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CARL SNYDER, THE REAL BILLS DOCTRINE, AND THE NEW YORK FED IN THE GREAT DEPRESSION

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Carl Snyder was one of the most prominent US monetary economists of the 1920s and 1930s. His pioneering work on constructing the empirical counterparts of the terms in the equation of exchange led him to formulate a 4% monetary growth rule. Snyder is especially apposite because he was on the staff of the New York Federal Reserve Bank. Why, despite his pioneering empirical work and his position as an insider, did Snyder fail to effectively challenge the dominant real bills views of the Federal Reserve (Fed)? A short answer is that he did not possess a convincing version of the quantity theory that attributed the Great Depression to a contraction in the money stock produced by the Fed, as opposed to the dominant real bills view attributing it to the collapse of speculative excess.

I. INTRODUCTION

In the decades following the publication of Milton Friedman's and Anna Schwartz's 1963 *A Monetary History of the United States*, a professional consensus formed that contractionary monetary policy was a major cause of the Great Depression. The

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question arises: Why was the Fed (Federal Reserve) not able to learn from its initial mistakes in the early 1930s and alter course? One answer is that, given the dominant real bills theory of recession as caused by the collapse of prior speculative excess, policy makers could always rationalize adverse outcomes in real bills terms: bust inevitably follows boom.

Such a rationalization, however, would have been much harder if there had been a countervailing theory to the real bills view at the New York Fed—that is, a theory that attributed the Depression to the collapse of the money stock produced by the central bank.[1] In this respect, the views of Carl Snyder are especially apposite in that he was both a quantity theorist and on the staff of the New York Fed.[2] Specifically, did he have a version of the quantity theory that made the Fed responsible for the control of the money stock? Did he then have a monetary theory of the Great Depression that attributed the Depression to that collapse?

As a quantity theorist, Snyder expressed his ideas in terms of the equation of exchange. One version is $M = kpy$, where M is money, k is the inverse of the velocity of money, p is the price level, and y is real output or transactions. A monetary theory of macroeconomic instability attributes instability in nominal aggregate demand (py) either to money, M, or to the inverse of velocity, k. The issue then arises whether that instability originates from independent movements in M (independent in that they do not merely offset movements in k or just accommodate growth in potential output, no more or less if the objective is price stability). Alternatively, does macroeconomic instability originate from independent movements in py, reflective of an inherent instability in a market economy? Did Snyder have a monetary theory of recession and deflation that held the Fed directly responsible for the Great Depression either through causing the decline in M or failing to raise M to offset a rise in k (a decline in velocity)?

The particular goal of this paper is to understand why Snyder could not mount a persuasive criticism of Depression-era monetary policy both with Governor George Harrison at the New York Fed and with the other governors and the members of the Federal Reserve Board. The broader goal is to ask why, in the first two decades of its existence, the Federal Reserve System could not learn that real bills was a defective guide to policy.

As we discuss in what follows, Snyder has been credited in earlier studies (e.g., Humphrey 1971, 1973; Garvy 1978; Laidler 1999, pp. 20, 233) for his pioneering empirical work on the equation of exchange: specifically, in the 1920s Snyder verified a long-run proportionate relationship between the money supply and the price level, and, in doing so, formulated a money supply growth rule to anchor price-level stabilization. Conversely, Snyder has been criticized in other earlier studies

[1] Hetzel (2022) provided evidence showing that before and during the Depression, the New York Fed was the dominant institution within the Federal Reserve System.

[2] Of course, there were other eminent quantity theorists in the 1930s, for example, Ralph Hawtrey, Gustav Cassel, Irving Fisher, and Lauchlin Currie. Each was unique in many ways, and the comments on Snyder should not be taken to characterize the others. On pre-Federal Reserve quantity theorists, see Laidler (1991), Humphrey (2001), and de Boyer des Roches and Gomez Betancourt (2013). Laidler (1999) contained significant information on later quantity theorists. On Lauchlin Currie, see Sandilands (1990, 2010), Laidler (1993), and Alacevich, Asso, and Nerozzi (2015). On Chicago quantity theorists, see Tavlas (2023). On real bills, see Hetzel (2022), Humphrey (2001), Mints (1945), and Skaggs (2010).

(e.g., Currie 1934; Steindl 1995) for his failure to provide a monetary explanation of the Great Depression under which the sharp decline in money was the main culprit in initiating and deepening the Depression. What explains these apparently contradictory positions, that money mattered for price-level determination yet money was not identified as the crucial variable in bringing about the Great Depression? Several factors were responsible for these differing positions, but one critical factor that we identify (for the first time) was a switch in Snyder's preferred monetary aggregate—from demand deposits (a liability of the commercial banks), used throughout his empirical work in the 1920s, to banks' loans and investments (an asset of the banks), used in his work from 1930 and after. We identify the reasons for the switch and its implications for Snyder's advice at the New York Fed in the early 1930s.

The remainder of this paper consists of six sections. Section II presents a brief biography of Snyder. Section III describes Snyder's policy advice at the New York Fed in the early 1930s, and then asks whether Friedman and Schwartz were correct that the views at the New York Fed differed from the real bills views held elsewhere within the system. If they were correct, and if policy at the New York Fed had prevailed, the Great Depression would have been an ordinary recession. Section IV discusses Snyder's work on the quantity theory and on real bills. Section V describes Snyder's understanding of the business cycle. Section VI examines why Snyder was not able to provide a convincing refutation of real bills. Section VII provides a concluding assessment.

II. AN OVERVIEW OF SNYDER'S LIFE AND WORK

Carl Snyder was born in 1869 in Cedar Falls, Iowa.[3] He was mainly self-educated; he attended courses at Iowa State University but did not graduate. Before joining the New York Fed, he was a financial reporter for the *Washington Post*, the *New York World*, and the *New York Herald Tribune.* He also authored several books and articles on scientific issues. The articles were published in such magazines as *McClure's* and the *Fortnightly Review.*[4]

Snyder joined the New York Fed in 1920 as manager of the Statistics Department and became its general statistician in 1923. Shortly after joining, he began to assemble statistical data on long-term trends in output, transactions, demand deposits, bank lending, and prices that would permit empirical assessment of the equation of exchange, having been preceded in this line of research by Irving Fisher.[5] As pointed

[3] This section is partly based on information provided in Garvy (1978) and an unpublished two-page memorandum, "Carl Snyder," complied by the Committee on the History of the Federal Reserve System (1955). The latter memorandum serves as the introduction to Snyder's papers at the New York Fed.

[4] His first book, *New Conceptions in Science*, was published in 1903. According to Garvy (1978, p. 456), it was an unstructured history of key episodes of progress in research in the natural sciences. His second book, *The World Machine*, was published in 1907 (Snyder 1907a). Garvy (1978, p. 456) considered it to be a more systematic history of the progress of knowledge in the natural sciences than the first book.

[5] Beginning in 1911, Fisher published a series of eight consecutive annual articles, each appearing in the respective June issue of the *American Economic Review*, and each presenting the annual changes in the terms of the equation of exchange. Fisher's series covered the period from 1896 to the year preceding the year of publication of the particular issue of the *AER.* Subsequently, Fisher established an Index Number Institute,

out by George Garvy (1978, p. 465), "the sheer magnitude of this task made the construction of these series by Snyder a significant achievement in the eyes of his contemporaries." His statistical work was published in leading academic journals. Often, his successive articles comprised updated measures of output, prices, and transactions compared with what he had published in his earlier articles. Most of the articles featured considerable numbers of charts displaying the series that he had constructed.

In addition to his research articles, Snyder published two books on economics: *Business Cycles and Business Measurements: Studies in Quantitative Economics*, published in 1927 (Snyder 1927), and *Capitalism the Creator: The Economic Foundations of Modern Industrial Society*, published in 1940 (Snyder 1940). The former book was a collection of the results of his research during his first seven years at the New York Fed. The latter book assembled a large body of evidence on the rate of progress made under capitalism. Snyder's objective in the latter book was to show that the capitalist system had produced a spectacular advance in material welfare.[6]

During his first few years at the New York Fed, Snyder formed a close relationship with the bank's governor, Benjamin Strong. However, Strong was skeptical of Snyder's exclusive concern with price-level stabilization, a state of mind that Strong dubbed the "Snyder complex." In a 1923 memorandum, Strong wrote to Snyder: "Our job is credit … [prices] are not our job."[7] Garvy (1978) expressed the view that Snyder's influence on policy formation at the New York Fed diminished after the mid-1920s. He became a kind of "intellectual in residence" (Garvy 1978, p. 472).[8] Snyder retired from the Fed in 1935. He passed away in 1946.

Snyder was one of the most-cited US economists of the 1920s and 1930s. His empirical work became the subject of papers in professional journals: in 1935, the *Quarterly Journal of Economics* (*QJE*) published an article titled "The Stabilization Doctrines of Carl Snyder" (Reed 1935); in 1936, the *American Economic Review* published "Mr. Snyder on Capital Supply and National Well-Being" (Keirstead 1936); and, in 1938, *Econometrica* published an article titled "On the Mathematical Hypotheses Underlying Carl Snyder's Trade-Credit-Ratio Theorem" (Huntington 1938). In a *QJE* article published that year, Gottfried Haberler (1928, p. 434) wrote of Snyder's empirical contributions: "our science is already highly indebted [to Snyder] for a series of studies in quantitative economics." Haberler (1928, p. 435) went on to call Snyder's empirical work on the equation of exchange "a masterpiece of statistical

which issued weekly data on changes in the price level and other elements in the equation of exchange. He also published data on these elements in professional journals. Snyder had studied Fisher's work on data construction. In a review of Fisher's book *The Making of Index Numbers* (Fisher 1922), Snyder (1923, p. 421) wrote of Fisher's data construction: "[Fisher] has cleared away much debris, so that the solid structure built up in the last fifty or sixty years stands forth now in clear and precise outline." For excellent discussions of Fisher's statistical contributions, see Dimand (1998a; 2019, ch. 6).

[6] A third book on financial issues, *American Railways as Investments*, published in 1907, was a collection of financial analyses of major railroads for potential investors (Snyder 1907b).

[7] The quotations are from Garvy (1978, p. 469).

[8] However, in a biography of Strong, Chandler stated that Snyder was among "the economists who had the greatest influence" on Strong (Chandler 1958, p. 51). There is a parallel between Snyder's position at the New York Fed as a resident intellectual with declining policy influence and the situation in the 1920s of another proponent of a monetary theory of the trade cycle, Ralph Hawtrey, director of Financial Enquiries at the British Treasury. On Hawtrey's trade cycle theory, see Deutscher (1990) and Laidler (1993).

technique … for which it deserves the highest admiration."[9] Snyder was a Fellow of the American Association for Advancement of Science, a Fellow of the American Academy of Arts and Letters, and a member of the Institut Internationale de Statistique. His empirical work on the quantity theory of money earned him the presidency of the American Statistical Association in 1928.

III. CARL SNYDER, GEORGE HARRISON, AND THE NEW YORK FED

Friedman and Schwartz (1963, p. 260) contended that monetary policy in the Depression would not have been contractionary if leadership of the regional Reserve banks had not moved from the New York Fed to the Federal Reserve Board in Washington.[10] Friedman and Schwartz (1963, p. 411) asked

> why an active, vigorous self-confident policy in the 1920s was followed by a passive, defensive, hesitant policy from 1929 to 1933 … [and] why the System failed to meet an internal drain in the way intended by its founders…. The explanation for the contrast between Federal Reserve policy before 1929 and after, and hence for the inept policy after 1929 … is the shift of power within the System and the lack of understanding and experience of the individuals to whom the power shifted.

Specifically, Friedman and Schwartz (1963, p. 692) argued that the Great Depression might have been averted had New York Fed Governor Benjamin Strong not passed away in October 1928. Prior to his death, Strong had been the dominant force within the Federal Reserve System. Friedman and Schwartz argued that, with Strong's passing, power shifted from the New York Fed to the board in Washington.[11] Friedman and Schwartz (1963, p. 692) noted that Snyder had expressed a similar view: "We share the view expressed by Carl Snyder, for many years associated with the New York Bank as a statistician and economist, that if Benjamin Strong could 'have had twelve months more of vigorous health, we might have ended the depression in 1930.'"[12]

Regardless of the validity of the above view, the question why the Fed did not learn during the early stages of the Depression remains. The founders of the Federal Reserve

[9] In a 1929 paper published in the *Journal of Political Economy*, Reed (1929, p. 262) expressed the view that "Carl Snyder has made great contributions" to the construction of measures of economic activity. Garvy (1978, p. 475) stated that "Snyder was widely known and appreciated abroad, especially in England and Germany."

[10] Hetzel (2022) argued that Friedman and Schwartz were misled by the fact that New York Fed Governor George Harrison, Benjamin Strong's successor, led from behind the scenes. Based on the minutes of the Open Market Policy Committee from 1930 to 1933, Hetzel (2022, pp. 229–261) provided evidence showing that, through Harrison, the New York Fed retained its dominant position within the Federal Reserve System. As Hetzel showed, Harrison thought that monetary conditions were "easy" in 1931 and 1932 but that banks were frustrating the Fed's easy stance through an unwillingness to utilize the reserves supplied to them. Harrison led the New York Fed from 1928 to 1940.

[11] For contrary views, see Wicker (1965), Wheelock (1991, ch. 4), and Meltzer (2003, ch. 5). Those authors argued that the failures of Federal Reserve policy during the Great Depression cannot be attributed to a single cause.

[12] The above quotation attributed to Snyder by Friedman and Schwartz is from Snyder's book *Capitalism the Creator* (1940, p. 203). A similar view about the consequences of Strong's death was held by Irving Fisher. See Cargill (1992).

wanted to reduce the frequency and severity of banking crises (Meltzer 2003, pp. 68–69; Hetzel 2022, p. 6). To do so, the Federal Reserve was designed on the basis of the real bills principle, which specified that bank loans should be (1) short term, (2) self-liquidating, and (3) issued against productive projects. The guiding principle of the real bills view was that episodes of speculative excess caused recession and deflation (Hetzel 2022, p. 6). Thus, the prevention of such episodes required the prevention of the prior speculative excess. By confining bank lending to only short-term, self-liquidating, and productive loans, the supply of bank funds would vary with the "needs of trade." Bank lending would then not generate speculative excess, the collapse of which led to deflation and recession.

Why did the Fed fail to abandon real bills views in favor of procedures designed to control money creation?[13] If Friedman and Schwartz were correct, the New York Fed's Harrison should have tried to convince the other governors of the need for open-market purchases to offset the loss of (non-borrowed) reserves arising from bank runs. Harrison did not do so.[14]

In fact, Harrison opposed open-market operations at exactly the time when Friedman and Schwartz considered them to be the most critical. Harrison believed that reserves provided through open-market operations would accumulate as excess reserves in the absence of a restoration of confidence.[15] For example, in fall 1931, in response to gold outflows, Harrison promoted a restrictive monetary policy to maintain confidence in the gold standard.[16] Such confidence was necessary, he believed, so that an addition of reserves to banks, when it did occur, would actually stimulate lending. Harrison stated:

> The Federal Reserve Banks … cannot by themselves bring about inflation, or raise prices, or increase business activity. We may put out millions of dollars, but if they merely pile up as excess reserves they have, at that point, no influence upon business or prices. That is the reason … why in the past we have discussed just such a program [to meet with bankers to encourage them to lend] as we are now embarked upon, without taking vigorous action. It would have been of no use to start a large open market

[13] In the 1920s and the 1930s, those ideas were labeled the "commercial loan theory" (see section VI below). The label "real bills" was due to Mints (1945). Referring specifically to 1929 and 1930, Meltzer (2003, p. 400) stated: "most members of the Federal Reserve Board and governors of the reserve banks accepted this [real bills] framework. They believed they had acted decisively to ease credit conditions, and on their measures they had." See also Yohe (1990).

[14] Among the most prominent proponents of the real bills view in the 1920s were Adolph Miller, H. Parker Willis, and Benjamin Anderson. Miller, who served on the Federal Reserve Board from 1914 to 1936, believed that inflationary credit expansion must inevitably be followed by contraction and deflation. Miller attributed the Great Depression to Strong's expansionary policies in the 1920s (Meltzer 2003, p. 39). Willis, a main architect of the Federal Reserve Act, taught at Columbia University in the 1920s and 1930s. In his view, under the Act the Fed was required "to furnish an elastic currency" (Willis 1915, quoted from Laidler 1999, p. 189). Anderson's views are discussed in section VI below. Both Willis and Anderson were influenced by the views of James Laurence Laughlin (Laidler 1999, p. 189). Laughlin, who taught at the University of Chicago from 1892 to 1916, was a strong supporter of the gold standard, a believer in free markets, and a critic of the quantity theory of money. See Dimand (2020).

[15] Meltzer (2003, p. 410) wrote: "Quite independent of the role Strong might have played, there is little evidence that Harrison generally favored an expansive policy."

[16] Following Britain's abandonment of the gold standard in September 1931, the New York Fed raised its discount rate from 1.5% to 2.5% on October 8, 1931. A week later, the bank set the rate at 3.5%. The other Reserve banks followed.

> operation if there were not a reasonable chance that the member banks would utilize the funds. And heretofore that cooperation probably would have been denied because the psychology of the bankers, largely by reason of the breakdown in central Europe and the suspension of the gold standard in England, was opposed to an expansion of credit. (Harrison Papers, Columbia, 1932, Board of Directors, April 21, 1932, p. 201)

In contradiction of Friedman and Schwartz that a shift in power within the system from the New York Fed to the board was responsible for the inept policy after 1929, Harrison believed that the periods in which there was "not a reasonable chance that the member banks would utilize the funds" were those periods in which reserve outflows were causing a contraction of the banking system and money. Harrison argued that "last year [1931] … because of a widespread lack of confidence with resultant bank failures and currency hoarding, the banks would not use the excess reserves which were placed at their disposal" (Harrison Papers, Columbia, 1932, Executive Committee, April 4, 1932, p. 188).[17]

Snyder favored open-market purchases in the early 1930s. The minutes of a September 1930 meeting recorded:

> Mr. Snyder called attention to the fact that … the figures for all member banks as of June 30 [1930] showed that there had been practically no change [in bank credit] as compared with the 1928 figures and an actual decrease as compared with the 1929 figures…. In his opinion, this "deflation" should now be aggressively combatted by additional purchases of Government securities in the hope that business would be stimulated and the hardships of what now looks like a winter of depression diminished. (Harrison Papers, Columbia, 1930, Officer's Meeting, September 17, 1930, pp. 46–47)

In April 1932, the Fed began to purchase securities on a large scale; during that month the Fed purchased $350 million, leading to a decline in open market rates (Friedman and Schwartz 1963, p. 347; Meltzer 2003, p. 363). Snyder urged Harrison to continue the purchases. In a memorandum dated April 29, 1932, he wrote: "I can't help thinking that if they [financial markets] had full confidence and assurance that the program will be carried out to the limit—that it is going to buy *until the tide turns*—there would be no question of support and applause. As it is now, [there is a] lack of confidence and a feeling of bewilderment" (Snyder Papers, Federal Reserve Bank of New York; italics in original). During the next several months, the Fed's purchases of securities steadily declined; in the last two weeks of July and the first two weeks of August, the maximum amount of purchases amounted to $15 million per week.

The beginning of the purchase program was shortly followed by an improvement in economic conditions: wholesale prices started rising in July; production started rising in

[17] Meltzer (2003, p. 274) wrote: "Harrison argued vigorously for open market purchases at times, but at other times he was a leading proponent of open market sales. The timing of Harrison's decisions to purchase or sell can be explained (approximately) by the conjunction of the Riefler-Burgess and real bills doctrines." The Riefler-Burgess doctrine stipulated that open market operations could be used to control member bank borrowing (Meltzer 2003, p. 264). Under the Riefler-Burgess view, banks were reluctant to borrow from the Reserve banks and did so only if reserves were deficient; thus, high borrowing implied tight monetary policy. Conversely, low member bank borrowing implied that banks' reserves were plentiful—that is, monetary conditions are easy. Meltzer (2003, ch. 5) argued that the Fed was misled by the Riefler-Burgess doctrine during the Great Depression, misinterpreting low borrowing for easy monetary policy. Winfield Riefler was with the Federal Reserve Board. Randolph Burgess was with the New York Fed.

August (Friedman and Schwartz 1963, p. 303, chart 28; p. 324). At the August 4, 1932, meeting of the New York Fed's directors, Harrison stated the "open market program of security purchases is now completed" (Harrison Papers, Columbia, 1932, Officers Meeting, August 4, 1932, p. 77). From mid-August until early September, the Fed did not undertake any purchases (Meltzer 2003, p. 369). Snyder, however, continued to advise that the Fed purchase securities. In a memorandum dated September 13, 1932, he wrote:

> Does not [the possibility of a decline in the bond market] seem an additional and very strong reason why we should do nothing to further disturb public confidence … as, for example, sales of securities. Of course my own view is that if we want to lower the ominous army of the unemployed *this winter*, our buying should continue. (Snyder Papers, Federal Reserve Bank of New York; italics in original)

The date (September 13, 1932) of Snyder's memorandum corresponds with the date of a meeting of the principal New York Fed officers to discuss when securities should be *sold.* At the meeting, Harrison was in favor of selling securities but was uncertain about the appropriate timing. Why did Harrison favor selling securities? Meltzer (2003, p. 375) reported that, at the meeting, "Harrison expressed concern about the risk of inflation."

Snyder was persuasive with many of the directors that cyclically low interest rates in New York had lowered long-term interest rates and stimulated investment in past recessions (Hetzel 2022, ch. 11). Nevertheless, Snyder was not able to persuade Harrison, who held real bills views, to support open-market purchases. As shown above, under Harrison's real bills (credit) views, open-market purchases were seen as adding reserves to banks, which would allow additional lending only if there was a demand by business. The idea that open-market purchases would create bank deposits through the bookkeeping operations of banks supported by the reserves that the Fed created through those bookkeeping operations would have gone against the real bills opposition to a regime of fiat money creation. As we discuss in what follows, Snyder, who held a monetary interpretation of the business cycle in the 1920s, adopted a real bills interpretation at the onset of the Great Depression.

IV. SNYDER'S VIEWS ON MONEY

The 1920s: The Equation of Exchange

Snyder's empirical model started from Irving Fisher's equation of exchange, $MV + M'V' = PT$, where P is the price level and T is the physical volume of transactions.[18] In his initial studies (e.g., Snyder 1924) Snyder held that M and M' are the quantities of currency and deposits, respectively, and V and V' are the velocities of currency and deposits, respectively.[19] He constructed monthly series of P, T, and V'. He examined the

[18] On the importance that Snyder assigned to empirical investigation, see Snyder (1933).

[19] Fisher (1897) was the first to mathematically formulate this particular version (with the inclusion of the level of deposits and the velocity of deposits) of the equation of exchange. In his PhD thesis, Kemmerer (1903) empirically confirmed the equation for the period from 1879 to 1901. Subsequently, Kemmerer extended the sample period to 1879 to 1904 (Kemmerer 1907) and then to 1879 to 1908 (Kemmerer 1909). For an excellent discussion of Kemmerer's contributions, see de Boyer des Roches and Gomez Betancourt (2013).

long-term behavior of these series and, assuming that currency (M) fluctuated in a stable way with fluctuations in demand deposits (M'), found that (1) the trade series (T) displayed an almost constant 4% average annual growth rate, (2) the price level (P) and the ratio (M/T) had remarkably similar (almost identical) trends, and (3) the deposit velocity series exhibited no discernible trend.[20] These findings convinced him that velocity played no role in determining long-term movements of the price level. The price level, he thought, was determined by the growth of trade relative to the growth of the stock of (deposit) money. Snyder suggested that the money supply should expand by 4% annually to compensate for the 4% fall in the (V/T) ratio in order to maintain price-level stability.

Turning to the short-run cyclical behavior of his series, he again found a very close correspondence between the general price level and the ratio of bank money to trade, M/T. This seemed to suggest that, in the short run as well as the long run, velocity played no role in price-level movements. But the highly volatile behavior of his short-run velocity figures appeared to contradict this interpretation until he (Snyder 1924, pp. 699, 708) noticed a strong correspondence, both in timing and amplitude, between his velocity series and the series of monthly deviations of trade from its secular trend. Based on the synchronous behavior of his two series (deposit velocity and trade expressed as deviations from trend), Snyder drew the following conclusion:

> Does the velocity of circulation of money or bank deposits ordinarily affect the price level … ? The answer is that it does not…. The variations in velocity and the variations in the volume of trade … run remarkably close together. Thus, their effects tend to cancel each other. Their effect on the price level is therefore slight … velocity [is] not an important factor in the determination of the price level, according to Newcomb's formula. (Snyder 1940, pp. 26, 387)[21]

In Snyder's view, P would always be proportional to M: "If … variations in national trade … and of deposit velocity are synchronous and compensatory, and the ratio of the two replaceable by a constant, K, then we should be able to write the equation: $P/K = M$" (1924, p. 708), where $K = V/T$.[22]

[20] Regarding the assumption that the velocity of currency and the velocity of bank deposits bore a stable relationship, Snyder (1924, p. 710) wrote: "while we do not know how the rate of turnover of circulation of our actual hand-to-hand currency in circulation outside the banks compares with the rate of turnover of demand deposits, we may very probably infer that the variation in this velocity is fairly synchronous." For detailed discussions on Snyder's empirical work on the equation of exchange, see Humphrey (1971, 1973) and Steindl (1995, ch. 8).

[21] Simon Newcomb (1885) emphasized the feasibility of the quantity theory equation as a framework for organizing data. For that reason, Fisher dedicated *The Purchasing Power of Money* (1911) to Newcomb's memory. Fisher extended Newcomb's formula by allowing bank deposits to have a different velocity of circulation from currency. Note that, just as Snyder's monetary economics had elements of real bills as well as the quantity theory of money (see below), Newcomb used the quantity theory to analyze the short run while holding a cost of production theory of the value of gold for the long run. We thank a referee for these comments. For discussions of Newcomb's monetary views, see Valeonti (2020), and Dimand and Valeonti (2022).

[22] As mentioned, Snyder's belief in the short-run neutrality of money was based on his empirical findings. Correspondingly, Fisher's belief in the short-run non-neutrality of money was based on *his* empirical findings (see, for example, Fisher 1926). An interesting issue, beyond the scope of this paper, is to study and compare the empirical studies carried out by Snyder and Fisher to investigate why those two researchers obtained such different results—for example, was it due to differing data, different sample periods, different data frequencies.

Snyder's emphasis on demand deposits in his empirical work in the 1920s led to a corresponding emphasis on demand deposits in his exposition of the business cycle. In his December 1928 Presidential Address before the American Statistical Association, he stated:[23] "back of every such era [of economic booms] apparently the most important factor always is the increased spending power derived from the expansion of the circulating medium, which … in our own time is almost wholly a question of the expansion of bank deposits" (Snyder 1929, p. 11). The amplitude of the business cycle, he believed, was relatively mild. An expansion of bank deposits in excess of 4% a year "can lead to only a very moderate increase in total production." After "the practical maximum [level] of employment" is reached, prices continue to rise until "credit expansion has also soon reached the end of its tether" (1929, p. 11).

Turning Point: 1930

Whereas demand deposits had served as Snyder's monetary aggregate throughout the 1920s, the year 1930 brought about a change. In a paper, "New Measures of the Relations of Credit and Trade," Snyder replaced demand deposits with banks' loans and investments as his preferred measure of money: "I shall speak of bank credit in terms largely of total loans and investments since these appear to afford the best practical index, or measure, that we have of the vast total of all credit by which the business of the nation is carried on" (Snyder 1930, p. 17). He argued that the large increases in "speculative and financial transactions" that had taken place in the late 1920s had rendered demand deposits an unreliable—in his words, "artificial"—measure of money (1930, p. 17). The 1930 article presented a figure (p. 28) showing that an updating of the long-run relationship between money and the price level that he had presented in his works throughout the 1920s continued to hold with data from the late 1920s, provided that total loans and investments were used to measure money. Thus, he concluded that "total loans and investments are a trustworthy index of bank credit, and this, in turn, of the nation's chief medium of exchange" (1930, p. 23). To confirm the long-run relationship between money and the price level, it was necessary to use "the broadest possible measures of 'bank credit'" (1930, p. 17).

V. SNYDER'S ACCOUNT OF THE BUSINESS CYCLE IN THE 1930s

Snyder presented a theory of the business cycle based on banks' loans and investments in an unpublished paper, "The Measurement of Monetary Phenomena" (Snyder 1932), at a conference on "Gold and Monetary Stabilization" held at the University of Chicago in January 1932, sponsored by the Norman Wait Harris Memorial Foundation. The non-Chicago economists included James Angell (Columbia University), Lionel Edie (Capital Research, New York), Irving Fisher (Yale University), Gottfried Haberler (Harvard University), Alvin Hansen (University of Minnesota), Arthur W. Marget (University of Minnesota), Chester Phillips (University of Iowa), James Harvey Rogers (Yale University), and John H. Williams (Harvard University). The Chicago participants included

[23] The lecture was delivered on December 27, 1928.

Aaron Director, Paul H. Douglas, Frank H. Knight, Lloyd W. Mints, Henry C. Simons, and Jacob Viner from the Economics Department, and Garfield Cox from the Business School.

The conference took place against a deteriorating economic performance. In the six months ending in December 1931, industrial production fell by about 14% and the money stock fell by about 5%; wholesale prices had fallen 11% below the level of December 1930 (Meltzer 2003, p. 352). Real income fell by 11% in 1930 and by an additional 9% in 1931 (Friedman and Schwartz 1963, p. 301). Despite the deteriorating economic performance, in his budget message of December 1931, President Herbert Hoover called for major tax increases and stringent controls on government spending to balance the budget for the next fiscal year (Tavlas 2023, p. 73).

Snyder's presentation was organized around a series of charts showing the evolution of various measures of the variables that enter the equation of exchange. The charts displayed correlations among rates of growth and deviations from trend of the components and subcomponents of the equation of exchange over various periods, dating as far back as 1820. Snyder drew the following inferences. (1) Measures of real production displayed steady growth of 4% per annum (Harris Foundation 1932, p. 269). (2) There had been an "extraordinary variation in prices." Consequently, there had been a "lack of connection between the growth of production … and the price level" (Harris Foundation 1932, p. 259). (3) Using total loans and investments as a measure of credit (Harris Foundation 1932, p. 264)—and dividing that measure by the long-term trend of growth—Snyder argued that "you get substantially the general price level … back to 1866" (Harris Foundation 1932, p. 264). (4) In the short run, fluctuations in velocity and transactions canceled out so that credit growth was neutral. Snyder (Harris Foundation 1932, p. 269) concluded:

> So we [i.e., researchers at the New York Fed] then came to the question of rewriting the equation of exchange, our familiar $MV = PT$. Allowing for an element of secular growth, in the last generation four percent per annum, as nearly as it can be measured, you simply get these two factors, the short-time fluctuations in V and T, cancelled out, and this is your equation of exchange…. Allowing for this rate of growth at any given time, the volume of bank credit in circulation is the general price level.

Snyder (Harris Foundation 1932, pp. 264, 269) explained that he used bank credit, that is, loans and investments, as a proxy for M because credit, unlike demand deposits, provided a close relationship between M (credit) and the price level:[24]

> In bank credit we have a factor that apparently is basic to the answer of this problem [of explaining the price level], since it cannot be money in circulation which has long ceased to be of any particular consequence. It is the short tail of a very large dog. Instead, then, of taking currency, we take bank credit, and relate it to the actual growth of business with a slight smoothing; that is to say, with a trend line through it, ignoring all variations, all business cycles, all fluctuations—nothing but the long-term growth. This is the point where you will find, I think, one of the difficult things to swallow, and that is

[24] Two reasons that Friedman and Schwartz (1963) focused on money, rather than on credit, were that the former aggregate was more susceptible to control by the central bank and it had a more predictable relationship with nominal economic activity in the short run. The collapse of the money supply during the Great Depression, they maintained, was preventable. See Nelson (2020, pp. 240–242).

> that taking the long-term trend of growth, the index numbers, and dividing that into the actual bank credit in dollars and obtaining therefrom a ratio of credit to trade, you get substantially the general price level. Allowing for this rate of growth [i.e., 4% annual growth in production], the volume of bank credit in circulation is the general price level.

Several participants questioned Snyder's use of bank credit as a proxy for M (Harris Foundation 1932, pp. 269–272):[25]

> Mr. Fisher: But you have adjusted it [the equation of exchange] by substituting loans and investments for deposits.
>
> Mr. Snyder: I think that is the answer; in other words, individual deposits [M'] subject to check did not tally with this thing [i.e., explain the price level] very well.
>
> Mr. Fisher: You mean the statistics were at fault?
>
> Mr. Snyder: The same thing we found with the money in circulation figures.
>
> Mr. Phillips: The disturbing thing to me is that the niceness of the correlation comes from the selection of your magnitudes. It would seem to me much more logical and reasonable to attempt to work deposits, because deposits are the purchasing power.
>
> Mr. Marget: However, wouldn't you say honestly that the evidence is not yet all in until we get statistics with respect to deposits over a long period?
>
> Mr. Snyder: The classification of demand deposits at the present time … if you dig deeply into those figures … have great trouble and tribulation because of the number of errors that are made … so that you see you are building your theory statistically on very unstable possibility.

Several participants pressed Snyder about the business cycle theory that underpinned his empirical findings and the policy implications. In particular, those participants queried Snyder about the model of the business cycle that could give rise to his empirical relationships and the policies that could prevent extreme events, such as the contraction that began in 1929. Arthur Marget was especially aggressive in pressing Snyder to present the analytical underpinnings of his empirical findings.[26] The following exchange took place (Harris Foundation 1932, pp. 279–287).

> Mr. Marget: Now the question arises how to explain [the] situation we are in [i.e., the Great Depression]. How did we get there?

[25] The following accounts of the Harris Foundation proceedings are abridged versions of what were longer discussions. In his summary of the conference, Steindl (1995, p. 137) also highlighted this reaction: "On several occasions, his use of bank credit instead of deposits or the money supply was questioned by Marget, Viner, and Phillips."

[26] Marget taught at Harvard University from 1923 to 1927, before moving to the University of Minnesota.

> Mr. Snyder: What I am getting at is this: The difficulty … is not in business cycles, but … the main thing in the business cycle is the change in prices, and that is what is causing the catastrophe now and caused it in '21, in '92, in '73, and every other one we have had.
>
> Mr. Marget: [The correlations are] not a theory, Mr. Snyder.
>
> Mr. Snyder: But if you get a very close correlation between these things—[the correlations explain the crisis in] 1907.[27]
>
> Mr. Marget: Why?
>
> Mr. Viner [addressing Marget]: That is the sort of question you mustn't ask. [Snyder is] not a theorist…. There is an obligation on the theorist to take these [Snyder's findings] and make what he can of them.
>
> Mr. Marget: I deny that. The feud has been started by the statisticians, not by the theorists.
>
> Mr. Cox [addressing Snyder]: Do you feel free, here in the bosom of the family, to tell us the best thing to do to keep out of these fluctuations?
>
> Mr. Snyder: I didn't mean to go into these questions very much, but if you like I will read, in the privacy of the family, some little conclusions that I thought I would draw up as to the golden rules of credit control.

Snyder then presented a business cycle theory.[28] The theory consisted of thirteen (often repetitive) postulates. In what follows, we present an abridged version comprised of six postulates.[29]

1. "Booms and depressions seem largely, if not fundamentally, dominated by monetary and credit factors. These are at least a *sine qua non.*"
2. Crises and depressions are necessarily preceded by a period of "over-expansion or 'boom,' and excited speculation." In turn, booms are "promoted" by rapid credit growth, that is, "a rate in excess of the long-time rate of industrial growth" of 4% per annum. Periods of credit expansion in excess of 4% per annum always give rise to "wild speculation, and boom."
3. Periods of rapid credit expansion always result in rising prices "either of commodities, land, or stocks." Conversely, periods of contraction of credit always result in falling prices. "The separation of these factors is inconceivable."
4. Booms always come to an end "through a *check* to credit expansion" (italics in original). "The severity of depressions seems directly related to the extent and

[27] The US economy underwent a severe contraction from May 1907 to June 1908.
[28] In a 1931 paper, "The World-Wide Depression of 1930," Snyder (1931) discussed the global character of the origins of the Great Depression.
[29] The abridgement reflects the repetitiveness of Snyder's original thirteen postulates.

duration of the fall in prices; and the general level of prices is, we know, determined by the volume of credit relative to the long term growth of trade."

5. Recoveries from depressions are "always" [initiated] "by outside factors." "Cheap money" and very low discount rates cannot, of themselves, initiate a recovery from a depression. "Business recovery seems promoted by forces that make for credit expansion, as, for example, an inflow of gold, or a return of money in circulation or heavy investments by the banks; all of which create deposits."
6. For the preceding factors to be effective, they need to "stop credit contraction." Otherwise, recovery will not take place. The gold standard of "former days" provided an automatic check to "undue credit expansion, through the exhaustion of reserves." The gold standard operated as "a rule also to check undue deflation and falling prices" (Harris Foundation 1932, pp. 288–290).

Snyder did not provide an explanation for the deterioration of the gold standard's effectiveness.[30] Neither did he provide an explanation for the view that lowered interest rates would not, in and of themselves, spur a recovery. Moreover, he did not explain what factors might motivate banks to undertake "heavy investments." Evidently, lower interest rates were not a sufficient condition.

Following the presentation, Chester Phillips pointed to an apparent inconsistency between Snyder's empirical data and his business cycle theory.[31] Phillips (Harris Foundation 1932, p. 304) noted that Snyder's view that economic contractions are necessarily preceded by periods of rising prices had special significance in light of the then-existing circumstances. Phillips noted, however, that measures of the price level displayed little movement in the 1920s. Phillips asked if Snyder's view would "be true with reference to the period 1921 and 1929" (Harris Foundation 1932, p. 304). In other words, if rising prices were a prelude to economic contractions, why did prices not rise in the 1920s?

Snyder's response was that the available measures of the price level were not sufficiently comprehensive to account for the actual course of events in the 1920s; they did not include "wages, real estate and security prices" (Harris Foundation 1932, p. 305). For that reason, those measures showed little variation during the period from 1921 to 1929. Thus, they did not disprove his theory. Inclusion of wages, real estate prices, and security prices in a general price index would show that the general price level rose in the

[30] Snyder's presentation was made on January 30, 1932. On January 27, 1932, Jacob Viner delivered a lecture, "The Balance of International Payments and the Gold Standard," at the conference at which Viner, a strong advocate of the classical gold standard, sharply criticized the working of the interwar gold exchange standard of the 1920s, which allowed central banks to hold foreign exchange in their reserves so long as they were in the currency of a "safe" country—notably, the United States, the United Kingdom, and France. His criticisms included the sterilization policies of the Banque de France and the lack of international cooperation in the 1920s. It may have been the case that Snyder had Viner's critique of the gold standard in mind. See Viner (1932).

[31] Phillips (1920) originated the theory of multiple Reserve banks expansion under which the banking system can multiply deposits under a given base although no individual bank can do so (see Humphrey 1987). More formal analyses of the deposit multiplier process were subsequently published by James Harvey Rogers (1927, 1933), and James Angell and Karel Ficek (1933a, 1933b). Following Phillips's work, these economists constructed expansion equations for both a single bank and the banking system as a whole, but, unlike Phillips, they introduced a cash drain into circulation. For a discussion, see Wicker (2002). Both Phillips and Rogers were former students of Fisher, and Phillips (1920) was that economist's Yale doctoral dissertation.

1920s, validating the postulate that economic contractions are always preceded by periods of rising prices.

Snyder believed that his empirical work had validated Fisher's equation of exchange. In turn, Fisher praised Snyder's empirical work. Thus, Fisher stated: "It seems to me that [Snyder] has made a contribution of the very first magnitude in those correlations" (Harris Foundation 1932, p. 302). In contrast to Snyder, however, Fisher was a first-class theorist, who had emphasized the non-neutrality of money in the short term throughout his career.[32] Thus, after praising Snyder's work on correlations, Fisher suggested that Snyder had manipulated the data in order to obtain results that confirmed his prior beliefs. In this regard, Fisher stated, "Mr. Snyder has done his best to get a fit by choosing the data in one way and another" (Harris Foundation 1932, p. 303).[33]

The view that Snyder's empirical results had been constructed in such a way as to validate his prior convictions was expressed explicitly by Williams: "I would say that after all this general relationship as revealed here had already been arrived at." Williams concluded with the observation that Snyder had not provided a convincing theoretical structure to support his empirical findings: "but we are left at the same point [at which the discussion had started], trying for an explanation. The events go on, but the motive is not explained, so we are left where we were before" (Harris Foundation 1932, p. 307).[34]

Snyder did not express a view on what policies would be appropriate to combat the economic contraction, even though, as noted, he had called for expansionary open market purchases in meetings at the New York Fed in the early 1930s. Snyder's reticence contrasted with the proactive stance taken by other participants at the Chicago conference. At the conference, twenty-four economists signed a telegram, addressed to President Herbert Hoover, that urged the government to enact a bold program of open market operations supplemented by spending on public works and other measures to restore business confidence and, thus, prevent a further collapse of money and its velocity. Viner and Williams, two of the six drafters of the telegram, would go on during the next few years to acquire important advisor positions at the New York Fed

[32] In the early part of his career, Fisher formulated a theory of the business cycle under which, following a rise in the money supply, the effect of lagged nominal interest-rate adjustment on the real interest rate (operating through lags in price expectations) provided the primary mechanism underlying the cycle (Fisher 1911). In the early 1930s, Fisher developed a theory of the business cycle under which contractions initiated by productivity shocks set off two "diseases" that fed on each other (Fisher 1933). Fisher called the two diseases "over-indebtedness" and "deflation." They worked as follows:

"The two diseases act and react on each other … deflation caused by the debt reacts on the debt. Each dollar of debt still unpaid becomes a bigger dollar, and if the over indebtedness with which we started was great enough, the liquidation of debts cannot keep up with the fall of prices which it causes…. Then, *the very effort of individuals to lessen their burden of debts increases it, because of the mass effect of the stampede to liquidate in swelling each dollar owed…. The more debtors pay, the more they owe* (1933, p. 344; italics in original). Fisher's theories of the business cycle are discussed by Laidler (1999), Dimand (1993, 1998b, 2019), and Tavlas (2021).

[33] Steindl (1997, 2000) argued that, beginning with Fisher's (1933) work on the debt deflation theory of depression, mentioned in the prior footnote, Fisher "subscribed to a real-bills doctrine of banking" under which banks were "essentially passive to the debt-deflation-induced repayment of loans and the consequent run-up in their excess reserves" (Steindl 2000, p. 494). Dimand (2000) provided evidence that contradicted Steindl's thesis.

[34] In his 1940 book, *Capitalism the Creator*, Snyder presented an analysis of the business cycle comprised of six postulates. The presentation was essentially a condensed version of his 1932 conference presentation.

(Williams) and the US Treasury (Viner), where they played crucial roles in shaping the monetary and fiscal policies undertaken in the New Deal.[35] The monetary approach they followed dissented both from the real bills doctrine and the quantity theory of money. It was a middle-way ground in which adequate money supply (whose management was then divided between the Fed and the Treasury) was seen as a necessary but not sufficient condition for reviving aggregate demand, while active deficit-financed fiscal expenditures were deemed effective in boosting the income velocity of money, at least in the short term. It was against this approach that Snyder's ideas collided with those of other participants at the Harris Foundation conference.

As mentioned above, in several of his works, Snyder blamed the Fed for causing the Great Depression. In doing so, he focused on the supply of bank credit. In his 1935 paper, "The Problem of Monetary and Economic Stability," he wrote that the Great Depression was caused by "a violent contraction of credit" (1935, p. 204). In *Capitalism the Creator*, Snyder (1940, pp. 188, 190) wrote:

> In 1930 or 1931 … we deliberately permitted the destruction of one-third of our essential bank credit, essential to the actual production of goods, without a great deal of protest, and without any adequate understanding of its inevitable effect. The proof: in the Autumn of 1931, when the depression was steadily deepening and extending all over the world, when the discount rate of the Federal Reserve banks was *raised*—raised instead of lowered—in order to 'protect' our gold. We had billions of gold, a huge excess, far more than we had any need for, and yet in panic we increased the pressure, forcing the banks to further contract credit.
>
> Normally the fall in the price level determines the duration of depressions, and as this is purely a function of the monetary or credit supply, it follows that if this credit supply is properly maintained, no such fall in prices or in wages is necessary. (italics in original)

VI. WHY SNYDER DID NOT OFFER A CONVINCING REFUTATION OF REAL BILLS

Several previous studies have identified Snyder as having been a quantity theorist (Humphrey 1973; Humphrey and Timberlake 2019, p. 60; Garvy 1978). We have seen, however, that, beginning in 1930, he used banks' loans and investments as his preferred monetary aggregate. We have also seen that he was not able to convincingly challenge the prevailing real bill views at the New York Fed: the New York Fed's Harrison believed that expansionary open market operation would not be effective unless there was first an increase in the demand for credit. Moreover, Snyder was not able to convince academic economists about the validity of his business cycle theory. What explains

[35] The other drafters were Irving Fisher, Alvin Hansen, Charles Hardy, and Henry Schultz. Laidler (1993; 1999, pp. 236–239) brought out the importance of the telegram. Laidler and Sandilands (2002) and Alacevich, Asso, and Nerozzi (2015) provided evidence indicating that the telegram originated in an unpublished and untitled memorandum drafted in January 1932 by three young members of the Harvard Economics Department—Lauchlin Currie, Paul J. Ellsworth, and Harry D. White. Currie and White also acquired important positions with the Treasury in the early 1930s.

Snyder's inability to convince his New York Fed and academic colleagues about the validity of his views? The short answer is that Snyder lacked a theory of the money stock that made the Fed responsible for the determination of the quantity of money. In the absence of that theory, Snyder lacked a theory of the business cycle that made instability in money the central factor. Essentially, Snyder lacked a theory of the business cycle that made it, in Fisher's (1923) words, "a dance of the dollar."

What explains Snyder's inability to formulate a comprehensive theory capable of demonstrating the Fed's lack of monetary control as the cause of the Depression? The reason is that, as mentioned above, he did not distinguish sharply between money and credit: whereas he used demand deposits to measure money in his work in the 1920s, in the 1930s he used credit as a proxy for money, and his business cycle theory focused on the role of credit. Real bills proponents understood the role of the Fed as influencing credit and either allocating it exclusively to productive uses or preventing a total extension of credit in excess of the needs of productive investment so that the excess would not spill over into speculative uses.[36] An implication of the real bills credit view is that, while the Fed has an influence in credit markets, it is just one player; financial intermediaries are the major players. As the Depression wore on, the view emerged that the lack of demand for credit was the dominant force restricting the supply of credit and an economic recovery.[37] As long as Snyder focused on credit, he had no clear framework for assigning the cause of the Depression to the Fed and its unique responsibility for the control of money as opposed to an ill-defined control of credit.

Snyder's problem was compounded because the alternative view of the Fed as a creator of money was associated uniquely with monetary experiments with paper money, all of which had ended with a worthless currency. The most recent example at the time of the Depression had been the hyperinflations in Europe following World War I. In the past, paper money was associated with the government financing of deficits. Fed policy makers associated paper money with the populist policies of William Jennings Bryan, referred to as "Greenbackism," and the abandonment of the gold standard. They believed that money had value because it was convertible into something with intrinsic value, that is, gold and/or silver. In the past, the successful issue of fiduciary money by banks had always occurred in a regime of convertibility into silver or gold (Velde 2020). There was no historical example of an independent central bank with the power to create fiat (paper) money that had stabilized the value of money.

With the international gold standard that existed in the pre-World War I era, central banks had no explicit responsibility to control money creation.[38] Moreover, an orthodoxy surrounding the gold standard considered a regime of fiat money a prescription for making money worthless. The issue then was whether Snyder could use the quantity theory to explain how a central bank could control the price level in a regime of fiat money creation.

[36] See Hetzel (2022, sec. 8.1, 8.2, 8.3) for the Federal Reserve Board's espousal of the former view and the New York Fed's espousal of the latter view—just different ways of implementing real bills views.
[37] As documented in section III, that was the view of the New York Fed's Harrison.
[38] Central banks could, of course, sterilize gold flows, a practice followed by the Federal Reserve and the Banque de France in the 1920s. However, sterilization was inconsistent with the gold standard's rules of the game.

Snyder did not share the real bills' view that the role of monetary policy was to guide the allocation of credit to productive uses and away from speculative uses. As we have documented, he favored a policy that would expand the credit supply by 4% annually. Governor Harrison could have assented to that policy while remaining firmly committed to the real bills view that speculative excess resulted from an extension of credit that exceeded the needs of the economy for productive investment. That is, for Harrison, Snyder's policy proposal could be understood as how credit booms led to speculative excess, the inevitable collapse of which created recession and deflation. Without distinguishing between money and credit, and without a framework that assigns the control of money to the Fed while leaving the control of credit to markets, it was hard to challenge real bills views. Similarly, without such a framework, Snyder lacked a theory of how monetary instability caused recessions through monetary nonneutrality. In its place, Snyder relied on ideas contained in the real bills doctrine (Hetzel 2022, pp. 270–275).

As discussed, Snyder's version of the quantity theory contained a strong neutrality proposition: whatever the aggregate used in the equation of exchange (money or credit), it was neutral in both the long run *and* the short run. With short-run monetary neutrality, Snyder could not formulate a theory of the business cycle that arose from the failure of the Fed to provide for monetary control. By default, he relied on the prevailing real bills explanation highlighting the collapse of speculative excess. Specifically, he believed that the underlying cause of the Great Depression was an overexpansion of speculative lending for securities in the several years preceding the Depression. In his 1935 paper, "The Problem of Monetary and Economic Stability," Snyder (1935, p. 200) wrote:

> Even by 1927 it is found that in the banks of the leading cities of the country, with a large share of the total of credit outstanding, only a little over a third of this credit was based upon direct loans to industry. Another 30 percent was due to the banks' own investments in securities, and the rest to loans on securities and miscellaneous types. It is clear that the over-expansion of credit in this period was due chiefly to speculative activity, and distinctly not to trade activity.

Snyder and Lauchlin Currie

In his study *The Supply and Control of Money in the United States*, Lauchlin Currie (1934, p. 25) emphasized the consequences of the failure to distinguish between money and credit for the contraction of the money supply during the Great Depression.[39] Currie stated: "I know of only two serious attempts to derive a series on money, those of Mr. Carl Snyder and of Mr. Y. S. Leong, and in each case the series was carried only to 1926."[40] Currie, who in his 1934 study carefully distinguished between demand deposits

[39] Discussions of Currie's contributions include Brunner (1968), Humphrey (1971), Sandilands (1990), and Laidler (1993; 1999, ch. 9). Currie, whose 1934 book grew out of his 1931 PhD dissertation written at Harvard, would have been Allyn Young's teaching assistant had not the latter left Harvard in 1928 for London School of Economics (see Blitch 1983; Laidler 1999). Regarding Young, Currie (1934, p. 48) wrote: "Professor Allyn Young, who was keenly aware of the ambiguity of the term, made it clear that when he spoke of credit simply he meant bank deposits subject to check."

[40] Yau Sing Leong was a researcher who, in the late 1920s and early 1930s, worked at Columbia University. In 1930, Leong published "An Estimate of the Amount of Money Held by the Banks and the Amount of

and bank loans, also wrote: "Mr. Carl Snyder's work would appear to afford an illustration of the danger of identifying bank loans and investments with credit when the term is intended to cover means of payment" (1934, p. 52). Currie (1934, p. 54) pointed out that "loans and investments, which are most frequently used [to measure the money supply], grossly exaggerate the rate of expansion of the money supply up to 1929 and minimize the contraction from 1929 to 1931." Noting that "there does not exist in any of the [Federal Reserve] system's publications … a series on money" (1933, p. 69), Currie constructed such a series (1934, ch. 3).[41]

Currie's data (1934, p. 55, Table 3) showed why Snyder had been misled by his focus on loans and investments during the several years leading up to the Great Depression and in the first two years of the Depression. Specifically, Currie's data for the three years ending in 1929 showed that credit growth rose by a cumulative 13.5%; during the same period money growth rose by a cumulative 4.5%. Hence, Snyder would have not worried about excess speculative activity had he focused on money growth. Correspondingly, Currie's data showed that money growth dropped by a cumulative 10.2% in 1930 and 1931; during the same period, credit growth rose by 1.0%. Currie provided the following assessment:

> There is evidence that the movements in the money supply played no part in Federal Reserve policy while, on the other hand, important decisions were based in part on the movements of loans and investments. In my opinion much of the monetary theory of the past, built up in connection with the control of money by the central bank, has been misapplied by the banking authorities to loans and investments, because of the ambiguity of the term credit. (Currie 1934, pp. 54–56)

Why was the money supply allowed to contract and, thus, to precipitate (and deepen) the Great Depression?[42] Currie attributed that circumstance to the Fed's adherence to the "commercial loan theory of banking" (1934, p. 34), which, as mentioned, subsequently became known as the "real bills doctrine." Out of concern that excessive bank lending had fueled stock market speculation, in 1928 the Fed began to cut down bank lending for financial transactions, which contributed to a decline in the money supply: "Had Governor Harrison understood by 'credit' means of payment, he would have been forced by the logic of his theory, since production was increasing, to advocate a policy quite different from what which he, in fact, espoused" (Currie 1934, p. 57).[43]

Snyder is likely to have been aware of Currie's work. As noted, Snyder's 1934 book grew out of (and overlapped with) his 1931 dissertation at Harvard. Moreover, Currie's discussion and criticism of the real bills doctrine in that book was based on a 1933 paper

Money in General Circulation in the United States," in which Leong presented annual US money stock data for the period from 1900 to 1926 and monthly data for the period from January 1914 to January 1927 (Leong 1930). In 1933, Leong's PhD dissertation, *Silver: An Analysis of Factors Affecting Its Price*, was published as a book by the Brookings Institution, where Leong had moved to work (Leong 1933).

[41] The Fed began to publish a series on the money stock in 1941. See Humphrey (2001, p. 177).

[42] Brunner (1968, pp. x–xi) expressed the following view about Currie's book: "His book … offers the most detailed and careful investigation of the major properties of the money supply mechanism developed until recent years."

[43] Laidler (1993) pointed out that Currie had been influenced by the views of Ralph Hawtrey. Currie had served as Hawtrey's assistant while the latter held a visiting position at Harvard in 1928–29. On Hawtrey's views on the Great Depression, see Hawtrey (1931).

(Currie 1933), published in the *Journal of Political Economy* (and was also in his thesis). Thus, the information that Snyder needed to show the weakness of the real bills view was available in the early 1930s. Had Snyder used that information, he would have had a more persuasive case to support expansionary monetary policy.

Anderson's Review of Currie's Book

The contrast between Currie's emphasis on the quantity of money and the real bills view was brought out clearly in a review of Currie's book by Benjamin Anderson. During the 1920s, Anderson was the chief economist of Chase Bank; he was an influential supporter of the real bills doctrine.[44] In a 1935 review of Currie's book, Anderson stated that Currie "draws the line sharply between two objectives [of Federal Reserve policy]: (1) The control of the total of money, which he advocates, and (2) the policy directed toward control of the quality of the assets of the member banks, which he condemns" (Anderson 1935, p. 441). Anderson then distinguished his real bills view with Currie's focus on the money supply:

> Currie is not at all concerned about the quality of bank credit and, indeed, makes a sharp issue between his theory, which calls for policy directed toward the control of the quantity of demand deposits, and the antagonistic policy of protection of the quality of bank loans and investments. I stand emphatically for the other point of view. I am concerned about the quality of money and credit. I trust a situation in which no new credit or debt is created without due consideration of the sources from which repayment can come, in which adequate margins exist to provide against risks and in which the general situation is adequately liquid. (1935, p. 454)[45]

As Laidler (1999, p. 193) pointed out with reference to the real bills view:

> There is no need here to do more than note the difficulties involved in giving operational content to such distinctions among the qualities of bank assets, in tracing the proceeds of particular loans through the financial system from their primary lender to ultimate user and in deciding whether their ultimate use has been productive or speculative.

The Fed and Real Bills in the 1940s

A difficulty in understanding why policy makers in the Great Depression could not recognize their responsibility for the control of money arises from projecting what is today taken as self-evident but, in fact, was not something understood earlier. Specifically, in the Depression, there was no concept of a banking "system" whose deposit liabilities rested on a reserves base created through the bookkeeping operations of the Fed. The Fed was understood as a collection of regional repositories of the reserves of banks with those reserves considered as limited by the gold deposited by the banks as a

[44] See Laidler (1999, pp. 189–193).
[45] We thank David Laidler for drawing our attention to Anderson's review of Currie's book.

condition of membership. The ability of the Fed regional banks to expand member bank liabilities and currency was strictly limited by collateral required in the form of gold cover and real bills. Those limitations were built into the Federal Reserve Act to prevent the Fed from being a central bank with the ability to create fiat money.

The concept of a banking system with liabilities under the control of the Fed, as opposed to control exercised through the loan demand of banks with the regional Fed banks as only one influence through their ability to discount real bills, is implicit, but not clearly articulated, in Clark Warburton ([1946] 1966).[46] Its first explicit articulation is in Friedman and Schwartz (1963), appendix B, "Proximate Determinants of the Nominal Stock of Money." The original draft of Friedman and Schwartz's *Monetary History* did not contain the appendix, but it was added as a result of criticism by Warburton (Steindl 1995, p. 159).

When Friedman and Schwartz published *A Monetary History*, they could make a convincing case that the Fed could have prevented the collapse of the money stock in the Great Depression through open market operations. What caused the change in professional opinion? First, real bills as a framework for understanding the role of the Fed collapsed after the end of World War II. Because of deficit financing in the war, the credit structure came to rest on government securities—not on real bills. According to real bills, the credit structure should have collapsed after the war with a return to recession and deflation. That failure left an intellectual vacuum.

Second, with the continuation of the rate peg imposed on the Fed by the Treasury after the end of the war, the intensification of the Korean War in fall 1950, and the associated surge in inflation due to fear of a world war and price controls, banks sold treasury securities to the Fed. To maintain the peg, the Fed had to buy them with the obvious result that the purchases added to the reserves of banks, allowing them to expand their loans and deposits. Thus, Federal Reserve Governor Marriner S. Eccles could urge an end to the peg and Fed independence by referring to the Fed as an engine of inflation (Hetzel 2022, ch. 1; Hetzel and Leach 2001).

Third, after the 1951 Treasury-Federal Reserve Accord under which the Fed gained its independence, the new Federal Open Market Committee chairman, William McChesney Martin, still needed to protect the Fed from being the residual buyer of securities the Treasury sold at a fixed coupon rate. To do so, he and his assistant Winfield Riefler developed the "depth, breath, and resilience" of the New York money market. It then became the market in which banks could adjust their reserve positions. As such, it was the analog of the pre-Fed call loan market. A major reason for the creation of the Fed had been to eliminate the latter market, which was seen as funneling bank reserves into speculation in the stock market. In this changed intellectual environment, the concept of a banking system whose liabilities collectively rested on a reserves base created through the bookkeeping operations of the Fed could take hold and lend credence to the Warburton and Friedman and Schwartz critique of the Fed in the Depression. There was then no debate over whether the Fed could control money but rather whether monetary policy was impotent.

[46] See Tavlas (2019; 2023, ch. 7). As mentioned, models of money stock determination had been constructed in the 1920s and the 1930s.

VII. CONCLUDING OBSERVATIONS

Carl Snyder's work on constructing the empirical counterparts of the terms in the equation of exchange, his finding that money is neutral in the long run, his formulation of a money supply growth rule, and his advocacy of expansionary open market operations to combat the Great Depression distinguished him as a leading monetary economist of his day. His policy advice at the New York Fed in the early 1930s was not, however, heeded. In this paper we have provided several reasons.

- Snyder lacked a theory of money-stock determination that made monetary control independent of the financial intermediation of the banks. Therefore, he was not able to formulate a monetary theory of the business cycle that arose from the failure of the Fed to control the supply of money. Neither was he able provide a policy framework under which expansionary open market operations would predictably increase banks' reserves and, hence, economic activity.
- In the 1930s, Snyder's business cycle theory contained strong real bills elements, although he did not share the real bills view that the role of monetary policy was to guide the allocation of credit. His focus on credit, rather than on the quantity of money, left him open to the real bills argument that expansionary open market operations would be effective only if the demand for credit increased. In turn, to support credit demand, it was essential to raise confidence. In the early 1930s, Governor Harrison viewed the gold standard as the key to maintaining the confidence of businesses required to encourage the renewal of borrowing needed for an economic recovery. The decisions by the New York Fed to raise interest rates in the fall of 1931 were taken to maintain confidence. Snyder lacked a theoretical framework stressing the need to maintain the money stock.
- Snyder's theoretical framework in the 1930s rested on the argument that the depressionary phase of the cycle was a natural consequence of excessive speculative lending during the prior expansionary phase. Under that framework, real bills proponents believed that the cycle should be allowed to run its course instead of being pre-empted with expansionary policies that could trigger more speculative excess. Snyder, however, had no effective rebuttal. Snyder's empirically derived short-run non-neutrality proposition implied that velocity was passive *during* the cycle, adjusting in line with movements in output, so that changes in money would produce corresponding changes in prices without affecting output. In other words, if money is neutral in the short run, what is the point of increasing the money supply in the contractionary phase of the cycle?
- As Currie (1934) pointed out, Snyder's use of loans and investments as a proxy for money instead of actual data on the money supply misled Snyder to exaggerate the rate of expansion of money in the several years before 1929 and to understate the rate of money contraction from 1929 onwards. Had Snyder constructed an accurate measure of the money supply (based on available data on demand deposits and banks' reserves), as Currie did in the early 1930s, Snyder would have been in a much stronger position to push forward the case for aggressive policy easing.

To conclude, Snyder made important empirical contributions to the quantity theory of money in the 1920s, but his failure during the Great Depression to formulate a money

supply mechanism and a monetary theory of the business cycle meant that he was not able to relate the sharp decline in the money supply to the decline in economic activity during the Great Depression, and he was not able to mount an effective argument in favor of open market operations. Instead, in the early 1930s he relied on a credit view of the Depression, leaving him vulnerable to the counter-argument that an increase in credit would lead to renewed speculative excess, thus undermining the persuasiveness of his policy advice.

COMPETING INTERESTS

The author declares no competing interests exist.

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