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## Editors' Introduction

**Jonathan A. Parker**, *MIT and NBER*

**Michael Woodford**, *Columbia and NBER*

The twenty-eighth edition of the *NBER Macroeconomics Annual* continues with its tradition of featuring theoretical and empirical research on central issues in contemporary macroeconomics. As in previous years, this year's papers not only address key recent developments in macroeconomics, but also take up important policy-relevant questions and open new debates that we expect to continue in the years to come. Accompanying each paper are two excellent discussions of the paper, each written by a leading scholar in the area.

The papers in this year's issue tackle fiscal and monetary policy—how it is that interest rates and inflation can remain low despite fiscal policy behavior that appears inconsistent with a monetary policy regime focused only on inflation and output and not on fiscal balances; money and inflation—both the long-run inflation rate and the coexistence of money with pledgeable and money-like assets and why there are not increases in inflation in response to business-cycle fluctuations in productivity; the labor market—the implications of reference dependent preferences and moral hazard in employment fluctuations; and finally, the stock market and how it relates to the real economy.

Turning to the specific contributions in order, many economists have been puzzled that interest rates in the United States have remained low despite dramatic increases in public debt, official unfunded pension liabilities, and other implicit liabilities and guarantees. Francesco Bianchi and Leonardo Melosi provide an answer in "Dormant Shocks and Fiscal Virtue." The idea is that, if a government followed one fiscal rule forever, it could either follow a rule that leads to balanced budgets absent monetary policy reacting to debt levels—an active money/

passive fiscal regime in which monetary policy could simply follow a Taylor rule—or follow a rule that does not respond enough to past debt to satisfy the government budget constraint absent changes in nominal interest rates—a passive money/active fiscal regime in which the monetary authority would allow inflation and interest rates to adjust in order to maintain fiscal solvency. But in the paper, the fiscal rules are stochastic. Households perfectly observe the current fiscal policy rule, but must learn whether a deviation from a fiscal rule consistent in the long run with active money/passive fiscal is transitory, thus unlikely to ever require “passive-type” monetary policy, or whether it is highly persistent, and so likely to lead to high interest rates and inflation. As a result, in a country in which lapses in fiscal discipline are mostly transitory, even quite long-lasting lapses are still perceived as likely to be transitory, so that interest rates and inflation can remain quite low. In a sense then, a country’s credibility determines in part their debt capacity.

The central contribution of the paper is to use this model to interpret the history of US inflation, including the recent history of accelerating debt and low inflation and interest rates. The paper is not only an insightful analysis of the interactions of fiscal and monetary policy, but also a methodological contribution. In the model, policy rules are completely observed but the true state of the economy also includes the persistence of the rule in place, which is unobserved and must be learned by agents. By judiciously modeling the state transitions, the state space of the household problem remains finite and the model can be solved with agents that optimize, completely understanding their future learning behavior.

During the last few decades, recessions in the United States have been characterized by productivity that rises when output falls and by very little variability in inflation. While the cyclicity of productivity is inconsistent with productivity or supply driving business cycles, as in the real business cycle model, the acyclicity of inflation is inconsistent with demand driving cycles in a quantitative New Keynesian model of the business cycle. Our second paper, “Understanding Noninflationary Demand Driven Business Cycles” by Paul Beaudry and Franck Portier, starts by documenting these business cycle facts. More interestingly, the paper shows that the acyclicity of inflation does not follow from the current quantitative version of the New Keynesian Phillips curve—this equation predicts that if demand drives cycles, the inflation rate should have been much more cyclical and volatile than it was. The paper argues that this puzzle is not simply resolved by productivity shocks,

investment-specific technological change, or slight changes in parameterizations.

Instead, the authors propose a novel modeling feature that provides a deflationary counteracting force in the model to a demand shock, and the paper provides microeconomic evidence supporting this channel. The idea is that labor is specialized and demand shocks have differential impacts across sectors and so lead to reallocation of workers, which, given frictions, leads to heterogeneous wage impacts. The second friction is that these wage impacts matter for demand because consumption insurance/asset markets are incomplete. In this case, a negative demand shock for one industry becomes a negative demand shock for the other—trade between sectors declines, and this trade decline can happen without pressure on the aggregate price level. The mechanics of this insight are elucidated nicely in a set of models. Finally, the authors use data from the Panel Study of Income Dynamics to show that, first, sectors are specialized in that demand increases for a sector feed through to wage increases for workers in that sector, and, second, that these wage changes feed through to consumption increases. These results are not surprising given existing work on wages and consumption, but is it important to highlight that the channel proposed in the paper not only solves the puzzle of acyclical inflation in the New Keynesian model, but does so with mechanisms that are qualitatively consistent with behavior observed in the disaggregated wage and consumption data.

One of the most debated topics in business cycle theory in recent years has been what drives cyclical variation in the unemployment rate. As Robert Shimer in particular has emphasized, the leading model of equilibrium unemployment (the Diamond-Mortensen-Pissarides model of labor market search and matching), when calibrated in ways considered empirically realistic in other respects, implies relatively small fluctuations in equilibrium unemployment even in response to productivity variations large enough to account for the cyclical variation in aggregate output. This occurs because the standard model (based on Nash bargaining over the wage when unemployed workers are matched with firms with vacancies to fill) implies that productivity changes result in immediate changes in the wage bargain that are large enough to imply little incentive for firms to vary their efforts to recruit workers. The obviously counterfactual nature of this prediction has led to increased interest in alternative accounts of wage determination.

Our third paper, "Reference Dependence and Labor-Market Fluctua-

tions" by Kfir Eliaz and Ran Spiegler, proposes a novel explanation for insensitivity of wages to productivity shocks based on an alternative model of labor supply. Interviews with personnel managers suggest that they are reluctant to cut wages during recessions (even though the alternative is to lay off workers) because of the effects that they expect such cuts to have on worker morale, and consequently productivity. The authors propose a formal model that captures this hypothesis, in which worker productivity falls in response to a wage lower than a "reference point" determined by their prior wage expectations. They then offer a careful strategic analysis of a dynamic game with labor market search, matching, and wage bargaining, taking this behavioral reaction as a constraint. The authors establish the existence of a unique subgame-perfect equilibrium, and characterize its properties. Among other results, they show that reference-dependence implies downward nominal wage rigidity, and inefficient loss of output in response to negative shocks; the authors discuss how this is consistent with optimal contracting (owing to contractual incompleteness). They also show that a measure of labor market tightness is more volatile in equilibrium as a result of the reference-dependent behavior than it would be in the case of standard (non-reference-dependent) worker preferences. While the authors do not attempt a quantitative analysis, their model offers the prospect of at least a partial resolution to the Shimer puzzle. The paper is also groundbreaking in showing how insights from the behavioral economics literature can be fruitfully applied to a central issue in business-cycle theory.

Our fourth paper, "Pledgeability and Liquidity: A New Monetarist Model of Financial and Macroeconomic Activity," by Venky Venkateswaran and Randall Wright, is a contribution to the long-standing discussion of the real effects of inflation. A critical issue in most such discussions is the role of money (an asset the real return on which is reduced by inflation) in the economy, and the extent to which it is possible for people and firms to substitute away from the use of money in response to the incentive provided by a reduction in its real return. The authors propose microeconomic foundations for the use of money that build upon the well-known model of Lagos and Wright, in which exchange takes place in an alternating sequence of markets (centralized and decentralized markets, following each other in succession), and purchases in the decentralized markets can be made only by transferring money (a generally acceptable means of payment, that is

as a consequence more "liquid" than other assets). The variation on this theory pursued in the current paper is to allow purchases in the decentralized markets to also be made using other assets, to the extent that they can be pledged as collateral for debts contracted to the seller. The "pledgeability" of assets is, however, assumed to differ across assets, and to generally be imperfect. The result is a model in which, rather than a sharp distinction between liquid and illiquid assets (as in the case of a pure "cash-in-advance" model, or the Lagos-Wright model), there is a spectrum of assets of differing degrees of liquidity, with money only distinguished as the most liquid of all.

An important consequence of this theory is that equilibrium returns on many different assets (and not just money) should reflect in part a liquidity premium; the authors propose that this may account for a substantial part of the well-known "equity premium puzzle" (the surprisingly large differential between the average returns on stocks and those on riskless Treasury debt). The authors also revisit the question of the real effects of inflation. Contrary to the classic "superneutrality" result obtained in the Sidrauski monetary growth model, the authors find that in their model, higher-inflation steady states are associated with higher capital-labor and capital-output ratios; the fact that the returns to capital, like those of other assets, involve a liquidity premium in their model, is responsible for this result. (In a higher-inflation environment, liquidity is more scarce; when capital is another source of liquidity, this provides an incentive for capital accumulation.) More generally, this paper opens an important discussion about the way in which the pricing and supply of assets is affected by the role of assets in allowing the production of privately-supplied money substitutes, arguably an important function of modern financial systems.

Our fifth paper, "Shocks and Crashes" by Martin Lettau and Sydney C. Ludvigson, analyzes the relative contributions of changes in productivity, factor shares, and effective risk aversion both to expansions and recessions and to stock market booms and crashes. The paper uses vector autoregression techniques to analyze the joint dynamic behavior of consumption, labor income, and a broad measure of financial wealth. Productivity shocks are identified as having permanent effects on all three variables. Changes in factor shares are identified as shocks that leave consumption unchanged but that move labor income and stock market wealth in opposite directions. Finally, the remaining purely transitory shock accounts for most of the transitory fluctuations

in wealth but explains little variation in consumption or labor income, and as such appears to largely capture time-variation in effective risk aversion.

What does this decomposition tell us about fluctuations in wealth and output? While there are many interesting findings in the paper, a few stand out. First, the factor shares shock explains most of the variation in quarterly labor income. That is, the addition of financial variables uncovers a central role for a shock that is missing from most macroeconomic models. This shock is also central to the lower frequency (decadal) changes in stock market valuation. Second, the effective risk aversion shock accounts for most short-run asset market volatility, having a half-life of about four years, consistent with a common view among financial economists. But this shock is almost unrelated to consumption contemporaneously or in the future, inconsistent with most modern asset pricing theories. Third, these effective risk aversion shocks played a large role in the technology boom and of the late 1990s, the following crash of 2000 to 2001, and the credit boom of the 2000s. Thus wealth changes were largely transitory with little relation to income and consumption. But the crash of 2008 is different, due not only to an increase in effective risk aversion but also to a large permanent negative shock to consumption coming from the productivity shock. Thus, an integrated analysis of the history of these three variables is consistent with a permanently lower level of output following the Great Recession. Worryingly, the paper's estimates imply that the ratio of wealth to consumption at the end of the sample in the third quarter of 2012 lies well above its equilibrium level, a deviation that in the past has typically been equilibrated largely by a change in wealth rather than a boom in output or consumption.

The final chapter is a speech by Christina Romer, longtime NBER member and director of the Program in Monetary Economics, recent chair of the Council of Economic Advisers under President Obama, and regular columnist for the *New York Times*. Romer addresses the large and well-publicized shift toward more expansionary monetary policy that has recently occurred in Japan. Economists have long been concerned about the coincidence of deflation and depression, and recent analyses have shown that when interest rates are at the zero lower bound, expansionary monetary policy is largely about managing expectations of future inflation. Romer points out that a large monetary expansion—a regime change when President Roosevelt took office in 1933—was associated with a large turnaround in the US economy with

industrial production rising by 57 percent in the first four months of the year. Her talk discusses historical evidence that this was perceived as a regime change and the types of evidence that show that this regime change, rather than other policies or economic disturbances, were the cause of the rapid, if incomplete, recovery. She concludes by drawing out the implications of this view of the efficacy of regime change in the Great Depression for both the impact of the recent dramatic policy shift in Japan associated with "Abenomics," and for the effects of more modest shifts in forward guidance undertaken by the US monetary authorities during the current slow recovery.

Finally, the authors and the editors would like to take this opportunity to thank Jim Poterba and the National Bureau of Economic Research for their continued support for the NBER *Macroeconomics Annual* and the associated conference. We would also like to thank the NBER conference staff, particularly Rob Shannon, for his continued excellent organization and support. Financial assistance from the National Science Foundation is gratefully acknowledged. Kyle Jurado and Mariana Garcia Schmidt provided invaluable help in preparing the summaries of the discussions. And last but far from least, we are grateful to Helena Fitz-Patrick for her invaluable assistance in editing and producing the volume.

## Endnote

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