

Introduction: Seven Decades of the IS-LM Model

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For some twenty-five years after the end of World War II, the IS-LM model dominated macroeconomics. With the advent of the new classical macroeconomics in the early 1970s, that dominance was at first challenged and then broken. Yet the IS-LM model lives on. While no longer central to the graduate training of most macroeconomists or to cutting-edge macroeconomic research, the IS-LM model continues to be a mainstay of undergraduate textbooks, finds wide application in areas of applied macroeconomics away from the front lines of macroeconomic theory, and lies at the conceptual core of most government and commercial macroeconomic models. What explains the rise, the fall, and the persistence of the IS-LM model? This volume presents essays from the *HOPE* conference held 25–27 April 2003 at Duke University that provide partial answers to this question. In addition to the ten essays from the conference, we are fortunate to be able to reprint an address delivered by Robert Lucas in conjunction with the conference. Professor Lucas made his remarks at a reception celebrating the commitment of his professional papers to Duke University's Rare Book, Manuscript, and Special Collections Library, where they will be housed with the papers of other distinguished economists received through the Economists' Papers Project. As Lucas is one of the central players in the intellectual movement that ultimately dethroned the IS-LM model, his lecture stands

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on an altogether different plane than the essays from the conference. It may be regarded reasonably as an eyewitness account by an observant and reflective participant.

The 1930s were years of turmoil for economists concerned with the problems of business cycles. Although macroeconomic questions were among the oldest in economics, macroeconomics as a field was struggling to grow into self-consciousness. The term *macroeconomics* was first coined by Ragnar Frisch in 1933.¹ Economists such as Erik Lindahl, Friedrich Hayek, and John Hicks were struggling with dynamics—time and expectations—and beginning to create formalized models. Frisch and Jan Tinbergen, among others, started to build statistically estimated models. The conceptual basis not only for macroeconomic models, but even for national accounting, was still hotly debated.

History, as is frequently said, is written by the victors. In light of the postwar dominance of “Keynesian” macroeconomics, it would be easy to overlook the fact that John Maynard Keynes’s *General Theory of Employment, Interest, and Money* (1936) by no means swept the boards in the macroeconomic debates of the mid-1930s. The *General Theory*, as the essay of Roger Backhouse and David Laidler reminds us, offered a systematic account of the macroeconomy that, on the one hand, built on numerous antecedents and, on the other hand, ignored hard-won theoretical achievements in the areas of economic dynamics. Keynes adopted a Marshallian approach, both in the sense that he deliberately echoed Marshall’s microeconomic analysis in a new macroeconomic setting and in the sense that he adopted Marshall’s notion that radical simplification is sometimes necessary to achieve a practically applicable analysis (Marshall [1885] 1925; see also Friedman [1949] 1953, 1955). Around the same time that Keynes’s *General Theory* provided an account of aggregate general equilibrium, mathematical economics began to make considerable strides in developing the underpinnings for the individually based general equilibrium model that started with Léon Walras and culminated in Kenneth Arrow and Gerard Debreu’s proof of the existence of general equilibrium in the early 1950s. The essay in this volume by Michel De Vroey explores the relationships and tensions between these

1. Jean-Paul Fitoussi and Kumaraswamy Velupillai (1993) report that Frisch used the term in lectures, whereas Lindahl may have been the first to use it in print. The term *macrodynamic(s)* was, however, already current in the middle to the end of the 1930s. The earliest example in the JSTOR journal archive is in an article by Edward Theiss (1935).

competing visions of general equilibrium and between the Marshallian and Walrasian methodologies. In particular, it claims that the IS-LM model belonged to the Marshallian rather than the Walrasian tradition.

The *General Theory* was immediately seen to be a vitally important book. Keynes used the language of mathematics to articulate elements of the economy: the consumption function, the liquidity preference function, the aggregate supply function, and so forth. But the glue that welded these pieces into a macroeconomic system was Keynes's elegant, but not always transparent, prose. Keynes (1936, v) had addressed the *General Theory* to his fellow economists. And at a meeting of the Econometric Society in Oxford in 1937, his fellow economists gathered to try to work out the meaning of his masterwork. Roy Harrod, James Meade, and John Hicks translated the *General Theory* into mathematical systems.² Their accounts have largely been forgotten, except for that of Hicks ([1937] 1967). Cutting through the elegant prose and the many detours, Hicks's IS-LL model proposed to reduce the central theoretical message of Keynes's *General Theory* to a short set of simultaneous equations and a single graph. At the time, Hicks could not have fancied the success that his model was to encounter. In effect, it became the organizing theoretical apparatus of the emerging discipline of macroeconomics.

Knowingly perpetrating a solecism, Keynes conjured up a straw man, "the classics," on page 3 of the *General Theory* in order to have a worthy foe to vanquish over the remaining 409. Hicks's essay, "Mr. Keynes and the 'Classics,'" begins by noting the smell of newly cut hay hanging about Keynes's classics. Nevertheless, Hicks tries to locate the essence of Keynes's approach in an understanding of just what Keynes claims distinguishes himself from the classics. Hicks presents a self-consciously stylized account of the *General Theory* in three equations. But it was the diagram, not the equations, that engendered the enduring fame of the essay.

Figure 1 is Hicks's original diagram. On the vertical axis are interest rates, and on the horizontal axis, aggregate nominal income. The downward-sloping IS curve represents the locus of points for which investment (a function of interest rates) and savings (a function of income) are equal. The upward-sloping LL curve represents the locus of points for which the stock of money (presumed fixed) equals the amount demanded

2. David Champernowne was also present at the meeting. He had previously presented a mathematical and diagrammatic version of the *General Theory* (Champernowne 1936), as had W. Brian Reddaway (1936).

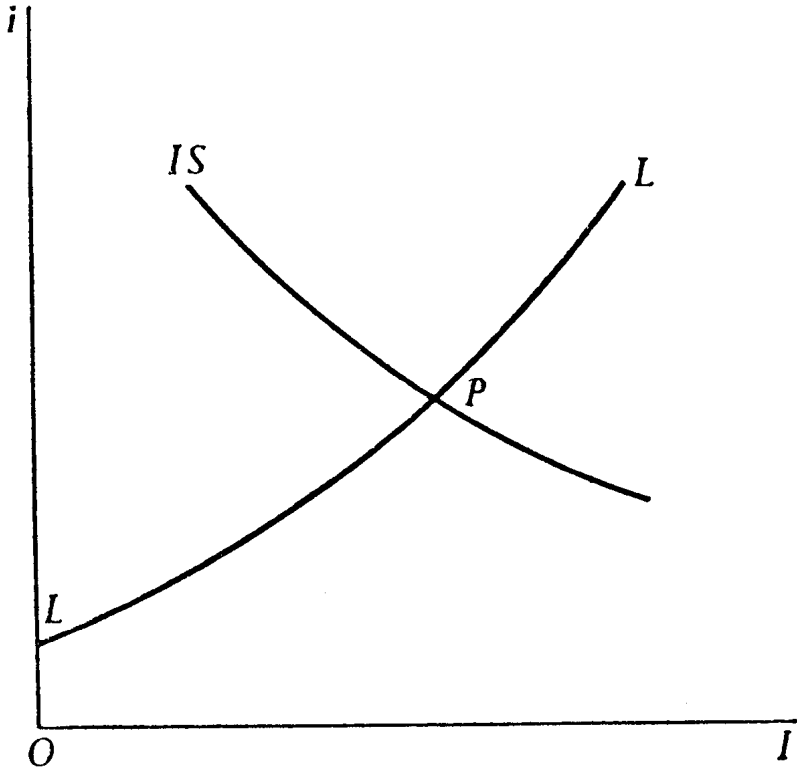


Figure 1 The original IS-LM diagram (Hicks 1937, fig. 3; [1937] 1967, fig. 9)

to satisfy liquidity preference. Hicks saw the essential difference between Keynes and the classics in Keynes's claim that liquidity preference offered a novel account of the determination of interest rates. As a result, Hicks paid special attention to the LL curve. According to him, Keynes's system became "completely out of touch with the classical world" whenever the LL curve exhibited a horizontal section and the intersection between IS and LL occurred on this section (Hicks [1937] 1967, 154). In such an occurrence, the "economics of depression," monetary expansion was unable to increase employment. In contrast, fiscal policy would be effective. With not even an acknowledgment of Keynes's (1936, 207) avowed ignorance of real-world cases of absolute liquidity preference

(or, as it came to be known, the *liquidity trap*), Hicks argues that the flat LL curve is *the* characteristically Keynesian case. The essay by Mauro Boianovsky traces the history and analysis of the liquidity trap from Keynes and Hicks through Krugman's analysis of the Japanese economy in the 1990s.

Hicks himself was sensitive to the limitations of his model and his diagram. He anticipated criticisms encapsulated in Joan Robinson's (1975) dismissive phrase "bastard Keynesianism" and in Alan Coddington's (1976, 1263) less pejorative, but accurate, "hydraulic Keynesianism." How then did Hicks's "little apparatus" become canonical? This occurred in two stages. First, recasting Hicks's model (De Vroey 2000), Franco Modigliani (1944) sharpened the contrast between the classical and the Keynesian submodels. The former now referred to a case of flexible wages and market clearing, the latter to downward rigid wages and involuntary unemployment. Modigliani's contribution is analyzed in Gouven Rubín's essay. Rubín also claims that Don Patinkin's (1956) simplified general equilibrium constituted an alternative way of achieving the aim that Hicks and Modigliani had set for themselves. Second, every prophet needs an apostle. Keynes and Hicks found their apostle in Alvin Hansen. Hansen (1949, 1953) reinterpreted Keynes and rewrote elementary macroeconomics using Hicks's model. For reasons that remain somewhat obscure, Hansen relabeled the LL curve "LM." It is a testimony to Hansen's importance in the story that the model has been referred to as IS-LM ever since.

After World War II, the IS-LM model was developed in several directions. It became gradually enriched by the consideration of open economies and by attempts to give microfoundations to the consumption function, portfolio decisions, and the investment schedule. It served as the basis for econometric models. By degrees, standard textbooks—starting with books aimed at graduate students and by the 1960s trickling down to elementary texts—adopted the IS-LM model as their framework.

As the model became more dominant theoretically, it lost its Keynesian character with respect to practical policy issues. That is, non-Keynesians could simply state that only its classical variant was valid, its Keynesian variant being flawed because of its rigid wages assumption. Thus, friends and foes of Keynes alike could use it to promote or confute Keynesian policy prescriptions.

The essay of Warren Young and William Darity is concerned with such an embellishment of the standard IS-LM model. It recounts the

story of how the model was broadened to consider the balance of payments and exchange rates—key questions in international finance. The essay by Robert Dimand addresses James Tobin's efforts to introduce more complex, more realistic financial markets into the IS-LM framework.

Throughout the high tide of the IS-LM model in the 1950s and 1960s, Milton Friedman and his fellow travelers (mostly associated in one way or another with the University of Chicago) advocated the superiority of the quantity theory of money over the Keynesian income-expenditure theory. Karl Brunner (1968) coined the term *monetarism* to describe the school of thought that included Friedman, Anna Schwartz, himself, and his frequent coauthor Allan Meltzer, as well as many of their students and colleagues. Drawing on very different paradigms, monetarists and Keynesians often seemed to talk at cross-purposes. When finally he was persuaded to try to articulate the framework of his monetary thinking, Friedman (1974), in an effort to bridge the gap between him and his Keynesian antagonists, turned to the IS-LM model. Friedman was not successful. In their essay, Michael Bordo and Anna Schwartz argue that, because of fundamental methodological differences between the monetarists and Keynesians, the IS-LM model was an inappropriate vehicle for successfully characterizing monetarism and that Friedman's attempt was doomed. They note that other monetarists, such as Brunner and Meltzer, who had argued that a much richer asset structure than was available in the IS-LM model was needed to capture monetarist views of the transmission mechanism for monetary policy, were not tempted to follow Friedman in trying to use the model as a neutral tool of communication with the Keynesians. Keynesians such as Tobin held similar views to Brunner and Meltzer about the need for rich asset structures (see Robert Dimand's essay), but nevertheless saw their position as elaborating rather than contradicting IS-LM (cf. Dornbusch 1976). Scott Sumner's essay argues that the IS-LM model offered an appropriate basis for monetary policy only in the gold standard era that was just ending at the time that Keynes wrote the *General Theory*. Sumner argues that, despite decades of intellectual dominance, the IS-LM model is necessarily an inadequate tool of analysis and communication for the quantity theorist.

The success of the IS-LM model must also be explained by its happy adaptability to econometric modeling. Keynesian economics provided the intellectual foundation of a new theory of economic policy. Although

Keynes himself was deeply skeptical about the new econometrics of the 1930s—expressed particularly in his 1939 review of Tinbergen’s early modeling exercises—macroeconomic modeling grew up in tandem with Keynesian macroeconomics. Published as *The Keynesian Revolution* (1947), Lawrence Klein’s doctoral dissertation was an interpretation of the *General Theory* in which Klein paid attention to important modeling aspects of Keynesian economics, including microfoundations for, in particular, the consumption function, the money-demand function, and the investment function. Klein went on to become the doyen of macroeconomic modeling in the United States and the United Kingdom. Econometric models became ever more elaborate, but their essential structure was closely related to the conceptual form of the IS-LM model.

Only one key feature of postwar macroeconomic models was not captured in the first generation of the textbook IS-LM model: inflation. The model was conceived in an era in which prices were not expected to trend up or down for long periods. Although the macroeconomic models added lagged variables to capture dynamics in a rough-and-ready way, the IS-LM model itself was essentially static. Soon after the publication of A. W. Phillips’s (1958) paper on wage inflation and unemployment in the United Kingdom, the “Phillips curve,” now generally estimated for price inflation and unemployment, became the standard way of “closing” the macroeconomic model.

The Phillips curve may have proved to be the undoing of standard Keynesian theory. The Phillips curve was criticized—particularly by Friedman (1968) and Edmund Phelps (1967)—for failing to integrate expectations and for ignoring the long-run neutrality of money. When macroeconomic models appeared to perform badly in the early 1970s, much of the blame attached to the Phillips curve. Robert Lucas (1972a, 1972b) initially turned his fire on his own antecedents, criticizing his old teacher, Milton Friedman, for modeling expectations in a manner that suggested that people made systematic, expensive, and easily correctable errors. Lucas and other “new classicals” such as Thomas Sargent and Robert Barro argued that expectations should be modeled according to the *rational expectations hypothesis* in a manner that did not build in systematic error.

The early new classical models (e.g., Sargent and Wallace 1976) simply added rational expectations to the IS-LM framework. Lucas soon came to see that the failure to model expectations appropriately was part

of a larger problem. In his important paper “Econometric Policy Evaluation: A Critique” (1976), he argued that the failure of the macroeconomic models in the early 1970s was attributable to a general failure to model the behavior of the individual, rational, optimizing agents that constitute the economy. In particular, Lucas criticized the practice of assuming that the parameters of aggregate econometric models would maintain stability in the face of changes in the conduct of economic policy. Lucas argued that the parameters themselves were functions of deeper parameters, governing the tastes and constraints of agents, and that these agents would adapt to new economic policies by adapting their behavior in a way that would shift the parameters of aggregate models.

The Lucas critique was widely taken to demand a microeconomic basis for macroeconomics. It is, of course, a difficult problem to model the millions of individual agents in the economy. And, rapidly, the new classicals settled on the representative agent model (and some other highly stylized models) as the basis for macroeconomic theory. This is not the place to go into the successes and failures of this modeling strategy (but see Janssen 1993, Hartley 1997, and Hoover 2001). The important thing in this context is that the widespread acceptance—by new classicals and new Keynesians alike—of the ideal of microfoundations for macroeconomics was a body blow to the aggregative IS-LM model. By 1980, the IS-LM model no longer stood at the forefront of research in macroeconomic theory. Over the next two decades it gradually faded from more and more applied areas of macroeconomics. A graduate student in 2003, having studied no economics as an undergraduate, might obtain a PhD without any acquaintance—much less mastery—of the IS-LM model.

Yet, somehow the model did not die. As Edward Nelson points out in his essay, the pedagogical simplicity of the IS-LM model made it an unparalleled tool of exposition not only to students but also to policy-makers. In their pure form, modern dynamic optimization models are difficult to grasp. But with judicious arrangement, policy models used at central banks can be cast as “optimizing IS models.” Typically, the LM curve is exchanged for an interest-rate policy rule. Nelson argues that monetary aggregates may, nevertheless, serve as proxies for the wide range of asset prices (beyond the policy rate and a longer bond price often found in these models) affected by policy and affecting the economy. A dynamic optimizing IS model with an important role for monetary aggregate would appear to be another incarnation of Hicks’s little apparatus.

In his keynote address, Lucas suggests another reason for the persistence of the IS-LM model—its flexibility and adaptability. He argues that the microfoundational models that he, as the leader of the new classicals, has championed for a quarter century try to capture quite detailed optimization problems. But they are nevertheless more stylized than realistic. They work in environments that suit them. The postwar macroeconomic environment has, he believes, favored them. Central bankers and government policymakers in developed countries have more or less followed sensible policies and have successfully stabilized the economy. In these stable environments, microfoundational models are at home and work well. But in novel and highly disrupted environments—for example, in the Great Depression or in the various crises of the developing countries—they hardly work at all. In contrast, the IS-LM model, although it is unsatisfactory from a purely theoretical point of view, nonetheless provides a framework on which practical empirical analysis can be hung. Lucas still hopes that better models will one day supplant it completely. But that day is not yet at hand.

And, so, the IS-LM model persists. David Colander closes the current volume with an examination of that persistence. No longer at the forefront of research, it remains unsurpassed as a tool of undergraduate pedagogy and communication about macroeconomic policy. A bibliometric study shows only a highly attenuated decline in references to the IS-LM model over the decades. But a greater proportion than ever are in historical or pedagogical contexts and fewer and fewer in pure theory. Textbooks still feature the IS-LM model, but where in Gardner Ackley's 1961 textbook the model itself was a focal point, in N. Gregory Mankiw's popular recent textbook (2003), it is mainly deployed as an instrument for the discussion of economic policy.

References

- Ackley, Gardner. 1961. *Macroeconomic Theory*. New York: Macmillan.
- Brunner, Karl. 1968. The Role of Money and Monetary Policy. *Federal Reserve Bank of St. Louis Review* 50.7:8–24.
- Champernowne, David G. 1936. Unemployment, Basic and Monetary: The Classical Analysis and the Keynesian. *Review of Economic Studies* 3.3:201–16.
- Coddington, Alan. 1976. The Search for First Principles. *Journal of Economic Literature* 14.4:1258–73.
- De Vroey, Michel. 2000. IS-LM à la Hicks versus IS-LM à la Modigliani. *HOPE* 32.2:293–316.

- Dornbusch, Rudiger. 1976. Comments on Brunner and Meltzer. In *Monetarism*, edited by Jerome Stein. Amsterdam: North-Holland.
- Fitoussi, Jean-Paul, and Kumaraswamy Velupillai. 1993. Macroeconomic Perspectives. In *Monetary Theory and Thought*, edited by Haim Barkai, Stanley Fischer, and Nissan Liviatan. London: Macmillan.
- Friedman, Milton. [1949] 1953. The Marshallian Demand Curve. In *Essays in Positive Economics*. Chicago: University of Chicago Press.
- . 1955. Leon Walras and His Economic System: A Review Article. *American Economic Review* 45.5:900–909.
- . 1968. The Role of Monetary Policy. *American Economic Review* 58.1:1–17.
- . 1974. A Theoretical Framework for Monetary Analysis. In *Milton Friedman's Monetary Framework: A Debate with His Critics*, edited by Robert J. Gordon. Chicago: University of Chicago Press.
- Hansen, Alvin. 1949. *Monetary Theory and Fiscal Policy*. New York: McGraw-Hill.
- . 1953. *A Guide to Keynes*. New York: McGraw-Hill.
- Hartley, James E. 1997. *The Representative Agent in Macroeconomics*. London: Routledge.
- Hicks, John R. 1937. Mr. Keynes and the “Classics.” *Econometrica* 5.2:147–59.
- . [1937] 1967. Mr. Keynes and the “Classics.” In *Critical Essays in Monetary Theory*. Oxford: Clarendon.
- Hoover, Kevin D. 2001. *The Methodology of Empirical Macroeconomics*. Cambridge: Cambridge University Press.
- Janssen, Maarten. 1993. *Microfoundations: A Critical Inquiry*. London: Routledge.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*. London: Macmillan.
- . 1939. Professor Tinbergen's Method. *Economic Journal* 49.195:558–68.
- Klein, Lawrence R. 1947. *The Keynesian Revolution*. New York: Macmillan.
- Lucas Jr., Robert E. 1972a. Econometric Testing of the Natural Rate Hypothesis. In *The Econometrics of Price Determination*, edited by Otto Eckstein. Washington, D.C.: Board of Governors of the Federal Reserve System.
- . 1972b. Expectations and the Neutrality of Money. *Journal of Economic Theory* 4.2:103–24.
- . 1976. Econometric Policy Evaluation: A Critique. In *The Phillips Curve and Labor Markets*, edited by Karl Brunner and Allan H. Meltzer. Carnegie-Rochester Conference Series on Public Policy, vol. 11 (spring). Amsterdam: North-Holland.
- Mankiw, N. Gregory. 2003. *Macroeconomics*. 5th ed. New York: Worth Publishers.
- Marshall, Alfred. [1885] 1925. The Present Position of Economics. In *Memorials of Alfred Marshall*, edited by A. C. Pigou. London: Macmillan.
- Modigliani, Franco. 1944. Liquidity Preference and the Theory of Interest and Money. *Econometrica* 12.1:45–88.
- Patinkin, Don. 1956. *Money, Interest, and Prices*. New York: Harper and Row.
- Phelps, Edmund S. 1967. Phillips Curves, Expectations of Inflation, and Optimal Unemployment over Time. *Economica*, n.s., 34.3:254–81.

- Phillips, A. W. 1958. The Relation between Unemployment and the Rate of Change of Money Wages in the United Kingdom, 1961–1957. *Economica*, n.s., 25.100:283–99.
- Reddaway, W. Brian. 1936. *The General Theory of Employment, Interest, and Money* by J. M. Keynes. *Economic Record* 12 (June): 28–36.
- Robinson, Joan. 1975. What Has Become of the Keynesian Revolution? In *Essays on John Maynard Keynes*, edited by Milo Keynes. Cambridge: Cambridge University Press.
- Sargent, Thomas J., and Neil Wallace. 1976. Rational Expectations and the Theory of Economic Policy. *Journal of Monetary Economics* 2.2:169–83.
- Theiss, Edward. 1935. Dynamics of Saving and Investment. *Econometrica* 3.2:213–24.