Keynesian Economics at the Cowles Commission

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Abstract

The Cowles Foundation for Research in Economics was, in the first decades after its establishment at Yale in 1955, closely associated with the Keynesian economics of James Tobin and his “Yale school” approach to monetary economics. Its predecessor, the Cowles Commission, was not at first Keynesian: a few papers on Keynes were presented at the Cowles summer conferences in Colorado in the late 1930s but Harold Davis’s Analysis of Economic Time Series (Cowles Monograph No. 7, 1941) dismissed Keynes’s General Theory in a footnote, focusing instead on theories of fluctuations as truly periodic cycles, including Jevons on sunspots. But in the 1940s Oskar Lange and Jacob Marschak took the lead at the Cowles Commission in promoting a distinctive formulation of Keynesianism: Keynesian economics as a small general equilibrium system of simultaneous equations suitable for guiding aggregate demand management. Key works were Lange’s 1938 articles and 1944 Cowles monograph on Price Flexibility and Employment, a joint paper that Lange and Marschak submitted to the Economic Journal responding to Keynes’s critique of Tinbergen, and Marschak’s Chicago lectures, published as Income, Employment and the Price Level (1951), as well as articles
by Marschak’s doctoral students Franco Modigliani (1944) and Don Patinkin (1947 to 1949). This approach contrasted with the emphasis on fundamental uncertainty in Keynes’s 1937 QJE reply to reviews of his General Theory, but not with the system of four simultaneous equations in the concluding lecture of Keynes’s Michaelmas 1933 lectures (an approach that Keynes did not carry over into the General Theory). Lawrence Klein, author of The Keynesian Revolution (1946) and a 1950 Cowles monograph on Economic Fluctuations in the United States, was at Cowles 1944-47. This view of the Cowles Commission, after Marschak became research director in January 1943, as Keynesian but in a distinctive way differs from the interpretation by Philip Mirowski, “The Cowles Commission as an Anti-Keynesian Stronghold 1943-54” (2012).

Keywords: Cowles Commission; Keynesian Economics; Lawrence Klein, Jacob Marschak

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I. Introduction

The Cowles Foundation for Research in Economics, after its establishment at Yale University, became closely identified with the version of American Keynesian economics advanced by James Tobin and his students, the “Yale school” approach, which differed from other American Keynesianism in its emphasis on the monetary system and financial markets (Tobin 1971-96, 1980, Colander 1999, Dimand 2014). Its predecessor, the Cowles Commission, founded in Colorado Springs in 1932 and based at the University of Chicago from 1939 to 1955, was initially wary of Keynes’s General Theory (see, e.g. Davis 1941) but then, after Jacob Marschak became research director of Cowles at the beginning of 1943, took the lead in advancing a distinctive form of Keynesian macroeconomics. The Keynesian macroeconomics of the Cowles Commission from 1943 onwards embraced
 Keynes’s vision of the need for stabilization policy in an economy in which automatic adjustment could not be relied upon to restore full employment but did not accept Keynes’s critique of Jan Tinbergen’s approach to macroeconometric model-building (the Cowles researchers also dissented from Tinbergen’s approach to estimating such models, but on other grounds).

II. Keynes and Cowles Until 1942

Keynes’s *General Theory* (1936), the center of worldwide discussion and debate among economists, received only limited attention at the Cowles Commission before Jacob Marschak became research director on the first day of 1943. Keynes’s book came under consideration at the 1938 Cowles summer conference in Colorado, with Joseph Mayer giving two lectures on “Full Employment and Easy Money – An Analysis of Mr. Keynes and His Critics”, and at the 1939 conference with Abba Lerner, then assistant lecturer in statistics at the London School of Economics (but soon to move to a series of American universities), giving the first presentation of his proposal for “functional finance” and Mordecai Ezekiel contrasting “Keynes versus Chamberlin.” These few conference presentations, two or three years after Keynes’s book appeared, dealt more seriously and insightfully with Keynes than had the Cowles Commission’s permanent research staff in the 1930s. Lerner’s talk on “Budgetary Principles” (abstracted in Cowles Commission 1939, pp.38-9) offered a robustly “Keynesian” approach to fiscal policy that went beyond Keynes in rejecting budget balancing over any time horizon as something to be considered at all: “All talk of the necessity, propriety, or usefulness of a government balancing its budget, whether weekly, annually, cyclically, or over any other period is nothing but an irrational transference to general public finances of principles that are appropriate only for departmental finance or personal finance.”

Mordecai Ezekiel, then economic adviser to the US Secretary of Agriculture, contrasted Keynesian theory with Edward Chamberlin’s monopolistic competition as two alternative explanations of chronic underutilization of resources and underemployment, with a focus
on statistical verification and on policy responses (in Cowles Commission 1939, pp.54-7). “From the data thus far available,” judged Ezekiel (p.56), “one may draw the tentative conclusion that there is a pervasive tendency, in our economy as now organized, for the volume of savings at full employment to outrun the volume of investment, and hence an inability to maintain the flow of payments necessary to maintain full employment. At the same time, there is monopolistic competition in many industries to an extent which tends to depress production, increase profits, and intensify the income maldistribution which contributes to excessive saving. Cyclical variations of the cobweb type are also present in some of the competitive industries, further lowering the average volume of output.”

Apart from those few papers at the summer research conferences, Keynes’s *General Theory* made little impact on the Cowles Commission in its Colorado days. Harold Davis, the mathematics professor who first told Alfred Cowles about the newly-established Econometric Society, founded the Principia Press that published the Cowles monographs until 1945 and was acting research director of the Cowles Commission in the late 1930s (as well as an associate editor of *Econometrica* for twenty-six years), opened the 1938 conference with a talk on “Problems in the Theory of Business Cycles” and closed it nearly a month later with a talk on “The Monetary Factor in Trends of Trade” without any mention of Keynes or any suggestion that economic fluctuations required any analysis other than decomposition into cycles of differing periodicity and amplitude. Davis dedicated a great deal of attention in his Cowles monograph on *The Analysis of Economic Time Series* (1941) to such cyclical explanations of business fluctuations as W. Stanley Jevons’s sunspot theory of the trade cycle, with fourteen references to Jevons in Davis’s index. But as to Keynes, Davis (1941, p.330) only remarked that a theory “attributed to J. M. Keynes (1930), distinguishes between saving and investment. Since these are distinct and different processes, there is a tendency toward disequilibrium which result either in a depression or an expansion,” adding in a footnote that “This theory has been rejected by Keynes in his more recent work, *The General Theory of Employment, Interest, and Money*, New York, 1936, xii + 403 pp. Unfortunately the arguments are not formulated in such a
way that they can be tested by statistical data.”¹ This last claim, stated without any elaboration, contradicted Mordecai Ezekiel’s finding (in Cowles Commission 1939, p.55) that “Statistical data for the verification of these theories is gradually becoming available. The work of Clark Warburton, [Harold] Moulton, Kneeland, [Simon] Kuznets, and [Lauchlin] Currie, is demonstrating that at levels of [US] national income of $60 billion or better, and with the usual distribution of incomes and savings by income classes, savings would exceed investment if it were not for countervailing expenditures of government agencies. This tentative conclusion is supported … by the correlation between federal expenditures in excess of receipts, and subsequent industrial activity, for the period since 1932.”

While Ezekiel raised the question of statistical testing of alternative explanations of underutilization of resources (soon to be the subject of Tinbergen 1939), Joseph Mayer (1938, pp.46-7) considered whether Keynes (1936) could be adequately represented by equilibrium models such as IS-LM: “In so far as Keynes’ exposition reflects merely the mathematical approach developed by Harrod and Hicks, his equilibrium views must be regarded in terms of determinateness only. And it is from this angle that Harrod’s ‘statics’ criticism takes on meaning, for thus construed Keynes’ apparatus presents a cross-sectional view of the economic system, an instantaneous photograph, from which temporal, cyclical, and secular factors are omitted. But Keynes also treats of the economic system in flux. He has in mind shifting as well as stationary equilibria and speaks of any number of positions of underemployment balance … how about Keynes’ psychological factors and the two per cent that John Bull ‘cannot stand’ – ‘the ultimate causal forces resting in the mores, customs, habits, and behavior pattern of the people’? … To the extent that longstanding prejudicial customs and habits, often exceedingly irrational in character, obstruct the movement toward full employment, they would seem to be about as potent in bringing on

¹ Even in this brief dismissal of Keynes’s importance Davis dedicated more attention to Keynes than did Charles Roos, the first research director of the Cowles Commission and first secretary-treasurer of the Econometric Society, like Davis a mathematician who viewed economic fluctuations as truly cyclical.
underemployment positions of obstructive dead center as are cost rigidities and monopolistic controls.”

III. Marschak, Lange, Koopmans and the Keynes-Tinbergen Exchange

The Cowles Commission was a research organization founded in Colorado Springs in 1932 by Alfred Cowles 3rd, a newspaper heir (grandson of one of the founders of the Chicago Tribune) and investor disillusioned with stock market forecasts, to promote the use of formal mathematical and statistical methods in economics, in affiliation with the recently-founded Econometric Society (of which Alfred Cowles became treasurer and, from 1937, secretary). The commission moved to the University of Chicago in 1939 when Alfred Cowles returned to Chicago to take over family investments on father’s death, but its transformation into perhaps the world’s leading center of mathematical economics and econometrics came when Jacob Marschak assumed the research directorship at the beginning of 1943. After twice emigrating, from Russia after the Revolution and from Germany in 1933, Marschak had been the founding director of the Oxford Institute of Statistics and then, after a year as a Rockefeller Foundation fellow in the United States, taught in New York from 1940 at the New School for Social Research, home of the “University in Exile” for displaced European scholars. From 1940 to 1942, Marschak and Oskar Lange (then visiting at Columbia University on leave from the University of Chicago) conducted a weekend seminar in econometrics in New York sponsored by the National Bureau of Economic Research and attended by, among others, Trygve Haavelmo, Tjalling Koopmans, Abraham Wald and Marschak’s New School doctoral student Franco

2 Mayer concluded that “Unless the first condition of a deliberate moving balance [between consumption and productive investment] is maintained, underemployment equilibrium sets in and the advance towards full employment stops, the industrial machine being in the position of an automobile mired in a mud hole, the machine and its spinning wheels being held in obstructive balance because of the lack of traction in the mud.”
Modigliani. Lange had been instrumental in bringing the Cowles Commission to the University of Chicago after the university’s only econometrician, Henry Schultz, had died in an automobile accident after speaking to the 1938 Cowles summer conference. Marschak in turn connected the Cowles Commission to the European tradition of econometrics disrupted by the upheavals of revolution and war, both as a student of Slutsky (before Marschak’s first emigration) and by recruiting such leading econometricians as Ragnar Frisch’s student Trygve Haavelmo and Jan Tinbergen’s student Tjalling Koopmans. Marschak’s contacts with the Cowles Commission began while he was at Oxford: he spoke at the 1937 and 1939 Cowles summer conferences, and would have become research director in 1938 if Alfred Cowles had been successful in his grant application to the Rockefeller Foundation (which had supported the creation of the Oxford Institute) to hire Marschak and expand the commission.\(^3\) (see Dimand and Hagemann 2019b).

Marschak’s interest in Keynes’s work began while Marschak was a monetary economist in Germany, where Keynes was well-liked and respected for his critique of the economic clauses of the Versailles Peace Treaty and where Marschak was associated with the “Kiel school” of macroeconomic interventionists (see Hagemann 1999). Richard Musgrave (1997, p.64) recalled that “Serious study of economics began with my transfer to Heidelberg in the Fall of 1931. Marschak, then a young Privatdozent, offered a seminar on Keynes’s *Treatise on Money, 1930* and on integrating fiscal flows into national income accounts.” While at the New School, Marschak published a series of articles in the school’s journal *Social Research* on “lack of confidence” (or, in other words, on animal spirits) as the source of investment fluctuation (1941a), on the indispensable role of government stabilization policy in maintaining full employment without inflation (1941b), and,

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\(^3\) As Mirowski (2012, pp.139-140) reports, Lange suggested Marschak as Cowles research director in 1942, adding that after arriving at Cowles, Marschak set about finding other sources of funding, reducing the commission’s dependence on Alfred Cowles. But Alfred Cowles had as early as 1938, based on Marschak’s talks at the 1937 conference, decided on Marschak as future research director and had initiated the process of seeking funding from the Rockefeller Foundation and other foundations. Lange’s suggestions fitted plans already made by Alfred Cowles.
reaching beyond Keynes to the Stockholm school of economics, on Knut Wicksell’s natural and market rates of interest, closely related to the analysis of Keynes’s *Treatise on Money* (Marschak 1941c). But despite the influence of Keynes’s *Treatise on* Marschak’s monetary economics and despite Marschak’s embrace of the need for monetary and fiscal stabilization policy because the economy was not automatically self-adjusting, he parted company with Keynes over Keynes’s critique of Jan Tinbergen’s *Statistical Testing of Business-Cycle Theories* (1939). The Marschak-Lange NBER econometrics seminar resulted in the writing of Marschak and Lange ([1940] 1995), a rebuttal of Keynes (1939) that Keynes declined to publish in the *Economic Journal*.

Keynes (1939, p.568), while acknowledging that Tinbergen (1939, Vol. 1) “is full of intelligence, ingenuity and candour; and I leave it with sentiments of respect for the author,” concluded, “But it has been a nightmare to live with, and I fancy that other readers will find the same. I have a feeling that Prof. Tinbergen may agree with my comment, but that his reaction will be to engage another ten computers [people, not machines] and drown his sorrows in arithmetic.” Subsequent exchanges show that Keynes did not always understand Tinbergen’s statistical methods, but Tinbergen did not grasp all of Keynes’s criticism of his methodology rather than his methods (Tinbergen 1940, Keynes 1940, Tinbergen in Harris (ed), 1947, Patinkin 1982, pp.223-60, Epstein 1987, Marcel Boumans in Dimand and Hagemann (eds), 2019, pp.283-89). Keynes was mistaken in supposing that assuming linearity rules out cyclical fluctuations, but also remarked on what in later terminology would be called omitted variables bias and simultaneous equations bias (Patinkin 1982, pp. 227-8). He complained that “there is no room for expectations, so far as I can discover, in the theory of investment with which the economists have supplied Prof. Tinbergen” and, especially given the volatility of long-period expectations, warned of structural breaks in the coefficients.

Marschak and Lange ([1940] 1995, p.390), while agreeing on the shortcomings of Tinbergen’s methods (having in mind Tinbergen’s use of single-equations OLS), felt Keynes was too sceptical of the possibility of verifying or falsifying trade-cycle theories: “Since we are both in profound agreement with the economic theories of Mr. Keynes, we are anxious to prevent the readers … getting from Mr. Keynes’ review the impression that
his theories are not capable of empirical and statistical verification.” They failed to persuade Keynes. But Keynes’s review of Tinbergen included constructive criticisms, not just scepticism about the whole project of statistically testing economic theories and modelling an economy. For example, Keynes (1939) suggested estimating coefficients over subperiods to check for structural breaks.

Contrary to Mirowski (2012, p.139), Keynes, despite his strong reservations, did not reject econometrics and Tinbergen did not become Keynes’s bête noire. Keynes (1940, p.156; 1973, XIV, p.320) concluded “No one could be more frank, more painstaking, more free from subjective bias or parti pris. There is no one, therefore, so far as human qualities go, whom it would be safer to trust with black magic. That there is anyone I would trust with it at the present stage or that this brand of statistical alchemy is ripe to become a branch of science, I am not yet persuaded. But Newton, Boyle and Locke all played with alchemy. So let him continue.” Keynes became president of the Econometric Society for 1944 and 1945 (accepting an invitation written by Alfred Cowles on behalf of the society). On July 23, 1945, Keynes wrote to Cowles, “I hope very much indeed that Tinbergen can be elected Vice-President [of the Econometric Society]. As it happens I had the pleasure two days ago to give a luncheon party in Cambridge in honour of Tinbergen and three other Dutch economist statisticians, whom he had brought over with him to this country … It was with extreme satisfaction that we renewed contact with him. I felt once again, as I had felt before, that there is no-one more gifted or delightful or for whose work one could be more anxious to give every possible scope and opportunity” (quoted by Patinkin 1982, pp.228-229). Believing Tinbergen’s work to be valuable, as Marschak, Lange, Koopmans and Klein did, did not make the Cowles Commission an anti-Keynesian stronghold as in the title of Mirowski (2012).

**IV. Keynes, IS-LM, Cowles and the Marshallian Tradition**

Paul Samuelson ([1946] 1964, p.316), in his memorial article on Keynes, argued that “until the appearance of the mathematical models of Meade (1937), Lange (1938), Hicks (1937)
and Harrod (1937), there is reason to believe that Keynes himself did not understand his own analysis.” In Samuelson’s opinion, the implications of Keynes’s *General Theory* were not worked out systematically until Harrod, Hicks and Meade presented their papers in their session at the September 1936 Econometric Society conference in Oxford hosted and organized by Jacob Marschak. Richard Kahn (1984) and Joan Robinson (1975), who like Meade had been part of the “Cambridge circus” helping Keynes progress from his *Treatise on Money* to his *General Theory*, held that Keynes would never have countenanced such a simultaneous-equations representation of his theory, a view reflected in Philip Mirowski’s characterization of Cowles Commission macro modelling as anti-Keynesian (Mirowski 2012). Kahn and Robinson saw a system of simultaneous equations as incompatible with Keynes’s vision of an economy moving in historical time in a world of fundamental uncertainty and took Keynes (1937), with its emphasis on fundamental uncertainty, as Keynes’s protest against watering down and distorting his revolution in economic theory into what Robinson termed “Bastard Keynesianism.” Whether because Keynes (despite his first-class honors degree in mathematics) failed (or was unable) to think of it, as Samuelson asserted, or whether, as Kahn and Robinson held, such simultaneous-equations modelling was inimical to his vision of the economy, these authorities saw the simultaneous-equation macroeconomic modelling of Klein’s Cowles monograph (Klein 1950) and subsequent Klein-Goldberger, Wharton and Brookings models, and their theoretical counterparts in Lange’s Cowles monograph on *Price Flexibility and Employment* (1944), Marschak’s lectures (1951), and the articles of Marschak’s doctoral students (e.g. Modigliani 1944, Patinkin 1948) as in some fundamental sense un-Keynesian.

Yet the first person to express Keynes’s new economics of aggregate employment and output as a system of four simultaneous equations was John Maynard Keynes himself, in a lecture at Cambridge on December 4, 1933, concluding his series of eight lectures on “The Monetary Theory of Production,” as recorded in student notes taken by Alec Cairncross, Marvin Fallgatter, Walter Salant, Bryn Thring, and, most fully, Robert Bryce (see Rymes, (ed), 1987, 1989, Bryce [1935] 1977, Dimand 1988, 2007). The first two journal articles using systems of equations equivalent to what became known in Hicks’s notation as IS-LM
to represent Keynes’s *General Theory* were by David Champernowne (1936) and Brian Reddaway (1936).^4^ According to Fallgatter’s notes, Keynes stressed that the equations “are merely a means of exposition, and not a productive tool. The real tool is thought, and they are not a substitute for it, but at most a guide, or embodiment” (quoted by Young 1987, p.13). With that caveat, Keynes wrote out four equations that together determined equilibrium income Y:

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\begin{align*}
M &= A(W, \rho) \quad \text{quantity of money equals liquidity preference} \\
C &= \varphi_1(W, Y) \quad \text{the consumption function} \\
I &= \varphi_2(W, \rho) \quad \text{the investment function} \\
Y &= C + I = \varphi_1(W, Y) + \varphi_2(W, \rho)
\end{align*}
\]

where rho (ρ) is the interest rate and W is the “state of the news,” a crucial shift variable that was not written explicitly as an argument of the liquidity preference, investment and consumption functions in later versions of IS-LM and so was likely to be forgotten. Later in the same lecture, Keynes, when writing the equations for employment N rather than income Y, made an unannounced switch from W as the state of the news to W as the money wage rate, so that

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N_2 = f_2(\rho), \text{ if liquidity preference and the quantity of money were given, but also } f_3(M/W).
\]

This switch of notation, apparently dividing the quantity of money by the state of the news (rather than measuring the quantity of money in wage units), justified Lorie Tarshis’s marginal comment, when copying Robert Bryce’s notes for that lecture (which Tarshis had missed), “Why in hell? Ask Bob.”

Keynes did not use such a representation of his approach in the final book, of which his lectures from 1932 to 1935 provided annual drafts, nor did it appear in his 1934 and 1935

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^4^ Keynes wrote to Reddaway on 17 August 1936 “I enjoyed your review of my book in the Economic Record and thought it very well done” (quoted by Young 1987, p.73).

^5^ When Keynes returned to Cambridge after serving in the British Treasury in World War I and at the Paris Peace Conference, he resigned the Goldsmiths’ Lectureship, informing the university that he did not require
lectures on “The General Theory of Employment.” One possible interpretation is that in his December 1933 lecture he had tried out a tentative approach which he then discarded as unsuited to his purpose. In this interpretation, the fact that Champernowne and Reddaway had been led by his 1933 lecture to read such a model into his 1936 book inhibited Keynes from public repudiation of their review articles: they were misreading The General Theory but Keynes himself, in his earlier lecture, was responsible for their doing so. But another possible interpretation is that Keynes was following the famous advice of his mentor Alfred Marshall to use mathematics as an aid to inquiry, to translate the results into English and, if the translation could be illustrated with practical examples, burn the mathematics and publish the translation into ordinary language, burning both mathematics and translation if there were no practical applications (see Dimand 2007 and references given there). The Cowles researchers, such as Marschak, Lange and Koopmans, did not of course concur about burning the mathematics (and each edition of Marshall’s Principles of Economics had an unburnt mathematical appendix, an example followed by Lange 1944). But what is not possible to argue is that Keynes failed or was unable to think of such a simultaneous-equations representation of his theory, as Samuelson claimed, or that he would have indignantly rejected any such representation, as Kahn and Robinson held.

The IS-LM representation of Keynes’s General Theory as a small system of simultaneous equations began to catch on in the economics discipline with three papers presented on 26 September 1936 at the Oxford meeting of the Econometric Society hosted by Marschak (see Young 1987), papers published as Harrod (1937), Meade (1937) and Hicks (1937). Keynes, a Fellow of the Econometric Society and a member of its council, did not attend, as he was lecturing in Sweden. The Harrod and Meade articles, by associates of Keynes, were reprinted in Harris (ed., 1947) but it was Hicks (1937) that became most influential, thanks to its diagrammatic presentation 6, which was developed further by Franco Modigliani (1944) in an article based on a dissertation supervised by

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6 Even though one may wonder how seriously Hicks took a diagram in which the intersection of SI and LL determines Y.
Marschak. Keynes’s reaction to the papers from the Oxford session was ambivalent, praising the authors and certainly not repudiating their models but stressing uncertainty and the volatility of long-period expectations (see Young 1987). Responding to reviews of his book by Leontief, Robertson, Taussig and Viner in the *Quarterly Journal of Economics* rather than directly commenting on the IS-LM articles, Keynes (1937) singled out fundamental uncertainty as his crucial difference with classical economics. Despite being reprinted in Harris (ed., 1947), Keynes (1937) had limited influence at the time.

Oskar Lange (1938) also represented Keynes’s theory in IS-LM terms with references to Reddaway (1936), Harrod (1937) and Hicks (1937), the last of which was still forthcoming when Lange was writing, but went beyond those articles to link the approach to “the Walrasian or Paretian system of equations of general economic equilibrium” in what Timlin (1942, p.8) termed “the Keynes-Lange system.” Lange proposed “to elucidate the way in which liquidity preference co-operates with the marginal efficiency of investment and with the propensity to consume in determining the value of interest and to point out how both the traditional and Mr. Keynes’s theory are but special cases of a more general theory” (quoted by Young 1987, p.79). That is, traditional theory took saving as a function of the interest rate, Keynes treated saving as a function of income, while Lange made saving a function of both variables. Lange insisted in his Cowles monograph on *Price Flexibility and Employment* (1944, p.6 n4) that “As is easily seen, our treatment is translatable into Keynesian terms and vice versa. The choice is merely a matter of convenience. It seems that our method ties up more easily with general price theory” which to Lange meant Walrasian and Paretian general equilibrium analysis. In the years preceding Lange’s 1938 linkage between Keynes and Walras, he had engaged in the debate over the possibility of rational economic calculation under socialism (see Lange reprinted in Lippincott ed., 1938), arguing that while Marxian economics was superior in analyzing the historical development of a capitalist economy, bourgeois economic theory and particularly general equilibrium analysis ironically provided the tools to manage a socialist economy. Lange saw Keynesian economics, restated in general equilibrium terms, as providing the macroeconomic side of such guidance of a socialist economy.
The systems of simultaneous equations in Champernowne, Reddaway, Harrod, Meade, Hicks and the future Cowles researchers Lange (1938) and Modigliani (1944) differed from Keynes’s December 1933 lecture in one crucial respect. Although they made verbal reference to structural shifts, volatile long-period expectations and an uncertain future, they did not formally include as an argument in their functions any shift variable playing role of Keynes’s W, “the state of the news”, or give more than formal recognition to Keynes’s concern in his exchange with Tinbergen about structural breaks in systems of coefficients. Even Champernowne and Reddaway, who had attended Keynes’s lecture, did not include any such variable, although their chances of grasping the importance of that aspect of Keynes’s lecture were not helped by Keynes using W both for the state of the news and for the money wage rate in the same lecture. Thus, the IS-LM approach, long controversial as a representation of Keynes’s *General Theory*, failed to incorporate a crucial part even of the model that Keynes presented in his December 1933 lecture. But that omission would make the Keynesian model, as restated by Lange (1938), appear more useful for macroeconomic management of an economy.

The topic of Lange’s Cowles monograph was *Price Flexibility and Employment*, in which he argued that traditional equilibrium theory implicitly “regards the nominal quantity of money as constant. On this assumption, the conclusion of this theory, that flexibility of factor prices always generates the substitution effect and expansion effect which restores equilibrium of supply and demand, appears to be fully justified”, adding in a footnote that “This is confirmed by an article of Professor Pigou which appeared after the above was written” (Lange 1944, p.14). Modigliani (1944) also argued that it was only the assumption of a fixed nominal wage rate that allowed unemployment to persist in a Keynesian model, a claim that led to Modigliani’s article being reprinted (with a bemused postscript by Modigliani) in an anthology of *The Critics of Keynesian Economics* (Hazlitt, ed., 1977). Modigliani continued to hold that view even though he considered himself to be preaching “the Keynesian gospel” (Modigliani 2003). Another of Marschak’s doctoral students, Don Patinkin (1948), followed Lange in writing on “Price Flexibility and Full Employment” (1948) while a Cowles Commission research associate. Patinkin (1956) concluded that the Pigou real balance effect (the wealth effect of a lower price level
increasing the real value of the monetary base) demonstrated that sufficiently lower prices and money wages would always suffice to restore full employment, so that persistent unemployment depended on assuming a fixed money wage rate (on the evolution of Patinkin’s macroeconomics while he was at Cowles and afterwards, see Goulven Rubin 2002, 2005, 2012, and his entry on Patinkin in Dimand and Hagemann, eds. 2019).

These studies by Cowles Commission researchers, finding persistent unemployment in an IS-LM framework only if the money wage rate was arbitrarily assumed constant (or was constant because of irrational money illusion as in Marschak 1943), implied that Keynesian economics was crucially relevant for policy and macroeconomic management in a world of nominal rigidities but was not a revolution in economic theory, being just a matter of taking the money wage as given. These writings ignored Keynes’s chapter on what happens when money wage rates change (1936, Chapter 19), which argued that the contractionary effect of falling prices was likely to swamp the expansionary effect of lower prices (see Minsky 1975 and Tobin 1980, both of which drew on the debt-deflation theory of Fisher 1933 as well as on Keynes’s Chapter 19). Modigliani and Patinkin, whose analysis was long dominant in macroeconomics, also neglected Lange’s singling out exogeneity of the nominal quantity of money as the crucial assumption. With an endogenous money supply (as in a small open economy with a fixed exchange rate or in a Wicksellian pure-credit economy), if a fall in the price level causes the nominal quantity of money to contract proportionately, “the monetary effect is absent and no amount of price flexibility can restore equilibrium” (Lange 1944, p.14).

V. Keynesian Modelling at the Cowles Commission

Building on the work of Trygve Haavelmo (1943, 1944\textsuperscript{7}) on applying probability theory to estimating systems of simultaneous equations, the Cowles Commission under Marschak

\textsuperscript{7} Haavelmo (1944) consisted of his 1941 doctoral dissertation, written in the United States for submission to the University of Oslo, plus an additional chapter. Originally scheduled to be a Cowles monograph (which
developed what became known as the Cowles Commission approach to macroeconometric modeling. Departing from Jan Tinbergen’s reliance on single-equation Ordinary Least Squares, Cowles researchers such as Marschak, Koopmans, Haavelmo, Wald and T. W. Anderson developed full information and limited information maximum likelihood (FIML and LIML) methods that took account of simultaneity, presenting their results at a conference at the University of Chicago in late January and early February 1945, eventually published as a very influential Cowles Monograph on *Statistical Inference in Dynamic Economic Models* (Koopmans, ed., 1950, with a fifty-page introductory chapter by Marschak). To provide the empirical counterpart to these theoretical developments, Marschak brought Lawrence Klein to Cowles as a research associate in 1944, just as Klein finished the MIT doctoral dissertation later published as *The Keynesian Revolution* (1947). Klein recalled Marschak telling him that “what this country needs is a new Tinbergen model” to guide post-war economic policy. In his three years at Cowles (see Klein 1991), Klein developed Klein Models I to III, published in his Cowles monograph *Economic Fluctuations in the United States, 1921-1941* (Klein 1950), combining the estimation methods of Koopmans (ed. 1950) and Tinbergen’s goal of a model of an entire economy with Keynesian macroeconomics as interpreted by Klein (1947) in the form of a system of simultaneous equations. At the time that Klein and Koopmans were hired as research associates in 1944, the research director was the only member of the Cowles Commission with a faculty appointment in the University of Chicago, a situation that began to change with Koopmans’s appointment as an associate professor in 1946.

Marschak (1949, 1951) gave two series of twenty lectures on econometrics and twenty on macroeconomics at the University of Chicago in 1948-49, circulating them as Cowles Commission Discussion Papers. When his lectures on *Income, Employment and the Price* would then have meant publication by the Principia Press owned by Harold Davis, whose very different approach to time series analysis was being displaced at Cowles), Haavelmo (1944) appeared instead as a supplement to *Econometrica*, which supplement was then also circulated as a Cowles Commission Paper.

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8 Tinbergen was not persuaded by the Cowles Commission approach, arguing that simultaneous equations methods of estimation meant that misspecification of a single equation would then affect the estimated coefficients of other equations.
Level were published with three supplementary lectures, the preface by David Fand and Harry Markowitz, the two graduate students who edited the lectures, began by stating that “Mathematical Economics, Keynesian Economics, Econometrics have all grown up in this period [the past two decades]. Significantly these branches of economic science seem to be well suited for dealing with Policy questions in the Economic Sphere” (Marschak 1951, Preface). The first page of Marschak’s first lecture presented Table 1.1 showing the effects on real income of government demand, money quantity and money wage-rate according to Keynes and to pre-Keynesian economics: “The pre-Keynesian economics, on the other hand, largely neglected the effect of fiscal and monetary policy upon real income, and expected economic recovery from cuts in money wage rates.” On the second page he revealed to the students which column was correct: “Table 1.1 (or, say, its ‘Keynesian’ column) gave a detailed aspect of the policy matrix: viz., the effect of single policies (certain elements of the whole set of policies) upon a single element of the results, viz., the real income.” Marschak (1951) was the first graduate-level textbook of Keynesian macroeconomics (a term given currency by Klein 1946, apart from a stray earlier use of “macroeconomic” by J. Marcus Fleming). The fifteen-item suggestions for further reading at the end of the book began with Keynes (1936), Harris (ed., 1947), Klein (1947) and Lange (1944) and included Klein (1950), Hicks (1937) and Modigliani (1944) and works by Abba Lerner and by and in honor of the Harvard Keynesian Alvin Hansen, with only two dissenting items by George Terborgh (aimed at Hansen’s stagnation thesis rather than directly at Keynes) and David McCord Wright (offering a more conservative reading of Keynes rather than a rejection). Like the lectures themselves, the reading list was unlikely to appeal to Marschak’s Chicago, but decidedly non-Cowles, colleague Milton Friedman, author of hostile review articles on Lange (1944) and on Lerner and, as Friedman recalled, “something of a hair shirt” at Cowles seminars (see Dimand and Rivot 2020). Contrary to the suggestion by Robert Solow (1991, p.94) that Marschak was not really interested in macroeconomics (and that Marschak’s lectures “were not inspired”), Marschak (1951) showed commitment to expounding and developing not just macroeconomics, but specifically Keynesian macroeconomics, in the particular form of a simultaneous-equations
Keynesian macroeconomic model in the style of Lange (1938, 1944), Hicks (1937) and Modigliani (1944) and as estimated empirically by Klein.

In Marschak’s lectures, the empirical models of Klein (1950), the articles of Marschak’s students Modigliani and Patinkin, and the writings of Oskar Lange (1938, 1942, 1944, before he left the University of Chicago, soon after writing his Cowles monograph on *Price Flexibility and Employment*, to represent the new Communist-dominated government of Poland in the United States and at the United Nations), the Cowles Commission emerged as a center of a particular kind of Keynesian economics: Keynesian economics interpreted as a system of simultaneous equations that could be used to guide macroeconomic policy, rather than as a revolution in economic theory or regarding fundamental uncertainty as a barrier to modelling the effects of public policy.

References


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