, but for whatever reason, those were precisely the best years in Latin America. Along those same lines, it was noted that many Latin American countries adopted market-based reforms in the early 90s, but for the most part, these reforms failed to lead to measurable increases in productivity.



Tim Kehoe

Are Shocks to the Terms of Trade Shocks to Productivity?

by Timothy J. Kehoe and Kim J. Ruhl

Foreign trade may be thought of as a production technology: a country's exports are the input, and that country's imports are the outputs. Framed in this manner, an increase in the terms of trade should have similar effects as a technology shock, as the same amount of exports now produces a smaller amount of imports. Kehoe and Ruhl argue that standard models do not in fact support this line of reasoning. While a shock to the terms of trade will yield similar effects on consumption and welfare as a shock to productivity, the effect of a shock to the terms of trade on real GDP is not the same as that of a productivity shock and is highly dependent on the method used to construct real GDP. When real GDP is constructed using chain weighting, deterioration to the terms of trade yields no first-order effect on output. When real GDP is constructed using fixed base-year prices, its effect on output is ambiguous. (It can, for example, be positive under certain circumstances.) Though deterioration to the terms of trade may not reduce output, the authors stress that its effect on consumption can be significant.

In extensions to the basic model, the authors find that (a) when labor is endogenous, real wages fall with a deterioration of the terms of trade, but there is no change to real GDP if chain-weighting is used; and (b) the effects of a deterioration of the terms of trade in an open economy when the government imposes a lump-sum tariff on imports are similar to those of a decrease in TFP in a closed economy when the government imposes a lump-sum tax

on intermediate goods; and (c) the effects of a shock to the terms of trade on real GDP and consumption vary with respect to the elasticity of substitution between domestic factors and the imported input. As the elasticity of substitution increases, changes in the terms of trade have larger impacts on consumption but smaller impacts on real GDP. The authors conclude that terms-of-trade shocks can increase GDP volatility but only by changing factor inputs, not productivity.

A participant noted that the model uses intermediate goods, not consumption goods, and suggested that the authors may want to reinterpret their results. Kehoe responded that the choice of goods is irrelevant: the same result holds. Asked about the extent to which they consider borrowing and lending, Ruhl explained that such considerations were explored in another paper, yielding the same basic result: TFP shocks don't affect real GDP. A participant asked whether one can observe differences between chain-weighted and base-year GDP when looking at the growth rates of TFP. Kehoe explained that growth rates may vary wildly depending on the choice of base year. Ruhl added that for years close to the base year, differences between chain-weighted and base-year real GDP are small, but further from the base year, the differences get larger. A participant noted that when there are costs of reallocation, terms of trade will not have a big impact on TFP, at least in the short run, as the response will likely be delayed. Moreover, whether the shock is permanent or transitory will make a significant difference.

The Terms of Trade and Latin America's Lost Decade

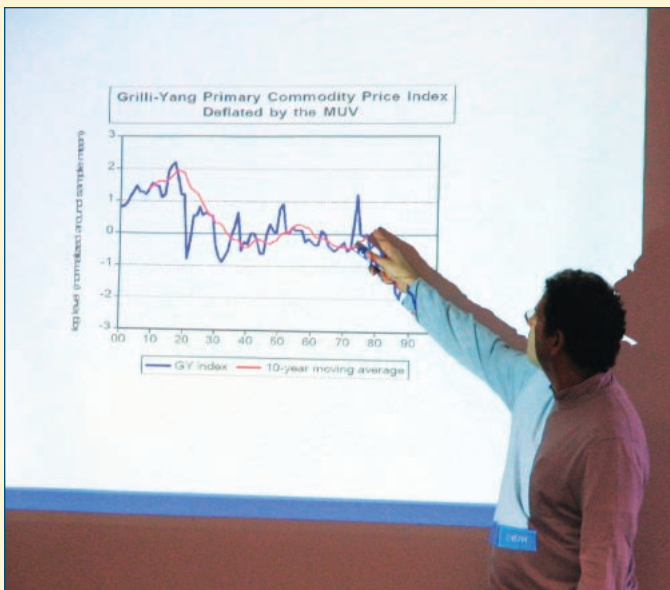
by Andrés Neumeyer, José Azar and Javier Cravino

Relative income per capita had been rising in Latin America since 1950, before falling precipitously in the 1980s. Several trends are observed in the Latin American data over this sample period: GDPs across countries appear to be moving in sync; GDPs appear positively correlated with the terms of trade; and GDPs appear positively correlated with U.S. real interest rates. Neumeyer, Azar, and Cravino examine the extent to which terms of trade and international interest rates can explain Latin America's "Lost Decade." The model is calibrated for each country, which at this preliminary juncture is limited to Argentina. The authors feed the model with the actual terms of trade and international interest rates and then compare the model's prediction with the data.

The authors use the standard neoclassical growth model with two sectors: exportable goods and non-traded goods.

In the steady state, import-competing goods are not produced. There is free trade and free capital mobility. The terms of trade and international interest rate are modeled as exogenous AR(1) processes. At current prices (as opposed to steady state prices), terms-of-trade and international-interest-rate shocks predict a decline in Argentina's GDP of 32% over the period 1974-1990, as opposed to the 38% observed in the data. The model qualitatively matches the data for the export sector but less so for the non-traded sector.

Asked about the frequency of the data collection process, Neumeyer explained that the data are collected every 10 years, with the numbers interpolated in the years between. A participant interpreted the results as a bigger puzzle than originally thought and wondered whether conventional methods could be measuring the data incorrectly. That is, we don't know what the terms of trade are. Neumeyer acknowledged that ideally one would want to go deeper into the data and find out how the numbers are computed. A participant hypothesized that Latin American economies were relatively closed—in which case the traded sector could not absorb the shocks—and suggested looking at the data by sector. In Mexico, for example, the response to terms-of-trade shocks such as those occurring in 1994 and 1995 was huge flows of resources from the non-traded to the traded sector as the relative price of exports increased.



Andy Neumeyer

Where Did Capital Flow? Fifty Years of International Rate of Return Differentials and Capital Flows

by Lee E. Ohanian and Mark L.J. Wright

Assuming that poor countries have higher marginal products of capital than rich countries, Lucas (1990) postulated that capital should flow from the rich to the poor. Ohanian and Wright construct a panel database of 200 countries between 1950 and 2005 and find that for much of the last half century, international capital flows have exhibited the opposite: low-return geographic regions such as Latin America have received considerably more capital than high-return regions such as East Asia. The authors analyze the correlations among bond returns, capital returns, and capital flows, first over the entire sample period and then partitioned by decade. The results suggest that, at best, world financial markets work only poorly to allocate capital where it has the highest return. The convergence in capital returns across countries over time suggests that the costs of investing abroad may not be large today, although the costs of capital market inefficiencies in history may have been much larger. These findings lead the authors to restate Lucas's puzzle from "why doesn't capital flow to the poor" to "why doesn't capital flow to high-return countries?"

To address this question, the authors assess whether common departures from standard theory, including models of contracting imperfections, or models with incomplete markets, can shed light on these findings. They find that none of these classes of models can sufficiently reconcile the fact that capital has not flowed to high return countries. The main reason for the existing theories' inability to account for observed flows is that these models retain the feature that capital flows from low-to high-return countries. Various frictions or market imperfections may limit these flows, but they do not reverse these flows to low return countries, as observed in the data.

Ohanian was asked why perpetual inventory was used, as opposed to calculating market values. He explained that the Perpetual Inventory method is the standard approach to constructing base stocks. More importantly, he added, it can be computed consistently across countries. Asked whether he and his co-author consider financial assets, Ohanian answered no. Stock market returns were not used since for those types of assets there are short-term movements for which there are no satisfactory theories. In the absence of a theory for those types of fluctuations, he explained, it is difficult to use those data. In response to the Lucas puzzle, a participant noted that in the CAPM, a country could have a low average return, but as long as its GDP negatively correlated with the world GDP, invest-

ment in the country could be a good hedging strategy. Thus, one may want to calculate the correlations between each country's GDP and the world GDP. Average return is not a sufficient metric unless you have a model with no uncertainty. A participant pointed out that Lucas argues a potential explanation for why capital doesn't flow is that governments don't allow it in. One might surmise that Asia had big restrictions on capital inflows, which would explain the low inflows and higher return. Ohanian concurred, adding that taxes or subsidies on capital outflows or inflows could be added to the model.

BIBLIOGRAPHY

Lucas, Robert E., Jr. (1990) "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review, Papers and Proceedings*, 80: 92-96.

Explaining Cross-Country Productivity Differences in Retailing

by David Lagakos

In poor countries, measured productivity of the retail sector tends to be much lower than in the United States. Evidence from productivity studies conducted by the McKinsey Global Institute suggests that this productivity gap is largely accounted for by the limited presence of modern retailers such as supermarkets and hypermarkets in poor countries. Modern retailers in poor countries are as productive as those in the United States, but they account for a much smaller share of the overall market. Lagakos posits that modern retail stores require sufficiently large local markets in order to recoup their high fixed costs, and in poor countries, most geographic markets are too small to support such establishments, allowing smaller traditional retailers to prevail. This hypothesis is supported by empirical data from Peru and Mexico. Additionally, comparisons between Mexico and the United States yield substantial differences in penetration rates of modern retailers, conditionally on a country's population density, average income, and car ownership.

In light of this discrepancy, Lagakos models a firm's decision to be either traditional or modern in the context of a circular city characterized by its average income, population density, and proportion of households owning cars. Households choose to shop at a given retail outlet based on minimizing the total cost of procuring the good, including whatever transportation charges they incur. The model implies minimum thresholds for market size and/or car ownership required to support modern retailers. The model is calibrated to match key features of the U.S. and then recomputed with income, population density, and car ownership characteristics from Mexican census data. Though the

model overpredicts the market share of modern retailers in Mexico, Lagakos notes that there may be any number of unmodeled factors inhibiting the viability of these retailers in poorer countries—including, but not limited to, the potentially high costs of capital or traditional stores' ability to evade taxes. From experiments to test the model's sensitivity to the Mexican parameterization, he finds several results: first, cars play a larger quantitative role than household income in the low retail productivity of a typical Mexican county; second, fixed costs do not appear to play a substantial role in the dearth of modern retailers; and third, traditional retailers' lower marginal costs due to tax evasion may potentially be responsible for their proliferation.

During the seminar, a participant noted that some blame these facts on regulations in size. Lagakos acknowledged the possibility. In Japan, for example, there are taxes for exceeding a certain size, though, as far as he knew, there are no such restrictions in Latin American countries. Lagakos was asked about the significance of used cars. He explained that he focuses on used cars because in his opinion these are the cars that will most directly raise car ownership, particularly for the middle class. A participant noted that cars alone don't tell the whole story and that one may additionally consider factors such as the quality of roads, the level of congestion, and the availability of public transportation. Along the same lines, participants questioned Lagakos' hypothesis that restrictions on used cars keep prices higher in Latin America. A suggested test would be to compare prices in newspaper classifieds in the U.S. versus Mexico. A participant asked why modern retailers in Latin America don't deliver. Lagakos explained that the average sale in the U.S. is approximately \$30.00, while in Mexico it is \$5.00. Given the expense of delivery, it is likely unprofitable to deliver such small purchase, he hypothesized.

East Asia vs. Latin America: TFP and Human Capital Policies

by Rodolfo E. Manuelli and Ananth Seshadri

Analysis of cross-country performance inevitably yields successes and failures. The task incumbent upon researchers is to develop an explanation of both episodes of fast growth and instances of economic stagnation. Manuelli and Seshadri present a preliminary attempt, in which the neoclassical growth model is amended to include endogenous human capital. The calibrated model is used to explore the roles of TFP and fertility shocks in explaining the stellar economic performance of several East Asian countries over the last 40 years, as well as the relatively poor performance of many Latin American economies.

The model yields results consistent with the evidence for the East Asian countries, in the sense that it properly predicts the changes in education levels and in the investment-output ratio between 1960 and 2000. The authors consider the effect of a once-and-for-all TFP shock coupled with the actual changes in fertility, and argue that the dynamic responses of schooling and investment are plausible. The findings for Latin America using the same basic model are somewhat less encouraging. The model underpredicts schooling in many countries, reproducing the “excess education puzzle” for Latin America, wherein significant increases in schooling have not translated into substantial increases in output. However, after adding private and public education with borrowing constraints to the model, the authors are able to match both the 1960 and 2000 data nearly perfectly. With imperfect capital markets, they conjecture, some highly-skilled students do not have access to education due to lack of resources.

During the seminar, Manuelli was asked about the transition in India, given its low spending on education in the 1960s: now that India is growing quickly, is it the case that it increased its spending? Citing his co-author, he stated that there was a sharp increase approximately 20 years ago. Some participants raised concern about the importance of education spending. One participant cited William Lewis's *The Power of Productivity*, which documents both miracle economies achieved without increases in education spending and stagnant economies with huge increases in education spending. Lewis's thesis is that education is not the answer to economic growth. Along the same lines, a participant noted that Theory of Value refers not to the level of expenditures but to how effectively those expenditures are spent. The participant suggested examining whether spending on education leads increases in wealth or vice versa.

BIBLIOGRAPHY

Lewis, William (2004) *The Power of Productivity: Wealth, Poverty, and the Threat to Global Stability*, University of Chicago Press.



Finn Kydland

Financial Frictions and the Persistence of History: A Quantitative Exploration

by Francisco J. Buera and Yongseok Shin

While the standard neoclassical model predicts swift convergence to the steady state, high real interest rates during the early stages of development, and a decreasing investment-to-output ratio over time, the growth experiences of East Asian and post-Communist countries do not conform to these predictions. In these economies, growth and investment were initially low before peaking in the latter stages, while real interest rates tended to be low throughout the transition. The authors attempt to reconcile the observed growth dynamics by incorporating financial frictions and resource misallocation into the standard neoclassical growth model. While well-functioning financial markets allocate capital to its best use, financial frictions limit the ability of talented entrepreneurs from operating at an efficient scale.

In the model, each agent makes a choice whether to work for wages or to become an entrepreneur based on his/her heterogeneous endowments of initial wealth and entrepreneurial ability as well as his/her access to credit markets. By adjusting the severity of the credit constraint to all agents, the authors determine the effects of financial frictions on economic development. Calibrated to U.S. data, the model economy converges slowly to the steady state, with the interest rate and investment rate initially low and rising over time. Numerical exercises demonstrate that the initial distribution of wealth has a significant and enduring effect on the transition dynamics. Specifically, an economy with a severe misallocation of wealth and entrepreneurial talent will have a lower aggregate output than an equivalent economy with a better allocation of wealth and talent. To test the plausibility of the model, the authors calculate the degree of initial misallocation that is required to match the observed time paths of real interest rates and investment rates. The results support the conclusion that the neoclassical growth model can be augmented to include financial frictions and resource misallocation.

A participant asked if the model can be made recursive. Buera explained that he and his co-author are interested in the transition dynamics, not the steady-state. Asked whether the model was tested with different parameterizations, Buera answered that it had been and that the results were not materially different. Regarding the experiment in which the level of financial friction was adjusted from low to high, a participant suggested that more variables need to be simultaneously adjusted. Buera agreed, but noted that doing so would only exaggerate the results. A participant asked whether there are micro data on savings available, as once reforms are implemented, savings rates

in the model change substantially. While not having previously considered such micro data, Buera concurred with this intuition, noting that such changes would manifest themselves in the investment-output ratios.

Financial Intermediation and Economic Development: A Quantitative Assessment *by Pedro S. Amaral and Erwan Quintin*

The strong empirical relationship between financial development and economic development is often presented as evidence that the former causes the latter by promoting investment and making the allocation of resources more efficient. The authors seek to quantify the importance of financial intermediation in economic development in the context of a dynamic general equilibrium model. The key mechanism is the default cost: the modeled economies are identical except for the degree to which financial contracts can be enforced. Agents in the model may choose to default on their loans insofar as doing so is individually rational. The results indicate that output is lower in economies where contract enforcement is poor because less capital is used in production and because capital is not directed to its best uses.

The model is calibrated with data from the Penn World Table. In particular, the quantity of financial intermediation is calculated as the sum of the credit firms obtain from banks and other financial institutions, the credit they obtain from issuing bonds, and the funds they obtain from issuing stock. In the calibrated model, financial differences alone can account for much of the output differences between the U.S. and middle-income nations. What distinguishes high enforcement economies from low enforcement economies is their ability to channel capital to the production sector. Production sector capital-output ratios vary almost one-for-one with the finance-to-output ratios. The model thus improves upon standard development models by generating output dispersion in a context where capital intensity differences are mostly absent. The results are robust to changes in parameters, save for two exceptions. First, raising the capital share greatly increases the effect of finance on output. Second, reducing the degree to which labor can be substituted for capital magnifies the output effect without changing the impact of finance on the capital-output ratio.

A participant noted that in the business sector, the capital-output ratio is close to one, and asked how the relatively larger capital stock is derived. Amaral responded that he

and his co-author use the Penn World Table – not U.S. NIPA – in order to have more countries' data. They estimate a general capital-output ratio of 2.5 for the entire economy. To compute the capital-output ratio, he explained, the only component to remove would be residential capital, which accounts for about one-third of total capital. Amaral was asked why he and his co-author focused on the manufacturing sector. He explained that all sectors were considered, while manufacturing is highlighted only for comparative purposes. A participant asked about the transition dynamics of the model. Amaral answered that they have not done any analysis in that area but he suspects the transitions will become more protracted upon including financial frictions.

Policy Distortions and Aggregate Productivity with Heterogeneous Plants *by Diego Restuccia and Richard Rogerson*

Standard neoclassical growth models typically assume a constant-returns-to-scale aggregate production function, in which only levels of inputs are relevant. This simplification, though analytically convenient, abstracts from heterogeneity in production units. Restuccia and Rogerson argue that not only does the level of factor accumulation matter but also how these factors are allocated across heterogeneous production units. The allocation of aggregate resources across plants with heterogeneous productivity may be important in understanding cross-country differences in per capita incomes. While the standard growth model predicts that exogenous differences in TFP lead to lower capital accumulation, the data contain several countries with low TFP and high capital accumulation. The model presented in this paper offers a potential explanation: if a country subsidizes the capital accumulation of low productivity units, then capital accumulation will increase but measured TFP will decrease.

The calibrated model is tested principally via three types of distortions. First, an aggregate distortion is applied in the form of a 50 percent tax levied on all output. While the negative effect on output is greater than in the standard growth model, the magnitude of the difference is not notable. Second, uncorrelated idiosyncratic distortions in the form of taxes levied on random firms are applied. One-half of the plants are taxed while the other half are subsidized. The distortion causes output to fall relative to the distortion-free model, but again, the size of the discrepancy is small. Third, correlated idiosyncratic distortions are applied, with low-productivity firms receiving a subsidy while high-productivity firms pay a tax. The

distortion generates substantially greater effects quantitatively than in the uncorrelated case – nearly four times the effect on TFP in the maximum specification. Moreover, the reverse policy of subsidizing high-productivity plants also has negative effects on output and TFP, as the subsidies distort the optimal plant size.

A participant asked whether the taxes and subsidies in the model are firm-specific. Restuccia answered yes, they are firm-specific, and explained that the paper considers distortions which aren't going to have any effect on aggregate prices or aggregate capital accumulation, but are going to affect the prices different producers face. Restuccia was asked why distortions may differ across countries – whether there are distortions that are endemic to particular areas. He answered that there may be such distortions but how those policies start and why they persist is outside the scope of this paper. A participant noted that the experiments in the model lead to a more compressed size distribution of firms. Given that developing countries are typically less compressed than U.S., the participant suggested considering the experiment in reverse.

Entry Regulation and Business Start-ups: Evidence from Mexico

by David S. Kaplan, Eduardo Piedra, and Enrique Seira

While firm creation is generally believed to be an important source of GDP growth, the costs of complying with government regulation of firms can provide incentive for firms to operate informally (unlicensed). Entrepreneurs must weigh the benefits of operating informally, such as tax evasion, against the benefits of operating formally, such as property rights and better access to credit.

Some governments have attempted to simplify the process of registering a firm in order to encourage firm creation. To test the effectiveness of such measures, Kaplan, Piedra and Seira examine the implementation of the SARE program in Mexico, which significantly shortened the time required to obtain a license (but did not alleviate the financial costs associated with licensed operation). The authors find that SARE led to only modest increases in firm creation, a result in contrast to much larger numbers reported by the World Bank. While registrations did in fact rise upon implementation, the increase appears to have been temporary, leading the authors to conjecture that the program principally affected the existing stock of informal firms and not the presumed entrepreneurs-in-waiting.

A number of identification strategies are undertaken to isolate the effect of the SARE program. The first compares adopting and non-adopting municipalities. The results indicate that the effect of SARE is not significantly different from zero. That the results are inconclusive is due in large part to the Mexican economic slowdown that began shortly after the start of the program. The authors suggest that adopting municipalities may have been hit with different shocks that were unrelated to the program itself. The second identification strategy compares the lifespan of eligible and non-eligible industries within SARE municipalities. New start-up-eligible firms increase their lives by 28% relative to their non-eligible counterparts. If SARE's main effect is through the formalization of previously informal firms, one would expect the probability of firm survival in eligible industries to increase after SARE is implemented, since the “new” firms are actually older firms, which have lower exit hazards. The authors argue that the effectiveness of the SARE program is limited by its focus on processing time, as opposed to a broader scope that included costs of registering or bribery. They demonstrate that the program is more effective in municipalities where the financial cost of registration and the level of corruption are low.

During the seminar, a participant asked whether firms know in advance that their municipality will be chosen for the SARE program. Kaplan explained that in theory, yes, firms may know, though he and his co-authors find no pre-existing trends to suggest this is the case. Based on their results, they theorize that there was a glut of informal firms waiting around, never planning on formalizing until SARE was implemented. A participant noted that perhaps benefits of legal operation are not binding for the firms on the margin; what binds for them is the tax they have to pay after registering. Kaplan agreed, adding that the costs of health and compliance inspections as well as any associated bribery may have contributed to the limited success of the SARE program.

Panel Discussion

Edward Prescott: Europe and Asia are catching up with U.S. productivity, but Latin America is not. The reasons for these trends do not appear to be differences in savings rates or work intensity. Prescott argued that the discrepancy stems from the fact that member states of the U.S. had greater economic sovereignty than those of Latin American countries. The U.S. surged past the U.K. in its “Golden Economic Era” (1865-1929) principally because transportation costs fell and the U.S. became an open set of states. Latin America needs to mimic the U.S. and EU and become an open set of states. Prescott’s prescriptions for Latin America’s economic malaise are decentralization and openness. Among his suggestions: broad-based private ownership; Latin American multinationals operating abroad; foreign multinationals operating in Latin America; increased competition; and fostering entrepreneurial talent.

José De Gregorio: Though per capita GDP in Latin America has fallen further behind the U.S., the region has experienced solid GDP growth and low inflation in the past fifteen years. Trade has been increasingly liberalized (though intraregional trade remains low), while governments are running increasingly smaller deficits, if not outright surpluses. De Gregorio argued that Latin American countries’ partial recent success is due to some extent to reforms initiated in the 1990s, contrary to the criticism of these policies. In the future, both institutional improvement and social inclusion will be important to Latin America’s success. The risk of deterioration of the external environment in the form of financial turmoil or a decline in the terms of trade will require commitment to maintain macroeconomic and financial stability, asserted De Gregorio.

Country	Period of Trade Liberalization	Avg. Tariff (1990-99)	Avg. Tariff (2000-09)
Ecuador	1990-1999	12.1	11.9
Brazil	1990-1999	12.1	11.9
Chile	1990-1999	12.1	11.9
Colombia	1990-1999	12.1	11.9
Costa Rica	1990-1999	12.1	11.9
Mexico	1990-1999	12.1	11.9
Peru	1990-1999	12.1	11.9
Uruguay	1990-1999	12.1	11.9

Latin America has made progress, mostly during the late 90s and the 00s, in terms of trade liberalization.

José De Gregorio

Tim Kehoe: Latin America is characterized by a sizable percentage of firms operating informally. Kehoe posed the question: are the variables that lead to a large amount of informal activity in a country the causes of the country’s lack of economic development or merely the symptoms? The answer is unclear. If informality is the problem in Latin America and curing it will lead to rapid economic development, then informality must have been the cause of low productivity, not of low investment or of low employment. Kehoe reviewed models of informality, which typically predict that an economy with a high level of informality will have a low capital-output ratio, not low productivity. While this line of research accurately captured the distribution of firms in an economy, it has been unable to explain the discrepancies in aggregate productivity. Given this apparent shortcoming in the existing literature, Kehoe argued that a better model of productivity is needed.

Michele Boldrin: The economies of China and India have grown while those of Latin America have not. Boldrin surveyed a number of potential explanations and ruled each out: political system; English or European language; high “formal” human capital; trade openness; financial frictions; externalities; and high taxes. He posed the question: is it possible that fast economic growth takes place only in countries where old and successful civilizations are present and dominant? This, of course, was a largely rhetorical exercise. More germane to the field of macroeconomics, Boldrin noted that the economic factors underlying the divergence between Asia and Latin America may be competition and adoption of technologies at a micro level. He suggested reconsidering the neoclassical model less as a theoretical benchmark and more as a growth-accounting tool. He questioned why the neoclassical model is used if it does not show causality.

Carlos Zarazaga: In the late 1980s, the Washington Consensus prescribed both institutional reforms (restore democracy throughout region) and economic reforms (open up trade; privatize industries; liberalize the financial intermediation process) as remedies for Latin America’s “Lost Decade” of the 1980s and secular low productivity problems. Zarazaga’s assessment was that the free-market reforms failed to increase prosperity as promised. Growth rates in the 1990s were slower than in the import substitution era (1950-70). Unemployment increased, and wages remained low throughout the region, while poverty and inequality did not significantly improve. As potential explanations, Zarazaga offered both the “theorem of the second best” and the second welfare theorem. While many countries in the region liberalized trade and the financial system, almost none liberalized labor markets as well. The theorem of the second best suggests that such uneven combination of reforms may deliver worse outcomes than no reform at all. Among the reasons why the reforms failed to elicit wide support in Latin America is that they hurt unskilled labor, which represented a majority of the population. The second welfare theorem implies that winners of the reforms need to compensate the unavoidable losers. Future research should identify the winners and losers of aggregate TFP-enhancing policies as well as any mechanisms to insure potential losers against the negative effects of such reforms. Zarazaga pointed out that the challenging quantitative research agenda suggested by these two theorems will need to incorporate heterogeneity explicitly in the analysis.

Discussion

In the open-ended discussion that followed the short presentations:

Prescott cited repeated instances of countries either expelling or subsidizing its poor, only to suffer economic downturns as a result. Such practices, he argued, are counterproductive.

Zarazaga noted that an observed rise in unemployment after privatization or reforms could in fact be workers from previously public industries who are unprepared for the job market.

Kehoe expressed skepticism regarding Boldrin's provocative hypothesis, that currently successful countries are the result of previously successful civilizations. The Mayans, he noted, mastered components of astronomy and mathematics well before their European and Islamic counterparts.

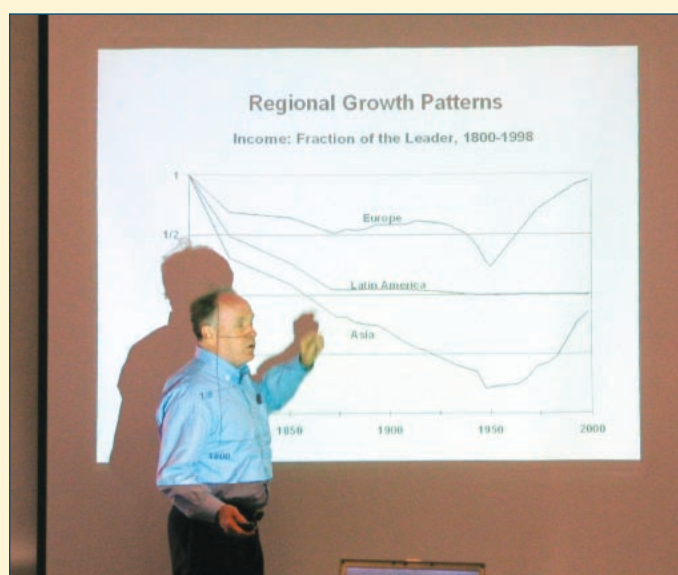
Boldrin noted that both in theory and in fact, inequality seems to be tied to government intervention. He professed being unconvinced of any causal relationship between the two. Scandinavia, he noted, has both low inequality and high government involvement.

Ohanian brought up evidence that the Latin American TFP puzzle is an overemployment phenomenon. When Mexico privatized its industries, output did not change, but employment fell by 70%. Similar episodes occurred in Brazil and Chile. He posits that so-called "Latin American TFP miracles" may simply be the result of industries shedding unproductive labor.

In response to Zarazaga's presentation, **Hansen** noted that the Washington Consensus was ostensibly sound economic theory. He asked whether its failure was the theory failing in practice or the theory not being implemented properly. **Zarazaga** clarified his position: the theory was incomplete, as policymakers ignored the Theorem of the Second Best. The Washington Consensus reformed only some areas of the economy (trade and finance) while ignoring others (labor).



Finn Kydland introduces the panel participants.



Ed Prescott

Asked whether the high Latin American growth we are seeing now could be related to the policies of the 1990s, **Prescott** concurred that lags in implementation matter. Greece, for example, took nearly 15 years after joining the EU to begin to catch up with the rest of Europe economically. Mexico, he predicted, would experience a steep take-off in approximately seven years.

Ohanian noted that over the last 25 years, Chile has gained nearly 13% on the U.S. while the majority of Latin America has lost ground relative to the U.S. He asked for the panel's thoughts on why Chile and not the other countries. **De Gregorio** felt that the credit lay in the strong institutions and policies in Chile, while **Prescott** felt that Chile's gains were simply a bounce-back effect after being extremely far behind the U.S.

Report from Costa Rica: Consulta de San José 2007

Finn Kydland

This issue of *From the Lab* is devoted almost entirely to the September LAEF conference on Latin America. My second “brush” with Latin America in less than two months was as a panel member at the Consulta de San José 2007 arranged in Costa Rica at the end of October by the Inter-American Development Bank in co-operation with the Copenhagen Consensus Center (CCC), an organization led by Bjørn Lomborg at the Copenhagen Business School. A similar project had been organized by CCC in 2003, in that case pertaining to the whole world. In both cases, the overall goal was to use benefit/cost analysis to recommend effective aid. In particular, our aim was to answer the question: If Latin America were willing to spend, say, \$10 billion more over the next five years on improving welfare, which projects would have the greatest benefits?

The other eight panel members were: Professor Orazio Attanasio, University College, London; Professor Jere Behrman, University of Pennsylvania; Nancy Birdsall, President of Center for Global Development; Professor John Coatsworth, Columbia University; Professor Ricardo Hausmann, Harvard; Professor Nora Lustig, visiting George Washington University, former director of UNDP Poverty Group; Professor José Antonio Ocampo, Columbia University, former United Nations Under Secretary General; and Professor Andrés Velasco, Harvard, currently Minister of Finance for Chile. Velasco had to leave half a day early. In parallel, a youth forum consisting of 35 young people from 20 countries across Latin America and the Caribbean went through a similar process as the panel.

To prepare for answering the question, experts were asked in advance to evaluate possible solutions in each of ten areas: democracy, education, employment/social security, environment, fiscal problems, health, infrastructure, poverty/inequality, public administration and institutions, and violence and crime. In each area, the expert(s) wrote in advance a paper proposing solutions, usually with detailed analysis ending up in a ranking, while another expert (or two) presented an alternative view. In the course of three intensive days, solution papers and alternative views were presented, the panel had its discussion, and then each of us separately made our ranking. In the end, we had been presented with a total of about fifty solutions across all the ten areas, of which the panel voted some to be inappropriate for consideration for various reasons. In some cases, it was pretty obvious the benefit/cost ratio would be well under one. In some cases, it wasn't so obvious that there was an identifiable cost to use in the B/C ratio. The panel more or

less decided not to be too hard-nosed about the latter issue. We then were asked to produce a final ranking of the remaining 30 or so solutions.

In terms of the average ranking, top priority was given to early childhood development programs. These are interventions that improve the physical, intellectual, and social development of children early in their lives. Besides improving children's welfare directly, the panel concluded that these programs create further benefits for family members, for example releasing them to work outside the home or to further their own education.

Improving fiscal rules was seen as a great opportunity to improve the budget process within many countries in Latin America and to realign incentives in ways that could potentially increase nations' growth rates substantially. Third on the panel's list was increased investment in infrastructure, including maintenance. Number four was the idea of establishing independent policy and program evaluation agencies. An independent (public or private), and possibly international, agency should provide evaluation to monitor government programs and policies over time. Between nations, the agencies should share information on effective policies.

As the fifth priority, the panel recommended conditional cash transfer programs to provide monthly cash payments to poor households conditionally on the parents sending their children to school, to health clinics, etc.

The high priority given to issues that fall under fiscal policy generally (nos. 2, 3, and 4) must be attributed to the importance assessed by the panel members of encouraging policy measures that could foster significant increases in the nations' rates of economic growth. Many of the other problem areas, worthy as they seem when seen in isolation, then as a consequence would be much easier to deal with in the future. One will note here not only the emphasis on the selection of welfare-improving policies as seen today, but also on the importance of putting institutions in place, as in no. 4, for example, to help to ensure consistency over time in these policies. Indeed, personally I favored, for analogous reasons, a proposal that the panel majority voted not to include in the overall ranking. Its brief description was “Increase the level of political party and party system institutionalization.” Admittedly, it was not easy there and then, even after the solution presentations, to assess its broad implications.

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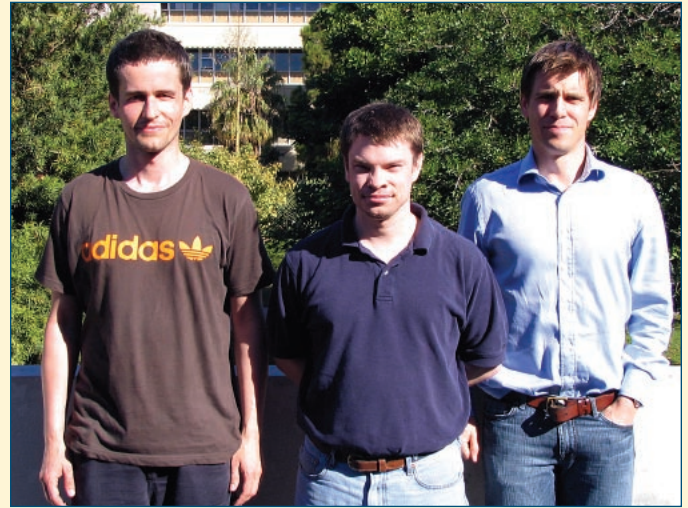
Scholars Visit LAEF

During October 2007, the Laboratory for Aggregate Economics and Finance hosted three visiting scholars: Professor Espen Henriksen (University of Oslo), Dr. Roman Sustek (Bank of England) and Professor Eric Young (University of Virginia).

Espen Henriksen returned to LAEF after having previously visited our department in May of 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, Henriksen worked on a paper with Finn Kydland and Roman Sustek, entitled “The High Correlations of Prices and Interest Rates across Nations.” He also presented a seminar to the UCSB Department of Economics professors and graduate students. The title of his presentation was “Taxes and the Global Allocation of Capital.”



Visiting scholars Roman Sustek, Eric Young and Espen Henriksen

Roman Sustek received his Ph.D. from Carnegie Mellon University in 2005. His current research interests include:

- Plant-level lumpy output adjustments and their implications for aggregate fluctuations and for the effectiveness of monetary policy.
- The determination of house prices over the business cycle.
- The joint dynamics of the return to capital and the short-term interest rate over the business cycle.
- The cyclical behavior of labor productivity.
- Fiscal policy and the Great Moderation.
- The behavior of nominal variables, such as inflation, the nominal interest rate, and monetary aggregates, over the business cycle.

While in residence at LAEF, Sustek presented a paper in the Economics Department seminar series related to the last topic. The title of his presentation was “Business Cycle Accounting for Monetary Economies.” In this paper, Sustek extends the business cycle accounting method of Chari, Kehoe and McGrattan to an important class of monetary business cycle models to investigate the quantitative importance of various classes of frictions for the joint dynamics of real and nominal variables over the business cycle.

Eric Young received his Ph.D. from Carnegie Mellon University in 2001. His current research interests include:

- Bankruptcy and default incentives for households.
- The implications of limited information-processing capacity for savings decisions.
- The effects of asymmetric information on wealth accumulation and asset pricing.
- Computational methods for solving models with aggregate and individual risk.

While at LAEF, Young presented a seminar to the UCSB Department of Economics professors and graduate students, entitled “A Quantitative Model of Information and Unsecured Credit.” This paper focuses on the trends in the market for credit card borrowing – namely, that households are borrowing more and using bankruptcy to default on more debt than they used to, while at the same time credit terms are becoming more sensitive to measures of default risk. The paper, joint work with Richmond Fed economist Kartik Athreya and UVA graduate student Xuan Tam, argues that changes in the information available to lenders can account for all of these trends. A key innovation is an algorithm to compute competitive equilibria with individualized loan pricing and asymmetric information between borrowers and lenders regarding default risk.

Consulta de San José

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As an aid to my own thinking, I presented the experts with the following scenario. Norway is in the process of accumulating a sizable oil fund (also called sovereign wealth fund). It has grown to be larger than Norway's annual GDP, and is projected to grow to about five times annual GDP by the year 2020. Early on after oil was struck, Norway decided on a decision rule for how much of the oil revenues could be used for current expenses in any given year, a rule that implies that a large portion will be saved for future generations. Naturally, politicians often come under pressure to spend them faster. Why not build more hospitals, considering there are queues for many surgical procedures, or start up more public kindergartens? There's no shortage of proposals. In spite of such pressure, this decision rule has been followed by Norwegian governments, whether

being leftist oriented (Labor Party) or center-right. (Perhaps it helps that the oil fund is administered by Norway's central bank!) So I asked the experts: Would a situation such as that (emphasizing consistency over time) be more likely under their solution proposal? The solution-paper author then pointed out that Chile has a copper fund, that Chile has been similarly quite successful in keeping it for future generations, and that if it had belonged to Argentina, the fund would have been gone in a jiffy. That answer convinced me of the importance of that solution also with regard to other aspects of fiscal policy, and I was quite disturbed when it was voted to be outside the realm of our ranking. (I bet Velasco would have supported it if he were still present at the end of that last day!) In my ranking, I still, defiantly, put it down as no. 8. Afterwards, seeing the overall ranking from the youth forum, I was impressed that they had placed that solution in eighth place.



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