RAFFAELE MATTIOLI LECTURES

Towards a New Paradigm in Monetary Economics

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CAMBRIDGE

THE RAFFAELE MATTIOLI LECTURE SERIES

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The Raffaele Mattioli Lectures

The Raffaele Mattioli Lectures, in which many prominent economists have taken part, were established in 1976 by Banca Commerciale Italiana in association with Università Commerciale Luigi Bocconi as a memorial to the cultural legacy left by Raffaele Mattioli, for many years chairman of the bank.

The aim of the new series of Lectures, which was not only promoted by the then Banca Commerciale Italiana and Università Commerciale Luigi Bocconi but also supported by Università Cattolica del "Sacro Cuore" (Milan), Università degli Studi di Milano and Politecnico di Milano, was to create an opportunity for reflection and debate on topics of particular current interest, thus providing stimuli and ideas for the increasing challenges of a continually changing worldwide economic scenario.

The present initiative is therefore dedicated to the analysis of the effects of important changes which are now taking place in the world economy: the globalization of markets, the continuous evolution in the field of information, technology and communications and the convergence of economics and international relations.

It is evident that these changes, coupled with the European Monetary Union, provide many complex subjects that will be best dealt with from an interdisciplinary perspective.

Distinguished academics and researchers of all nationalities concerned with all kinds of economic problems will be invited to take part in this enterprise, with the intention of contributing to the debate interconnecting economic theory with practical policy.

Preface

These lectures were presented in Milan in abbreviated form on November 9, 1999 at Banca Commerciale Italiana and on November 10, 1999 at Bocconi University as the biannual Raffaele Mattioli Lecture. We are grateful to the staff at BCI and Bocconi, and for the useful comments from the discussants: Patrick Artus, Giovanni Barone-Adesi, Giampio Bracchi, Marco Pagano, Luigi Spaventa, Mario Saranelli, and Gianni Toniolo. In addition we would like to acknowledge the contribution of Barbara Rindi from the Scientific Committee of Bocconi University. We used the occasion to try to summarize a line of research that we had been pursuing for the past fifteen years. Our theoretical work in this area was interrupted by Stiglitz going to Washington, as a member and then Chairman of the President's Council of Economic Advisers, and then as Chief Economist of the World Bank and its Senior Vice President for Development. While the seven years in Washington had interrupted our formal research program, the events surrounding that tumultuous period provided what could not have been a better testing ground for the ideas that we had been developing. We became increasingly convinced not only that our ideas were right, but that they were important and relevant: that had the perspectives on monetary policy that we had been developing been widely adopted, for instance, the IMF might well have managed the global financial crisis of 1997–1999 far better.

We have attempted to present these ideas here simply, with words, diagrams, and simple mathematics, illustrated by examples drawn from recent experiences.

In developing these ideas, we are indebted to a large number of co-authors, who have participated with us actively at various stages in our research program. The ideas of one of our longest-term collaborators, Andy Weiss, with whom we developed the theory of credit rationing, and one of our youngest collaborators, Jason Furman, with whom we analyzed the East Asia crisis, will be especially apparent. We should also like to thank Barry Nalebuff, Carl Shapiro, Arik Levinson, Michael Salinger, Meir Kohn, Amar Bhattarcharya, Alan Blinder, Michael Rothschild, Mark Gersovitz, Jonathan Eaton, Marcus Miller, Marilou Uy, Raj Sah, Yingi Qian, Steve Salop, Ian Gale, Dwight Jaffee, Kevin Murdoch, Thomas Hellman, Andreas Rodriguez, Richard Arnott, and Giovanni Ferri, who co-authored one or more of the papers that provided the backdrop to the results reported here. The notion that capital markets were imperfect, and that cash flows might therefore limit investment, was a conventional assumption in much of macro economics before neo-classical models came to predominate. Such an assumption played an important role in some of Stiglitz's earlier work in macro economics, some of which was done with Robert Solow, George Akerlof, Hirofumi Uzawa, and Peter Neary.

We have discussed the ideas presented in this book at universities and central banks throughout the world, and the innumerable comments and criticisms have been invaluable – and though too numerous to mention by name, whether friendly or hostile, they have helped improve the book immensely.

Research assistantship in preparing the manuscript was provided by Monica Fuentes, Noémi Giszpenc, Niny Khor, Anton Korinek, Nadia Roumani, Ravi Singh, Marco Sorge, Maya Tudor, Kelly Wang, and to all of these we are greatly indebted.

At various stages, the research on which this book is based has been supported by the National Science Foundation, the Ford Foundation, the Rockefeller Foundation, Bell Labs (now part of Lucent), Princeton University, Oxford University, and the World Bank. We are particularly indebted to Stanford University and

Columbia University for their support during the period in which this book was written.

The usual disclaimer that the ideas presented here are those solely of the authors, and not of the institutions with which they are currently or were previously affiliated, applies with particular force. We would be remiss not to acknowledge the vibrant intellectual atmosphere inside the World Bank, in which the ideas presented here were debated, challenged, and adopted and adapted as we confronted the most dramatic set of economic events of the last half of the twentieth century – the global financial crisis; but we would also be remiss if we did not express our sense of frustration at the attempts by the US Treasury and the IMF to suppress open discussion of these ideas. What was at stake was more than issues of intellectual freedom or professional integrity, but what we mean by meaningful democracy. There cannot be meaningful democracy without transparency and without open public discourse of vital issues that affect the lives and livelihoods of the citizens. The ideas presented here do represent a major change in thinking about certain aspects of policy, and as such they represent a challenge to the established orthodoxy. The policy implications are important – not only for the aggregate performance of the economy but for specific groups within our societies. It is our hope that in presenting these ideas, in an imperfect form as they are at the current state of development, they will stimulate debate and discussion, and that on the basis of these ideas alternative policies will be formulated which will spare those facing crises in the future from the policies that so ravaged the countries of East Asia.

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Joseph Stiglitz, Columbia University, New York
Bruce Greenwald, Columbia University, New York

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PART ONE
The principles of the new paradigm

Money has long played a central role in popular conceptions of economics – and life more generally. "Money makes the world go around" and "money is the root of all evil" are but two aphorisms that come to mind.

Professional economists give money an equally mixed review. The monetarists – whose enormous popularity in the early 1980s seems subsequently to have waned – place money as a central determinant of economic activity. By contrast, in the classical dichotomy, money has no *real* effects, a view which has been revived in real business cycle theory.[1] Monetary economics has thus been a curious branch of economics: At times, its central

These lectures are based on our joint research over the past decade, parts of which are reported in Greenwald (1998), Greenwald and Stiglitz (1987a, 1987b, 1987c, 1988a, 1988b, 1988c, 1988d, 1989a, 1989b, 1990a, 1990b, 1991a, 1991b, 1991c, 1991d, 1992, 1993a, 1993b, 1993c, 1995); Greenwald, Kohn and Stiglitz (1990); Greenwald, Levinson and Stiglitz (1993); Greenwald, Salinger and Stiglitz (1991); Greenwald, Stiglitz and Weiss (1984) and Clay, Greenwald and Stiglitz (1990). In parts of these lectures, we have also drawn upon joint work with Thomas Hellmann and Kevin Murdoch (especially in the discussions concerning bank regulation) reported in Hellmann, Murdoch and Stiglitz (2000) and in Hellmann and Stiglitz (2000). The analysis of the East Asia crisis in part II draws heavily upon joint work with Jason Furman, published in Furman and Stiglitz (1998). The views expressed here are solely those of the authors and do not necessarily represent those of any organization with which they are or have been affiliated.

[1] See Kydland and Prescott (1990) and Kydland and Cooley (1995).

tenet seems to be that it is a subject of no interest to anyone interested in real economics; at other times, it moves front and center.

While for long periods of time the view that money does not matter has held sway in monetary theory, this does not appear to be the view of the world, which hangs on anxiously, wondering whether the Federal Reserve will raise or lower interest rates by as little as twenty-five basis points. As our starting point for this book, we recognize there is some validity in the view that money matters, at least in the short run. We take it that the task of monetary economics is to explain why, and in doing so, provide better guidance to policymakers attempting to use monetary policy to enhance the overall economic performance – allowing expansion of the economy, at least to the point where such expansion does not lead to an increase in the rate of inflation.

The central thesis of this chapter is that the traditional approach to monetary economics, based on the transactions demand for money, is seriously flawed; it does not provide a persuasive explanation for why – or how – money matters. Rather, we argue that the key to understanding monetary economics is the demand and supply of loanable funds, which in turn is contingent on understanding the importance, and consequences, of imperfections of information and the role of banks. We argue, in particular, that one should not think of the market for loans as identical to the market for ordinary commodities, an auction market in which the interest rate[2] is set simply to equate the demand and supply of funds. T-bill rates do matter, but they affect economic activity largely indirectly, through their effect on banks. Banks provide vital certification, monitoring, and enforcement services, ascertaining who is likely to fulfill their promises to repay, ensuring that money lent is spent in the way promised, and collecting money at the due date.

[2] For most of part I, we assume that the inflation rate is fixed, so that the interest rates can be viewed as either nominal or real (since changes in nominal translate immediately into changes in real). Since traditional economic analysis has stressed that what matters is real variables, including real interest rates, it will be convenient to think of the interest rates as inflation adjusted real interest rates. In those chapters of the book where we focus on the effects of nominal interest rates as well as real ones, we will use subscripts to denote nominals.

That some loans are not repaid is central. A theory of monetary policy which pays no attention to bankruptcy and default is like *Hamlet* without the Prince of Denmark, and is likely to – and in the East Asia crisis, did – lead to drastically erroneous policies. Thus, a central function of banks is to determine who is likely to default, and in doing so, banks determine the supply of loans. Providing these certification, monitoring, and enforcement services is in some ways like any other business; there is risk, and thus the key to understanding the behavior of banks is understanding limitations on their ability to absorb these risks, and how their ability and willingness to do so can change with changes in economic circumstances and in government regulations. A closer look at these determinants of bank behavior reveals why it is that economic activity may depend on the nominal interest rate as well as the real interest rate, thus providing an explanation of one of the more disturbing anomalies in economics.[3]

While banks are at the center of the credit system, they are also part of a broader credit "general equilibrium" – a general equilibrium whose interdependencies are as important as those that have traditionally been discussed in goods and services markets. However, their interdependencies, until now largely unexplored, are markedly different – and are affected differently both by economic events and policies.

This book can be viewed as a contribution to the new institutional economics, which has emphasized the importance of institutions in any economy. In Walrasian economics, attention focused on equilibrium outcomes, determined by the underlying "fundamentals" of the economy – preferences and technology, which determined the demand and supply curves. Neo-classical economists argued that one should see through the superficial institutions to the underlying fundamentals. Monetary economics was easily incorporated into this framework, simply by postulating a demand function for money – and a supply determined by the government. The new institutional economics argues that there is much more to economic analysis – institutions

[3] As we shall comment below, standard economic theory argues that investment should depend just on real interest rates, not nominal interest rates. Yet empirical studies seem to suggest the contrary.

matter. Furthermore, they also argue that one can *explain* many aspects of institutions, for instance by looking at transactions-cost technology[4] or the imperfections and costs of information.[5] This book argues that financial institutions – banks – are critical in determining the behavior of the economy, and that the central features of banks and bank behavior can be understood in terms of (or derived from) an analysis of information imperfections.

The argument for looking at the banking system's institutional structure in detail as an intrinsic part of monetary economics has strong empirical support beyond that implicit in practical monetary policy discussions (which takes the importance of institutional factors as given). Over time, in closely observed systems like that in the United States, traditional monetary relationships have varied significantly, while in the same periods there have been equally important changes in the institutional structure of the banking system, or at least in the institutions within the banking system. Similarly, there are marked differences in the effectiveness of monetary policy in different countries, and similarly marked differences in their institutional structures. We argue that the changes in the monetary relations over time and differences across countries can be linked to institutional variations in the banking system. Frequently such changes become especially marked as the economy goes into a recession or faces a financial crisis. It is precisely when monetary policy becomes of crucial importance that the traditional models fail most dramatically. Later, we will argue that the failure to understand key aspects of financial institutions and their changes lies behind some of the recent failures in macro-economic policies, including the 1991 US recession and the severe recessions and depressions in East Asia that began in 1997.

An important reason for focusing on the impact of banking institutions is the rapid pace at which these institutions are changing. Existing theoretical models, largely institutionally independent, provide little or no guidance for assessing the effect of these changes on monetary policy. For example, transactions-

[4] See Williamson (1979, 1985, 1999).
[5] See, for example, Stiglitz (1974b, 1987b); Newberry and Stiglitz (1976); Braverman and Stiglitz (1982, 1986); and Braverman, Hoff and Stiglitz (1993).