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Economic fluctuations and growth

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Program Report

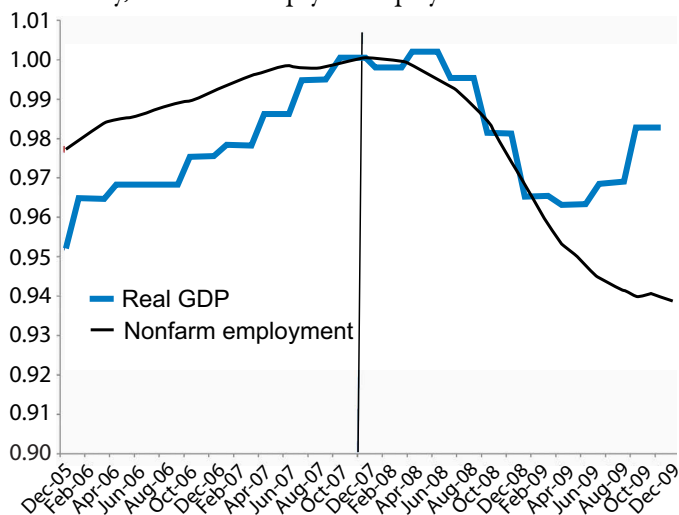
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Economic Fluctuations and Growth

Robert E. Hall*

The Economic Fluctuations and Growth (EF&G) Program goes back to the beginning of Martin Feldstein's presidency of the NBER, although originally it was simply called the Economic Fluctuations Program. It has been my honor to serve as its director from its founding, 32 years ago. To the public, the Program's most conspicuous activity has been to maintain the NBER's chronology of the U.S. business cycle, generally accepted as the standard for identifying the beginning and ending of each recession. As I write, many eyes are on the program's Business Cycle Dating Committee, which I also chair, as evidence grows that the recession that began in December 2007 may have come to an end recently or is about to come to an end. The following graph shows the two main indicators the committee considers in deciding on the dates of turning points in economic activity, real GDP and payroll employment:



*Hall directs the NBER's Program on Economic Fluctuations and Growth and is Chairman of the NBER's Business Cycle Dating Committee. He is 2010 President of the American Economic Association, and is the Robert and Carole McNeil Professor of Economics and Hoover Senior Fellow at Stanford University. In this article, the numbers in parentheses refer to NBER Working Papers. For other papers, titles are included, and the latest versions can be found by googling the title.

NBER Reporter

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Both measures are stated as indexes that reached 1.00 in December 2007, the month determined to be the peak of the business cycle by the committee on November 28, 2008. That month was the exact peak of employment, but real GDP reached a slightly higher value in the second quarter of 2008. Both measures plunged in late 2008 as the financial crisis took hold. Real GDP began to grow in the summer of 2009 but employment continued to decline. The percentage drop in employment in the current recession was the largest since the government began the collection of the data in 1939, although not nearly as large as the decline in the Great Depression in 1929 to 1933, according to annual data from earlier sources. The huge difference between the recent behavior of output and employment reflects the unprecedented growth of productivity in 2009. In determining the date for the trough in economic activity, the committee will be deciding how to weigh output and employment in its definition of economic activity.

EF&G is the largest of the Bureau's research programs, with 149 Research Associates and 45 Faculty Research Fellows (as of February 2010). At recent Program Meetings, the papers have included two on the effects of the small probability of large disasters: Francois Gourio, "Disasters Risk and Business Cycles" (15399); and Robert Barro, Emi Nakamura, Jon Steinsson, "Crises and Recoveries in an Empirical Model of Consumption Disasters." Housing economics has played a major role in the meetings, too, with: Veronica Guerrieri, Daniel Hartley, and Erik Hurst, "Endogenous Gentrification and Housing Price Dynamics"; Jack Favilukis, Sydney Ludvigson, and Stijn Van Nieuwerburgh, "The Macroeconomic Effects of Housing Wealth, Housing Finance, and Limited Risk-Sharing in General Equilibrium"; and James Kahn, "What Drives Housing Prices?" Volatility in financial markets has an important new role in macroeconomics, as seen in YiLi Chien, Harold Cole, and Hanno Lustig, "Is the Volatility of the Market Price of Risk due to Intermittent Portfolio Re-Balancing?" (15382) and Ricardo Lagos, Guillaume Rocheteau, and Pierre-Olivier Weill, "Crises and Liquidity in Over-the-Counter Markets" (15414). The novel role of fiscal policy in today's economy was the subject of Christopher Ercceg and Jesper Linde, "Is There a Fiscal Free Lunch in a Liquidity Trap?"

Most of the EF&G Program's activities take place in its nine research groups. Each group has two or three leaders, who determine the membership of the group and its methods of operation, timing of its meetings, and content of its programs. Most groups meet at the NBER Summer Institute in July and many also meet during the academic year.

Impulse and Propagation Mechanisms Group – Lawrence Christiano and Martin Eichenbaum, Leaders

Recently, this group has focused on an important area of research stimulated by the financial crisis of 2008: understanding the role of financial market frictions. Gadi Barlevy in "A Leverage-Based Model of Speculative Bubbles," George-Marios Angeletos and Jennifer La'O (14982), Zheng Liu, Pengfei Wang, and Tao Zha in "Asset Priced Channels and Macroeconomic Fluctuations," and Luca Dedola and Giovanni Lombardo in "Financial Friction, Financial Integration and the International Propagation of Shocks" all study models in which informational frictions give rise to important capital market frictions. The first two papers are theoretical in nature, exploring new ideas and frameworks. The others are more quantitative in nature, exploring the significance of different financial market frictions in dynamic stochastic general equilibrium (DSGE) models.

Motivated by recent events as well, other researchers in this group are exploring the efficacy of different policies in economies where a zero bound on the nominal interest rate is binding, and in economies in which the spread on interest rates to borrowers and lenders experiences large changes. In "Conventional and Unconventional Monetary Policy," Vasco Cúrdia and Michael Woodford extend the basic New Keynesian model of the monetary transmission mechanism to allow for a spread between the interest rate available to savers and borrowers. This spread can vary for either exogenous or endogenous reasons. Woodford discusses policy rules that

provide good approximations to optimal policy in such environments. In "Where Should Liquidity be Injected during a Financial Crisis?" Ricardo Reis formalizes the notion of a liquidity shortage and then studies the tactical aspects of monetary policy when such a shortage arises.

Lawrence Christiano, Martin Eichenbaum, and Sergio Rebelo (15394) analyze the circumstances under which fiscal policy has a large and socially beneficial effect. Standard macro models imply that the effect of fiscal policy on output is positive but relatively small. However, these effects can be very large if the zero-bound constraint on the nominal interest rate is binding. A key determinant of the size of the multiplier is the state of the world in which new government spending comes on line. If it comes on line in future periods when the nominal interest rate is zero, then there is a large effect on current output. If it comes on line in future periods where the nominal interest rate is positive, then the current effect on government spending is smaller. This finding supports the view that, for fiscal policy to be effective, government spending must come online in a timely manner.

Capital Markets and the Economy – Janice Eberly and Deborah Lucas, Leaders

The capital markets group studies interactions between the real and financial economy. The recent financial crisis has sparked new and interesting research on the sources of the crisis, how such a crisis might be prevented or foreseen, the potential impact on the macroeconomy, and policy responses.

The group has discussed several papers related to market dynamics that are similar to bank runs, but occur outside the banking sector. Julio Rotemberg (14222) presented a novel model of how payments clearing among interconnected agents are settled, and how the amount of liquidity needed to clear the payments depends on the payments system among the agents.

Two additional papers by Zhiguo He and Wei Xiong (15482) and by Viral Acharya, Douglas Gale, and Tanju Yorulmazer (15674) consider the effect of financing longer-term investments by rolling over short-term assets, as in many financial institutions. The papers consider the risks associated with this maturity transformation and the roles played by volatility, liquidity, and maturity, as well the potential role of financial regulation in mitigating these risks.

The group discussed two related empirical papers. The first, "Banking Crises and Crisis Dating," by John Boyd, Gianni De Nicolò, and Elena Loukoianova, carefully considers the roots of measured banking crises and finds that the crises arise from underlying systemic bank shocks. Since the shocks pre-date the crises, using the shocks to date the origins of the crisis changes one's view of the dynamics and causes of financial crises. A second paper, by Manuel Adelino, Kristopher Gerardi, and Paul Willen (15159), looks at data during the financial crisis, starting in 2007, and shows that because of re-default risk and self-cures (mortgages becoming current again), renegotiating delinquent mortgages is not very attractive to investors. Hence, payment-reducing loan modifications have been uncommon in both securitized and non-securitized pools of mortgages.

Finally, this group considered several theoretical treatments of the recent financial crisis. In "Securitization, Transparency, and Liquidity," Marco Pagano and Paolo Volpin argue that there are cases where the release of coarse information is preferred by bond issuers enhancing primary market liquidity, at the cost of secondary market liquidity. In "Bursting Bubbles: Consequences and Cures," Narayana Kocherlakota, now the President of the Federal Reserve Bank of Minneapolis, discussed a framework in which asset market bubbles can arise, because the asset can be used as collateral for borrowing. He shows that the consequences of bursting the bubble can be dramatic and persistent in the real and financial economy.

The Labor Market in Macroeconomics – Richard Rogerson, Robert Shimer, and Randall Wright, Leaders

The labor market is central to many issues in macroeconomics, including business cycles, unemployment, inequality, and growth. This group considers models of the labor market, data analysis, and the use of models to carry out substantive policy analysis.

Modern models of the labor market stress the underlying dynamics in job and worker flows. High-quality data on these flows is central to developing better models of these processes and assessing their consequences for a variety of substantive and policy issues. Therefore, this group has always emphasized the analysis of new datasets that can shed additional light on the empirical properties of these flows. A recent example of this is the work of Steven Davis, Jason Faberman, and John Haltiwanger, “The Establishment-Level Behavior of Vacancies and Hiring.” Recent models of labor market flows stress the role of vacancy creation in understanding labor market outcomes, and this is the first paper to provide systematic evidence on the relationship between vacancy posting and hiring. The paper uses data from the recent JOLTS dataset and the facts that it presents will play a key role in guiding the development and calibration of models of labor market dynamics.

Understanding the nature and causes of labor market fluctuations associated with business cycles remains a key issue in economics, and research on this issue has always featured prominently in the group’s meetings. A recent example is my paper, “Reconciling Cyclical Movements in the Marginal Value of Time and the Marginal Product of Labor,” which shows that a standard macroeconomic model appended to capture labor market frictions, in the spirit of work pioneered by Diamond, Mortensen, and Pissarides, can reconcile observed labor market fluctuations in a framework where all bilateral gains from trade are realized. It does not follow that fluctuations are optimal from

the perspective of society — high unemployment is socially inefficient.

Another long-standing issue in the analysis of aggregate labor market outcomes concerns the elasticity of aggregate labor supply, and in particular, the apparent inconsistency between low labor-supply elasticities that are estimated from micro data and the much larger values implicit in many aggregate models. The elasticity of aggregate labor supply has important implications both for the propagation of shocks in business cycle models and for assessing the implications of fiscal policy instruments, such as tax and transfer programs. Work by Richard Rogerson and Johanna Wallenius (13017) argues that there is no inconsistency. They present a model of life-cycle labor supply in which standard procedures used to infer elasticities using micro data would find a small elasticity even though the aggregate elasticity is large. Central to this finding is the fact that individuals adjust their lifetime labor supply along two margins: how much to work while employed, and what fraction of their lives to spend in employment. An important implication of the analysis is that tax and transfer policies generate large responses in aggregate hours worked.

Forecasting and Empirical Methods in Macroeconomics and Finance – Mark W. Watson and Kenneth D. West, Leaders

The forecasting and methods group focuses on the development and assessment of econometric methods for use in empirical macroeconomics and finance, placing special emphasis on problems of prediction. It meets jointly with a group on forecasting under the Committee on Econometrics and Mathematical Economics umbrella, with support from the National Science Foundation.

Group meetings tend to involve two types of papers: one type with models or forecasts of one or more variables, using novel or technically advanced methods; a second type in which the authors develop and evaluate a new methodology for estimation, inference, or prediction. Many of

the papers that are presented fit in both categories.

In the first category, Jens H. E. Christensen, Francis X. Diebold, and Glenn D. Rudebusch (13611) study the term structure of nominal government debt, showing that a combination of a standard parametric specification and an arbitrage-free specification leads to improvement in predictive performance.

In the second category, Serena Ng, Emanuel Moench, and Simon Potter, in “Dynamic Hierarchical Factor Models,” develop and apply a procedure that allows a hierarchy across cross-section units prior to estimation; this is natural, for example, in applications with global, country, and regional factors. In real-time forecasting of real activity, Elena Andreou, Andros Kourtellos, and Eric Ghysels, in “Should Macroeconomic Forecasters Look at High-Frequency Financial Data?” show that quarterly forecasts improve if monthly data are used.

Methods and Application for Dynamic Equilibrium Models – Jesus Fernandez-Villaverde and Frank Schorfheide, Leaders

The dynamic equilibrium group conducts research on a range of subjects related to the construction, computation, estimation, and evaluation of dynamic models and their applications in empirical research. These types of models have become one of the main workhorses of modern macroeconomics and related fields such as finance. Sophisticated empirical analysis based on dynamic equilibrium models has produced novel substantive findings. An increasing number of policy making institutions, including the Federal Reserve Board and many central banks including the European Central Bank, are actively formulating and estimating DSGE models for policy analysis and forecasting. Many of the group’s activities are aimed at creating bridges of communication and cooperation between pure macroeconomics researchers, time-series econometricians, and central bank staff.

One active area of research is the incorporation of time variation into the parameterization of DSGE models. Time-varying parameters can be used, for instance, to capture changes in monetary policy over the post-war period. Roger Farmer, Daniel Waggoner, and Tao Zha (12965) develop and apply tools to solve rational expectations models with regime-switching coefficients. Vasco Curdia and Ricardo Reis (15774) examine to what extent the conclusions derived from estimated DSGE models, for instance with respect to the sources of business cycles, are sensitive to assumptions about the driving forces of macro fluctuations.

Martin Uribe and Stephanie Schmitt-Grohe (14215) study the role of news (or anticipated) shocks for business cycle fluctuations. Because direct information about the agents' information sets is not available, this information needs to be extracted in an efficient manner from the auto-covariance properties of observable macroeconomic variables.

Macroeconomics across Time and Space – Jeremy Greenwood and Lee Ohanian, Leaders

This group uses modern dynamic theory to investigate long-standing questions of substantive historical interest. Research presented at these meetings includes analyses of great depressions, industrial revolutions, the diffusion of new technologies, secular shifts in hours worked and leisure, long-run trends in marriage, women's labor supply, and fertility, the connection between the formation and dissolution of institutions and the economy, the rise in urbanization; international trade and capital flows, and the growth and location of business.

Yuriy Gorodnichenko, Enrique Mendoza, and Linda Tesar (14874) challenge the standard view that Finland's depression of the 1990s was caused by a banking crisis. Instead, they show that the depression began before the crisis, and its inception coincided with the breakup of the former Soviet Union. Their paper develops a quantitative theo-

retic model of Finland's depression based on the very large trade relationship with the USSR that collapsed following the end of the Soviet Union. They show how this shock temporarily reduced output, as the production inputs from this sector were not easily reallocated to other sectors, and then show how this shock was propagated for many years by labor market rigidities that prevented wages from declining and that kept unemployment high.

Another paper that integrates modern approaches to modeling with a long-standing question of historical interest is by Matthias Doepke, Moshe Hazan, and Yushi Maoz (13707). They develop a theory of the post-war baby boom based on the increased demand for female labor during the war, using a model with endogenous fertility and labor force participation. The theory implies that women who worked in the war accumulated important work experience which led to higher wages and also a persistent increase in labor force participation after the war, resulting in that cohort delaying births. In contrast, the theory predicts that younger women will tend to have children earlier. The quantitative analysis generates a substantial baby boom, followed by a baby bust, simply reflecting the one-time wartime increase in the demand for female labor. The theory's predictions are consistent with differences in the timing of births across countries that differed with respect to the relative increases in their wartime demand for female labor in the 1940s.

Betsy Caucutt, Thomas Cooley, and Nezh Guner (12854) undertake an analysis of the rise of social security during the beginning of the twentieth century. They argue that the rise of such programs in the West is linked to the decline of the agrarian economy and the rise of the industrial one. In decades past, the rural population did not favor social security. The median voter was a middle-aged person who earned a lot of his income from land. With industrialization, the value of rural land declined. The population shifted from the countryside to the city. This led to a shift in the median

voter. Now, she was an older, middle-aged urban resident who favored the imposition of a social security system.

Aggregate Implications of Microeconomic Consumption Behavior – Orazio Attanasio, Christopher Carroll, and José Víctor Ríos Rull, Leaders

Research in this group ranges from empirical studies using microeconomic data to theoretical analyses of dynamic stochastic general equilibrium models with uninsurable idiosyncratic risk. At the 2009 Summer Institute, the group dedicated an entire day to a workshop on the Consumer Expenditure Survey, organized in collaboration with the Conference on Research on Income and Wealth (CRIW). The event attracted a large number of academics and users of the CEX, as well as a delegation from the Bureau of Labor Statistics, and included discussions of "Evolution and Change in the Consumer Expenditure Surveys: Adapting Methodologies to Meet Changing Needs," by Karen Goldenberg and Jay Ryan, and "Strengths and Weaknesses of the CE from a BLS Perspective," by Thesia Garner and William Passero. The panel discussion afterwards included NBER President Jim Poterba with Barry Bosworth, Chris Carroll, Stephen Landfeld, and Jonathan Parker. The workshop also included three methodological papers on consumption measures: "Survey Instruments and the Reports of Consumption Expenditures: Evidence from the Consumer Expenditure Surveys," by Erich Battistin and Mario Padula; "Methodological Innovations in Collecting Spending Data: The HRS Consumption and Activities Mail Survey," by Mike Hurd and Susann Rohwedder; and "Five Decades of Consumption and Income Poverty" (14827), by Bruce Meyer and James Sullivan. The current shortcomings of the CEX were discussed extensively, with an eye to possible changes and innovations that would improve the quality of the consumption measures currently available. The active participa-

tion of the BLS delegation was particularly welcome.

Several papers presented to the group provided evidence on income processes: for example, “Changes in the Distribution of Income Volatility,” by Shane Jensen and Stephen Shore; “RIP to HIP: The Data Reject Heterogeneous Labor Income Profiles,” by Dmytro Hryshko; “Semiparametric Characterizations of Income Dynamics,” by James Feigenbaum and Geng Li; and “Wages over the Business Cycle: Spot Markets?” by Marcus Hagedorn and Iourii Manovskii. Another set looked at the topical issues of housing, mortgage markets, and bankruptcy, including “Mortgage Innovation and the Foreclosure Boom,” by Dean Corbae and Erwan Quintin; “Housing and Debt over the Life Cycle and over the Business Cycle,” by Matteo Iacoviello and Marina Pavan; “Bankruptcy and Debt Portfolios,” by Thomas Hintermaier and Winfried Koeniger; “Access to Credit after Bankruptcy: Does it Pay To Be a Deadbeat?” by Ethan Cohen-Cole, Burcu Duygan-Bump, and Judit Montoriol-Garriga; and “Household Borrowing after Personal Bankruptcy,” by Song Han and Geng Li. Others considered different types of investment and other life-cycle decisions such as college enrollment, entrepreneurship, and disability risk, including “Insuring College Failure Risk,” by Satyajit Chatterjee and Felicia Ionescu; “Health Insurance and Entrepreneurship,” by Vincenzo Quadrini; and “Disability Risk, Disability Insurance and Life Cycle Behavior,” by Hamish Low and Luigi Pistaferri.

Income Distribution and Macroeconomics – Daron Acemoglu, Roland Benabou, and Oded Galor, Leaders

This group explores a wide range of issues related to the sources and consequences of inequality at the national and international levels. Much of its discussions have centered on the interplay of markets, technological change, trade, and redistributive policies with geographical, institutional, and cultural

factors in accounting for the remarkable transformation of the world income distribution over the last two centuries, as well as in the sharp rise in inequality within countries during recent decades. The groups’ work is organized along three main avenues of research.

The first line focuses on deep-rooted determinants of the growth process and comparative economic development throughout the course of history, and up to the modern era. These include: 1) geographical factors, such as differences in land endowments and access routes, which were shown to generate permanent differences in both income and ethnolinguistic heterogeneity, by Stelios Michalopoulos (“The Origins of Ethnolinguistic Diversity”) and Louis Putterman and David Weil (14448); 2) long-run consequences of major historical events, such as slavery, by Nils-Petter Lagerlof (“Slavery and Other Property Rights”) and Nathan Nunn (13367), and colonization and the industrial revolution, by Carol Shiue and Wolfgang Keller (10778); 3) initial stocks of scientific knowledge, by Diego Comin, William Easterly, and Erick Gong (12657), and factors affecting the subsequent pace of innovation, such as the levels of diversity and cooperation within a society, by Quamrul Ashraf and Oded Galor (“Human Genetic Diversity and Comparative Economic Development”), or the attitudes of different political and religious groups towards the diffusion of knowledge, by Roland Bénabou, Davide Ticchi, and Andrea Vindigni (“The Political Economy of Science, Religion, and Growth”).

The second theme is the role of political institutions and social conflict in determining cross-country differences in income per capita. From a long-term perspective, a key issue is: what makes institutions so persistent, even when they have very detrimental economic effects, as in the case of entrenched elites, dictatorships, or weak, failed states? This is addressed in studies by Daron Acemoglu and James Robinson (12108); Nicola Gennaioli and Ilia Rainer (“The Modern Impact of Pre-Colonial Centralization

in Africa”); Daron Acemoglu, Davide Ticchi, and Andrea Vindigni (12748); and Daron Acemoglu, James Robinson, and Rafael Santos (15578). With a shorter-run perspective, the main questions explored by the group centered around: 1) the optimal forms and levels of redistribution and social insurance, for example, Emmanuel Farhi and Ivan Werning (11408), Giovanni Violante and Nicola Pavoni (“Optimal Welfare-to-Work Programs”), and Jess Benhabib and Alberto Bisin (14730); 2) the political-economy mechanisms and belief dynamics that can explain why actually observed policies are often so different, for example, Rodney Ramcharan (“Inequality and Redistribution: Evidence from US Counties and States, 1890-1930”), Dietrich Vollrath (“Inequality, Property Taxes, and Public Debt: The United States, 1880–1930”), Roland Benabou (13907), Erzo Luttmer and Monica Singhal (14268), Emmanuel Farhi and Ivan Werning (“The Political Economy of Nonlinear Capital Taxation,”), and Benjamin Olken and Monica Singhal (15221).

The group’s third main line of research aims to: 1) identify the main market and non-market channels through which the distributions of income, human capital, and financial assets affect aggregate economic performance; and 2) bring to light the key determinants of the rise in inequality experienced by most countries over the last quarter-century. On the markets side, the papers have documented the impacts on wages levels and income risk of: sectorial shifts in labor demand, for example, Francisco Buera and Joseph Kaboski (14822); international migration, for example, Jess Benhabib and Boyan Jovanovic (12871); and globalization, for example, Xavier Gabaix and Augustin Landier (12365), and Thomas Philippon and Ariell Reshef (14644). Considerable attention also was devoted to credit market imperfections as impediments to educational or entrepreneurial investments, and to how the human-capital promoting or retarding nature of institutions and policies (child labor regulation, and the availabil-

ity and quality of public education) is shaped by the distribution of ownership of production factors and the interests of landed aristocracies or industrial elites. Examples include Raghuram Rajan and Rodney Ramchandran (14347), and Oded Galor, Omer Moav, and Dietrich Vollrath (“Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence”). On the non-market side, a number of papers have documented and analyzed the role of family decisions (fertility, intra-household bargaining) and the powerful influence of social networks, such as in “Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy,” by Kaivan Munshi and Mark Rosenzweig. In particular, changing patterns of gender inequality or parental preferences for educated offspring reflect a combination of market and technological forces with slow-moving cultural attributes and gradual adaptation of preferences to economic incentives. An example of this work is Raquel Fernández, Alessandra Fogli, and Claudia Olivetti (“Mothers and Sons: Preference Formation and Female Labor Force Dynamics”), and Matthias Doepke and Fabrizio Zilibotti (12917).

Economic Growth - Charles I. Jones and Peter J. Klenow, Leaders

The growth group focuses on differences in income across countries, firm-level productivity growth, and technical progress over time, as illustrated by the following papers: Simon Johnson, William Larson, Chris Papageorgiou, and Arvind Subramanian (15455) study how revisions to the Penn World Tables—one of the most widely-used datasets in the literature—affect our understanding of economic growth. They document that in the move to the most recent version, the revision to the annual growth rate of a country had a standard deviation of 5.4 percent, much greater than the average growth rate itself of 1.5 percent. Remarkably, the revision to the average 30-year growth rate had a standard deviation of only 1.1 percent.

Daron Acemoglu, Philippe Aghion, Leonardo Bursztyn, and David Hemous (15451) examine theoretically how technological change and environmental problems can interact. In particular, they study situations in which researchers can choose to work on improving “dirty” technologies like the internal combustion engine, or “clean” technologies like

fuel cells and electric cars. They find that achieving optimal growth without an environmental catastrophe often involves not only input taxes (such as a carbon tax) but also efforts to direct technical change through research subsidies or profit taxes. When inputs are sufficiently substitutable, such subsidies or taxes can be temporary.

Mark Aguiar and Manuel Amador (15194) document that high-growth countries tend to accumulate *official* net foreign assets, but not private net foreign assets. Their explanation: the government in power has a bias toward current consumption (which it can direct while it is temporarily in power), and cannot commit the future government to a low tax rate on capital. Reforms that reduce these political economy and contracting frictions result in less government debt, and therefore less temptation to tax capital—but only gradually over time. So growth proceeds as the tax on capital slowly falls and official net foreign assets rise. Their theory implies that unconditional foreign aid does not boost growth even temporarily, and that unconditional debt relief lifts growth only temporarily.