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Chester A. Phillips and the forgotten history of bank credit

Jes Black

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UNIVERSITAT DE
BARCELONA

DOCTORAL THESIS

CHESTER A. PHILLIPS
AND THE FORGOTTEN HISTORY OF BANK CREDIT

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A thesis submitted in fulfillment of the requirements

For the degree of Doctor of Philosophy

in the

Department of Economic History, Institutions, and Policy and World Economy

Faculty of Economics and Business

September 8, 2021

Summary

Chester A. Phillips and the Forgotten History of Bank Credit

Abstract:

This thesis studies the main contributions to monetary theory by Chester A. Phillips in the 1920s and 1930s which deal with the expansion of the money supply when commercial banks use the creation of bank credit to purchase a loan or asset. Chapter one deals with his doctoral thesis from 1919, *A Study in Bank Credit*, done at Yale under the supervision of Irving Fisher, which was then published as a book in 1920 and quickly won general acceptance as the definitive exposition on the multiple expansion of bank credit. This pioneering work dealt with the multiple expansion of deposits that results in the banking system when commercial banks originate loans and overturned nearly a century of muddled thinking regarding the interaction of bank credit and the money supply. Economists of this time were still struggling to formulate a complete theory when Phillips devised an innovative mathematical theorem to calculate the lending potential of any individual bank based on the required reserve ratio and the ability of that individual bank to retain this newly created money. Chapter two explores the rise and fall of Phillips's original equation. By tracking the evolution of bank credit theory as presented by introductory textbooks from 1877 to 2017, the data clearly shows how the consensus view of bank credit creation has changed over time. The findings reveal that the predominant view for over a century - that banks create money in the act of purchasing a loan or an asset - was only recently replaced in the 1980s by the new

view that banks are mere intermediaries of preexisting deposits. Chapter three deals with Phillips's other major contribution, *Banking and the Business Cycle*, written in 1937, which expanded on his previous work to show that the purchase of either government or corporate securities by the commercial banks had the same effect on the expansion of money supply. Here, Phillips explains that the effort to finance the First World War through the commercial banking system led to a multiple expansion of deposits which then required an unorthodox operational policy in the 1920s to avoid credit deflation. Phillips contends that the Federal Reserve's open-market operations in the 1920s were intended to stabilize the economy and the price level, but also inadvertently allowed bank credit to flow into long-term assets instead of short-term revolving loans as was originally intended under the Federal Reserve Act. Phillips's conclusion is that that the decision to target price stability alone is not a sufficient central bank policy, and this critique is still relevant today.

The purpose of [the theory presented here] is primarily not to expose the fallacy of the false, but to demonstrate, clarify, and enforce the truth of the true.

Chester A. Phillips

Acknowledgments

I would like to thank those who directly or indirectly have made this work possible. The names of everyone involved are too numerous to mention, but in particular, I thank my thesis advisors Francisco Javier San Julian Arrupe and Alfonso Herranz. I would also like to thank Carles Sudrià and the department of Economic History at the University of Barcelona who helped me with the initial ideas for my research while I did my masters degree there. I am extremely grateful both to Javier and the rest of the department for their availability during these five years of doctoral studies and especially to Javier for his advice and encouragement from beginning to end.

My thanks also go out to those who at some point or another took the time to read and critique my work. In particular, I thank Rebeca Gomez Betancourt for her extensive and valuable comments. I also appreciate Edward Nelson who helped me refine the ideas presented here. Finally, I would like to thank the personnel of the Department of Manuscripts and Archives of Yale University Library for their help in sending me Phillips's original 1919 dissertation and then Scott Scheall who at the last minute was kind enough to intervene and make sure I received it.

I finally thank my father Gregory, my wife Alia and my children Diego and Ainhoa who were kind enough to nod their heads in quiet agreement as I explained the evolution of bank theory to them time and again.

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Introduction

i. Motivations, general approach and justification

The Global Financial Crisis of 2008 and its aftermath brought to light the importance of understanding commercial banks as more than mere financial intermediaries. The creation of bank credit - and by consequence the nation's money supply - had once been at the vanguard of monetary economics in the early twentieth century but its importance diminished in the postwar era of modern macroeconomics (See Solow 2005). These new models attempted to better explain how the economy works but regrettably minimized the role of banks and their ability to create bank "money" when originating a loan or purchasing an asset. As a consequence of portraying banks as merely bringing savers and borrowers together, many economists and policymakers alike were ill equipped to identify the warning signs of increased leverage in the 1990s and the run-up to the 2008 crisis (See Jakab & Kumhof 2015). However, in the aftermath of the most recent financial crisis there has emerged a renewed interest in better understanding the creation of money by commercial banks and many researchers have turned to economic history for guidance.

For the public at large, understanding the mechanics of money creation comes almost exclusively from textbooks on economics. In the neoclassical view banks are only able to lend money after depositors have made a deposit into a bank and commercial banks can only lend out excess reserves. However, this model of intermediating loanable funds does not represent the real function of banking (See Mehrling 1997). In many publications from the world's leading central banks the opposite view is held, where banks create deposits in the act of originating loans.

Consequently the vast literature on the role of banks in the money creation process confronts many unresolved issues. Given the consistent framing in textbooks of banks as simple intermediaries of loanable funds, the literature has ignored how we got to this level of misunderstanding between how banking is taught and how it is understood by the practitioners. In this regard, the main question that motivated this work has been to learn why the public at large is taught that banks are intermediaries of existing savings when in fact the professionals at central banks know that the function of banks is really the provision of finance through the creation of new bank credit.

This study adds to the historical understanding of bank credit, leverage and financial crisis by highlighting the contributions of Chester A. Phillips. Relatively unknown prior to 1920 (when he published his doctoral thesis as *Bank Credit: A Study of the Principles and Factors Underlying Advances Made by Banks to Borrowers*), his novel explanation of the multiple expansion of bank deposits quickly won acclaim in the 1920s and was cited by Keynes, Hayek and Fisher in the 1930s as the definitive explanation for how the money supply expands through the banking system.¹ Following his overnight sensation, Phillips did not publish again until 1937 when he argued in *Banking and the Business Cycle*, that the Federal Reserve's policy to target price stability in the 1920s was misguided because it allowed commercial banks to finance long-term assets - and not short-term loans as was intended. He argues that this shift in asset structure is one of the reasons the depression of the 1930s lasted so long. But Phillips and his contemporaries who highlighted the role of bank credit in the real economy and the types of assets held by the banks were quickly swept aside by the Keynesian revolution and along with it, interest in monetary equilibrium theories in the postwar era (See Wharburton 1981, Dimand 1995 and Dimand 1998).

Given the vast literature on both the Great Depression and the Global Financial Crisis what could be gained from resurrecting a forgotten economist and their ideas? Jacob Viner once said that "to resurrect forgotten or overlooked material worth of

¹ James Harvey Rogers (1926), Keynes (1930), Fisher (1932), James W. Angell (1933), Hayek (1933), Machlup (1940) all cite Phillips (1920) for having developed the deposit multiplier formula.

resurrection” was an effort to “trace the origin and development of the doctrines which were later to become familiar, and to examine the claims to acceptance of familiar doctrine” (Viner 1937, p. xiii). Frank Knight also observed that “A major lesson to be learned from the history of ideas is to realize the ‘glacial’ tardiness of men, including the best minds, in seeing what it later seems should have been obvious at the first look” (Knight 1973, p.46).

Perhaps the best reason is that old ideas - if sufficiently forgotten - can become new again. Wesley Mitchell remarked that “Our interest in the history of economics changes with the development of economics itself.”² Certainly, therefore, the dramatic transformation in American economic thought from individual banks as creators of money to that of mere intermediaries of deposits deserves assessment. However, very little scholarly attention has been devoted to understand how and why bank credit theory changed so dramatically over the last century. While the mechanics of money creation is vitally important to understand - the history of bank credit theory has been largely forgotten.

If one were to read explanations of the money creation process during the interwar period, there is an unmistakable consensus on the process of money creation among even the most renowned economists with diverse opinions like Keynes, Schumpeter, or Hayek. These economists all held that individual banks have the power to create money by originating a loan through the creation of bank credit. But this widely held view was gradually overturned in the postwar period and by the 1980s the orthodox view had been replaced by a new paradigm in which only the banking system - as a whole - can create credit money. Students of monetary theory and non-specialist economists are left to imagine reasons for why the formerly mainstream theory had changed. The objective of this work is to explain exactly how and why that happened.

Consequently, historians of economics still have a great deal to say and learn about the evolution of thought concerning the creation of money by commercial banks in

² See Durlauf, S., & Blume, L. E. (2016, p. 54) for a discussion of Mitchell’s lectures on Economic History.

the United States. By tracing the development of bank credit theory, the reader will see where many gaps in our knowledge have formed over the years. The main endeavor of this thesis is to fill some of those gaps by highlighting the contributions of Chester A. Phillips who was a pioneer in the field of bank credit theory in the interwar period. He was the first to introduce an innovative mathematical theorem to calculate the lending potential of any individual bank based on the required reserve ratio and the ability of that individual bank to retain this newly created money. Phillips's deposit multiplier theory was widely adopted in the 1920s and 1930s and overturned the "old view" of bank credit creation which claimed that all individual banks can act like single bank monopolies.

Phillips's final publication *Banking and the Business Cycle* expanded on his previous work to show that the purchase of either government or corporate securities by the commercial banks had the same effect as the origination of business loans in the creation of deposit money throughout the banking system. Written in 1937, Phillips makes another original contribution to a fascinating episode in economic history. In an effort to explain the long-lasting depression of the 1930s, his account of events is that the decision to finance the First World War through the commercial banking system led to a subsequent multiple expansion of deposits (as government funds were re-deposited at banks) which he contends then required an unorthodox stabilization policy in the 1920s to avoid a larger credit deflation in the post-war period.

That the Federal Reserve strayed from its original framework is not controversial (See Meltzer 2010). However the view that the Federal Reserve's operational policy resulted in excess bank credit in the 1920s is contentious because the consensus is that there was little overall inflation in the 1920s and that the central bank's operational policy was targeting borrowed reserves to control credit (Bordo & Roberds 2013). Phillips, however, contends that the Federal Reserve's open-market operations in the 1920s inadvertently allowed bank credit to flow into long-term assets instead of short-term revolving loans as was originally intended under the Federal Reserve Act. As a result, Phillips argues there was a subsequent need for

price stabilization which resulted in the Federal Reserve to disregard the actual transmission channels of bank credit creation flowing into long-term assets. Phillips's conclusion is that the decision to target price stability alone is not a sufficient central bank policy if certain banks become highly leveraged in pursuit of profits.

Phillips is therefore both a missing link in the evolution of economic thought as well as someone whose ideas are currently very much relevant. His original bank-credit multiplier theory showed that each bank had a different amount of power to create a multiple of new credit for every deposit received. Their power depended mainly on the ability to retain this new bank credit created through the process of originating loans. If these loans recycled back into the bank, the same bank could in fact lend much more than just excess reserves. Phillips concludes that trying to control this non-homogenous creation of bank credit by targeting a general price index could be a fool's errand resulting in an overly leveraged financial system without price inflation - a critique that is still debated today.

ii. General structure

This work is divided into three chapters which chronicle the origin of modern bank credit theory, followed by the transmogrification of the deposit multiplier into a simplified loanable funds model and finally how the current mandate for central banks to target inflation continues to complicate monetary policy decisions. Each chapter focuses on Chester A. Phillips, using his writings as the common thread to link together the general objectives outlined herein. The key contributions of this work are therefore the development of a more profound historical understanding of bank credit theory as well as the resurrection of a forgotten monetary economist.

Chapter one focuses on Chester A. Phillips and the origin and disappearance of his novel theorem which showed that each individual bank's power to create a multiple of new credit for every deposit received varied depending on the bank's unique situation. Having seemingly come out of nowhere following the publication of *Bank*

Credit in 1920, the research question posed in chapter one was to uncover how Phillips devised this theory in the first place and why it disappeared. The main works in the literature addressing the origin story are Mints's (1945) *A History of Banking Theory* as well as Humphrey's (1987) *The Theory of Multiple Expansion of Deposits: Why it is and Whence it came*, and Timberlake's (1988) *A Reassessment of C. A. Phillips's Theory of Bank Credit*. Humphrey writes that Phillips's theory of deposit expansion was the culmination of five economists from the 1820s to the 1910s who consolidated, advanced and refined the arguments in various ways. In sequential order, the five economists cited by Humphrey (1987) are James Pennington, Robert Torrens, Thomas Joplin, Alfred Marshall and H. J. Davenport. Timberlake (1988) and Mints (1945) agree that the best explanations of the expansion of bank credit prior to Phillips were Joplin in England and Davenport in the United States.

Phillips's main contribution is that he overturned other banking writers of the time who contended that an individual bank could multiply its deposits on a given reserve base just as the banking system does. The popularized view of the time followed nearly verbatim the work of Henry Dunning Macleod's *The Theory and Practice of Banking*, whose first edition appeared in 1856 and continued to be published into the early 1900s. According to Macleod a commercial bank is "not an office for 'borrowing' and 'lending' money," instead it is a "Manufactory of Credit" (1891: II, p. 594). Phillips agreed that commercial banks were not "money lenders" and when a bank makes a loan, it expands its balance sheet with both assets and liabilities increasing by the same amount. However, Phillips highlighted an essential differentiation between the ability of a competitive bank to expand its loans versus multiple expansion by the banking system as a whole. His answer was that individual banks would lend out excess reserves which would become the basis for new reserves at other competing banks and then multiply throughout the banking system. Whereas the origin of the deposit multiplier is seldom discussed or credited to Phillips, his novel theorem has been almost entirely forgotten.³

³ The only contemporary reference to Phillips's original deposit multiplier is Jesus Huerta de Soto's fourth edition of *Money, Bank Credit, and Economic Cycles* which explains Phillips's equation in great detail (2020 p. 203).

In Phillips's estimation, each individual bank would lend out a little more than its excess reserves. To illustrate this he was the first to publish algebraic formulas relating the expansion potential of an individual bank and the banking system as a whole. Phillips's equation calculates the lending potential of an individual bank, and then allows for using that as a representative model to aggregate the total deposit creation of the banking system (d) which is later simplified as the new deposit (c) divided by the reserve ratio (r). Here, the individual bank's loan expansion of (x), is a product of the new deposit (c) and the reserve ratio (r), as well as a percentage of loans (k) which will be withdrawn and returned to the same bank so that once $(1-k)$ are withdrawn and (kr) returned, then the loan expansion formula for a single bank is:

$$x = \frac{c(1-r)}{kr + 1 - k} \quad \text{and the banking system's loan creation is: } d = \frac{c}{r}$$

The majority of the literature discussing the deposit multiplier focuses on Phillips's explanation that due to banking regulations most banks in the United States were small and would lose nearly all of their excess reserves. However, what is tragically overlooked is that he disagreed that *all* individual banks were simply small-scale unit banks. Instead, he offered a more pragmatic conceptualization where banks were non-homogenous strategic agents in competition with others which causes each individual bank to lend either a little more or a little less than the new deposit it receives. Afterwards, it is the bank's inability to retain its newly created deposits that results in a multiple expansion of loans throughout the banking system as the lending and redeposit of excess reserves multiplies itself. As Humphrey (1987, p. 8) explains, "Reserve ratios and the resulting power to lend vary by type of bank. Small isolated banks, because of their potentially greater exposure to cash drains and adverse clearings, will operate with larger reserve ratios than big banks or those having ready access to a central reserve pool."

Certainly, in Phillips's demonstration, commercial banks are first and foremost the creators of money and will expand loans to a level where they can manage their

liabilities against the inherent liquidity constraint of a mixed cash-credit banking system. It is only after they have reached the natural limits of expansion within a competitive banking system that they are forced to reconcile new loan expansion with their ability to find and retain reserves. The elegance of Phillips's equation is that it bridges the gap between two seemingly competing views of banks as either simple intermediaries or those that are capable of a multiple expansion of deposits similar to the banking system as a whole. In Phillips's equation, banks are both intermediaries for the deposits they receive as well as creators of money - limited only by the cash drains and adverse clearings they might suffer following the creation of bank credit when originating a new loan.

The first contribution of this chapter is to revive Phillips's original equation and to show how this theorem fits neatly into the current debate where textbooks present banks acting only as simple intermediaries whereas the professional practitioners see banks as providing financing through money creation. In fact, commercial banks are both intermediaries and creators of money and the ability to create money and become more highly leveraged is a function of the size and scope of the bank. Consequently, there is a great capacity for increased leverage by commercial banks who have a larger number of customers or access to central bank funding. One might conclude that this original equation still has pedagogic value and could easily be reintroduced into textbooks to explain the lending power of banks depending on their various sizes and institutional settings.

The second contribution of this chapter is to attempt to explain why this useful theorem disappeared. In the fourth section of chapter one "From Credit Creation to Intermediation" three possible explanations are given. First, events during the interwar period altered the institutional background dramatically in favor of a view that credit could be controlled by the Federal Reserve. Second, textbooks in the postwar period followed Paul Samuelson's *Economics* (1948) which modified Phillips's equation by removing the "k" factor (bank credit deposits that returned to the same bank). Samuelson instead presented the reader with two limiting cases. The first being that all banks are small unit banks and therefore cannot lend more

than their excess reserves. The other alternative was that banks acted as monopoly banks like Bank of America in California or like the Canadian banking system with only a few large banks. But Samuelson said the latter case was not representative of the American banking system which was mostly small unit banks.

The third factor for the disappearance of this novel theorem is that Phillips did not publish academically so his equation fell into obscurity.⁴ Following the release of *Bank Credit* in 1920 he was hired at the University of Iowa and then promoted to Dean of their business school in 1921 where he remained at that position until he retired in 1950. His memoirs show that he was more active in administration than research, although he did remain engaged in the debates of that time. In 1932, he was one of only a dozen non-Chicago economists (including Irving Fisher) to participate in drafting and signing Henry Simon's six-page memorandum on banking and monetary reforms which later became known as the Chicago Plan. But by the time he retired in 1950 the transmogrification of original model had only just begun to take hold.

In conclusion, as the light on Phillips began to dim in the 1940s the traditional view of banking also began to fade away. Most importantly, the removal of Phillips's k -coefficient in the postwar period was equivalent to setting ' k ' to zero which would only represent a small country bank who sets aside the required reserve and then loses one hundred percent of the excess reserves to its competitors once a loan was made. In other words, all banks in the United States would eventually be portrayed as small country banks. Consequently, the over-simplification of Phillips's model in the postwar period led to just as much confusion about the process of money creation as that which preceded the publication of *Bank Credit* in 1920.

In the second chapter, the rise and fall of Phillips's original equation is evaluated. In an unexpected twist, the widespread adoption of Phillips's multiplier in the interwar period allowed mainstream economic theory to move from one extreme perspective (of all banks capable of creating a multiple of bank credit for each deposit) to its

⁴ I am indebted to Robert W. Dimand for this helpful observation.

polar opposite once the original equation was modified in the postwar period. The popularization of Phillips's formula in the interwar period and the subsequent institutional changes in the postwar period resulted in a new interpretation of his model. Specifically, following the removal of Phillips's k -coefficient and the subsequent popularization of a simplified model there was a gradual but dramatic transformation in American economic thought from individual banks as creators of money to that of mere intermediaries of deposits.

Phillips's deposit formula should therefore be regarded as the missing and causal link between these two radically different theories of bank money creation. Given the renewed importance of bank credit theory concerning the debates about whether macroeconomic models have lost their connection with economic reality - as well as the ongoing endogenous versus exogenous money debate⁵ - Phillips's original work deserves to be reexamined. Understanding the novel conception of the deposit multiplier can help researchers understand that macroeconomic modeling has lost sight of the microeconomics of banking (See Freixas and Rochet 1997).

To appreciate the contributions of Phillips when both the man and his original contributions have been forgotten was the objective of chapter one. The research question posed in chapter two was to understand the rise and fall of Phillips's equation within the broader context of the evolution of thought regarding banking theory. The challenge was how to do this. However, economics teaches us to look out for the right facts when reading history and in turn, historians of economics can contribute to the development of economics by searching for those facts when they

⁵ The endogeneity or exogeneity of money is an argument about the proper theory of money creation and bank lending. Historically, the dispute dates back to Ricardo and the Currency School who argued that only coins and Bank of England notes could be considered as money and the central bank set the quantity of money supplied exogenously, or independent of demand. The position of the Banking School was that bank deposits are money as well. Consequently, loans create deposits (through the act of marking up an account with bank credit) so the money supply is endogenous and dependent on the demand for loans. Since the majority of money is supplied by commercial banks in the form of bank deposits the endogeneity of money then becomes a question of whether the central bank sets the interest rate policy. Alternatively, if the central bank sets a quantity target of money exogenously then private agents within the economy will set the interest rate depending on the demand.

aren't readily apparent. In many cases, the construction and revision of databases or discovering and creating new ones entirely is required to make the unfamiliar come to life.

Accordingly, to place Phillips's contributions in the proper historical context requires not only a narrative approach to reveal the origins of his novel deposit multiplier but also a database to assess how his theorem spread in the interwar period and then changed in the postwar period. This chapter makes that possible by constructing a database of nearly every American textbook from 1875 to 2017 to determine the evolution of thought regarding banking theory. For the first time ever there is now empirical evidence from over two hundred textbooks that clearly establishes when the universal acceptance of commercial banks as dynamic "credit creators" was overturned and when the idea of banks as mere intermediaries of loanable funds became the new dominant model.

Prior to this empirical study, researchers have often had to rely on the equivalent of intellectual signposts. This occurs when readers encounter references to influential papers from the past which appear to point out where economists stand at that time. For instance, a frequently cited paper from James Tobin (1963) affirms that commercial banks are financial intermediaries whose liabilities are used as media of exchange. These banks are therefore more than mere financial intermediaries but, as Tobin said, they do not possess an inexhaustible supply of credit money.⁶ In the 1960s this view was not controversial and many references to this paper today are an attempt to draw the reader's attention to the fact that this was not up for debate. However, the rise of the neoclassical-Keynesian synthesis from the 1950s to 1970s saw money as a veil and held an exogenous-money position where banks must first receive reserves to then make a loan. As the exogenous-money position became more popular, the deposit-multiplier model also assumed the monetary base was exogenous and this was incorporated into new mainstream macroeconomic models.

⁶ See Tobin's (1963) "widow's cruse" reference in *Commercial Banks as the Creators of Money*.

The purpose here is not to enter into the endogenous versus exogenous debate. Whether money is endogenous or exogenous depends on the monetary system and its institutional details. However, the novel findings from the database on textbooks presented in chapter two adds never before seen details as to how the evolution of monetary thought in the United States went from endogenous to exogenous over the last century. The survey of textbooks tracks the path of change and these intellectual signposts no longer appear isolated because they can now be fixed to a road-map. Moreover, the database reveals that many of the questionable textbook descriptions of the creation of money by the commercial banks have a specific origin that can be dated exactly. As a result, researchers may now realize there were specific models presented in textbooks that began to appear in the postwar period that gradually dislodged the orthodox banking view by the 1980s.

For instance, one contribution from the database was the discovery that the ever-present table in economics textbooks that depicts the multiple expansion of bank deposits as the result of excess reserves flowing from bank to bank actually first appeared in the *Federal Reserve Bulletin* of May 1939 "The Federal Reserve System: Its Purposes and Functions" (1939, p. 73) which contains a table. This table illustrated the deposit expansion that would only occur among a group of small banks that (after setting aside the required reserve) each lost 100 percent of their new loan creation to the next bank. It is here in the *Federal Reserve Bulletin* of May 1939 (and reproduced again in February 1940) that the Lilliputian model of deposit expansion was first introduced to a wide audience of economists and subsequently repeated through textbooks - first in Peterson's *Money and Banking* (1941) and then in Samuelson's *Economics* (1947). Interestingly, Peterson warns the reader that the inherent assumptions behind the simplified model made it "devious" (1941, p. 373) as it assumed other banks in the system were neither expanding or contracting their loans so that the individual bank could not expand its deposits above the amount of its excess reserves.

Samuelson also uses this same model for deposit expansion first popularized by the *Federal Reserve Bulletin* of 1939 but instead of warning the reader to be cautious, he

actually warns the reader that Phillips's "derivative" or "self-returning" deposits are not important for the United States, "and calling attention to them only confuses the beginning student" (Samuelson 1948, p. 330). Moreover, Samuelson introduces a sleight of hand that would be repeated by subsequent textbook writers and likely led to a great deal of confusion about bank credit creation that still exists today. This occurs in the T-account when explaining how a bank originates a loan. Prior to Samuelson, the well-established first step in money and banking texts since Macleod's (1856) *The Theory and Practice of Banking* showed that after receiving an initial deposit the bank would then add the new loan-derived deposit to both the assets and liabilities side of the ledger simultaneously.

However, when Samuelson asks the reader "can banks really create money?," his over-simplification of the balance sheet confuses the loan creation process by combining two steps into one and therefore answering "no" when it should be "yes." By failing to show that a new loan will first increase both assets (loan) and liabilities (deposits) for the bank, the actual loan creation disappears. In Samuelson's example, the bank would simultaneously lose one hundred percent of its new loan so that it appears individual banks can only lend their excess reserves. Following the success of Samuelson's *Economics*, subsequent authors continued to present only the extreme limiting case where each bank loses one hundred percent of their new loan-derived deposit credits.

Samuelson's textbook no doubt reshaped all textbooks that would follow. However, without the database to track the changes to all textbooks that appeared over time it would have been nearly impossible to know when these dramatic changes first appeared. Consequently, the contribution made by this second chapter is that we can now track the development of the original bank credit theory through a survey of over two hundred economics textbooks from 1877 to 2017 to gauge the rise and fall of Phillips's contribution. The survey also exposes for the first time how our historical understanding of bank credit was shaped by only a handful of influential authors who in turn were influenced by the events of their time. These three authors

are McLeod, Phillips and Samuelson, whose original contributions are the hallmark of banking theory in their time as shown to the general public through textbooks.

The most likely explanation for the subsequently sudden shift away from “loans create deposits” in the 1980s is that textbook authors in the 1970s and 1980s were probably influenced by the popularity of Samuelson’s *Economics* which dominated the market in the 1950s and 1960s when these new authors were just beginning to learn economics. The number of textbooks following Samuelson’s middle-of-the-road approach jumped from just one other textbook author in the 1950s and 1960s to 44 percent of all the textbooks in the 1970s and peaked at 50 percent in the 1980s. In addition, textbooks in the 1970s and 1980s begin to teach the quantity theory of money and monetarism so that consequently the first appearance of the phrase “money multiplier” in the late 1960s became tied to the spread of the “deposits creates loans” approach in the 1970s and 1980s.

Prior to this period, commercial banks were always described as something more than just a financial intermediary. However, by the 1980s, they were frequently described as being *only* a financial intermediary. The development of macroeconomics in the post-war period and the inclusion of a simplified money multiplier into mainstream macroeconomic models appears to have contributed to an increased prevalence of the “deposits create loans” trend seen in the 1970s and 1980s. The emergence of monetarism in the 1970s and 1980s focused on exogenous control over the money supply and money multipliers became the dominant approach by the 1980s. As a result, references to Phillips’s “multiple expansion” of bank credit was subsequently replaced by the “money multiplier” lexicon.

The third chapter examines the role of bank credit creation on the real economy by analyzing what Phillips believes was the root cause of the lasting depression of the 1930s. This chapter connects with the previous ones because *Banking and the Business Cycle*, written in 1937, expanded on his previous work to show that the purchase of either government or corporate securities by the commercial banks had the same effect on the expansion of money supply. Phillips’s first book *Bank Credit*

(1920) focuses on commercial loans and how the money supply multiplies through the banking system under a “real bills” framework and how the Federal Reserve can control it. In *Banking and the Business Cycle* (1937) he extends the explanation how the money supply expands by including commercial bank purchases of assets and securities from 1917 to 1928, which strayed from the “real bills” approach and therefore shifted the underlying credit structure from short-term self-liquidating loans to long-term less liquid loans.

In much the same way as Phillips writes in *Bank Credit* (1920) that the process of bank credit creation was not well understood - even by most economists in 1920 - Phillips adds to that in *Banking and the Business Cycle* by saying that “The correlative process of the creation of bank credit, by means of purchases of investments on the part of the banks, is far from having universal recognition even today” (1937, p. 15). As such, “It seems quite certain that some of those responsible for the way in which the War was financed in this country were not cognizant of the procedure by which it was done” (1937, p. 16). They were, as Withers (1924, p. 58) puts it, “making reckless use of a delicate machine which they did not understand and producing consequences which they neither foresaw nor recognized.”

Phillips’s unique perspective is that the origins of the Great Depression must first be understood as the unintended consequence of financing the First World War with bank credit. This is a view that is seldom supported in the literature and makes for an interesting topic to investigate as it relates both to the historical study of war finance as well as bank credit and ultimately central bank monetary policy in the interwar period. Phillips contends that the conscious decision by the Treasury to finance the First World War through the commercial banking system (as opposed to taxation or tapping into existing household savings) led to a subsequent multiple expansion of deposits as government funds were re-deposited at banks. Consequently, he argues there was a rapid leveraging that occurred from 1917-1919 that required an implicit operational policy of price stabilization following the sharp consumer price deflation engineered by the Federal Reserve in 1920 that resulted in the 1920-1921 depression. However, the subsequent decision to maintain a constant price level

from 1922-1928 through open-market operations led to the monetary authorities overlooking the actual transmission channels of bank credit creation flowing into long-term, and therefore, less liquid assets.

Central to Phillips's bank credit critique of the war and the immediate postwar period is that, "the purchase of investments by banks creates new deposits in the banking system in much the same fashion as does the granting of loans" (1937, p. 6). The economy was therefore stimulated first by the purchase of war bonds, and the subsequent multiplication of deposits that occurs throughout the banking system. The economy was then stimulated again by the purchase of long-term commercial bonds, which altered the underlying credit structure away from short-term liquidity. The attempt by the Federal Reserve to squeeze out inflationary excesses in the 1920-1921 period was cut short (because it was so severe) and as a result, the price deflation that ensued did not restore the economy to a sustainable equilibrium. Most importantly, and at the heart of Phillips's critique, is that a focus on price stabilization policy in the 1922-1928 led to three substantial open-market purchases in 1922, 1924 and 1927 which allowed bank credit creation to continue to flow into assets, but did not lead to price inflation. Phillips says the adoption of such a policy by the Reserve System, "on three separate occasions during the 'twenties was the significant action leading to an expansion of total bank credit during that period" (1937, p. 7).

The research question of the third chapter is to investigate if Phillips's claim is justified and whether his policy recommendation from over eighty years ago - that inflation targeting alone is not sufficient - is still relevant today. Examining the literature there is general agreement that in the aftermath of the First World War the Federal Reserve was "faced with challenges for which it saw no precedent" (Tallman and Jacobson 2020) and learned to guide policy only after learning from its mistakes. It is also generally agreed upon that the first major policy error was the failure to persuade banks to restrict overall lending in 1919 following the Armistice in November 1918. The second policy error was the overly aggressive increase in the discount rate from 4 percent in October 1919 to 7 percent in June 1920 which

precipitated a sharp deflationary recession from 1920-1922. The third major policy error was the failure to act with the same decisiveness in the 1930s following the stock market crash of 1929.

The problem with Phillips's link between the financing of the First World War and the Great Depression is that this is not a widely held view. It is generally agreed that the Federal Reserve worsened the banking crisis of the early 1930s by failing to intervene (See Friedman and Schwartz 1963) but there is still some disagreement over the Federal Reserve's formative years and the period of the 1920s (See for example Rothbard 1963). While there are similarities to the Austrian critique of excess credit creation in the 1920s, Phillips is making a larger case that the root cause goes all the way back to the unintended consequence of financing the First World War with bank credit. As a result of this rapid leveraging of the American banking system - and the necessity to manage the aftermath - the Federal Reserve was forced to operate without an appropriate framework to do so (See Tallman & Jacobson 2020).

Historians of economics look to the monetary policy of the 1920s for clues to the 1930s depression. However, a reading the literature reveals that scholars have generally overlooked the rapid leveraging of the banking system that took place in the 1917-1919 period and how the decision to draft the commercial banks into the war effort would directly influence the Federal Reserve's operational policy in the post-war period. Consequently, one of the contributions of this chapter is to re-engage with this idea and to highlight Phillips as one of the first to take account of the nexus between war finance and bank credit which hopefully adds some historical perspective to the renewed debate around monetary policy frameworks and toolkits.

The other contribution is to examine Phillips's statement that the focus on price stabilization led to an unnecessary expansion of reserves during the 1920s that allowed commercial banks to use their credit-creation powers to purchase investments which could not be easily liquidated following the 1929 crash. In section five of the third chapter the findings reveal that the increase in member bank

reserves was due to the Federal Reserve lowering its discount rate and increasing its open-market purchases of government securities in 1922, 1924 and 1927 as Phillips had described. Notably, during the period analyzed here, the Federal Reserve's gold stock was above the minimum requirement and gold inflows were sterilized, or offset during this period. This has led many to describe the Federal Reserve's actions as contractionary.⁷ However, this situation did not meaningfully constrain its use of policy instruments to pursue macroeconomic goals. Instead, the use of the discount window, purchases of banker's acceptances, and purchases of government securities in the open market led to higher growth rates in the money supply. By Phillips's account (1937, p. 88-95), much of the growth occurred in time deposits, which paid a higher rate of interest and were a more fungible source of leverage for commercial banks, which allowed for a further expansion of credit.

Phillips focuses on expansionary monetary policy in the 1920s which he believes created a boom that led to the subsequent bust in the 1930s. However, he goes beyond his contemporaries and the accepted wisdom of today and argues that the imbalances that built up in the run-up to the 1929 crash were not due exclusively to excessive stock market speculation, but instead due to a gradual move away from the original moorings of the Federal Reserve Act, which left the Federal Reserve's operational policy adrift. Consequently, the chapter concludes with Phillips's observation that under a fractional reserve banking system, price stabilization policies may be able to keep inflation low, however they may not be effective in preventing a boom to bust cycle if banks try to maximize profits through increased leverage. This period, which he calls an "experiment," allowed for asset inflation precisely because price indexes did not detect the underlying increase in leverage. As a result, Phillips's argument that inflation targeting may not be a sufficient operational target continues to be relevant today. Moreover, Phillips's contention that an economic expansion fueled by excessive bank credit growth would likely be followed by a slower recovery is upheld by a recent study by Jorda, Schularick & Taylor (2013). This final chapter hopefully illustrates to scholars that while monetary

⁷ See for example Friedman & Schwartz (1963) as well as Meltzer (2003), Timberlake (1993), and Wheelock (1992).

policy tools differ across historical episodes, previous lessons may still inform modern circumstances.

Methodology and sources

The original contributions made here consist of the research of archival sources in Chapter one followed by the construction in Chapter two of the first database to assess the evolution of thought regarding bank credit theory as presented in American textbooks.⁸ In Chapter three, original data bring to life Phillips's (1937) original arguments and make his forgotten work much more accessible to scholars of monetary theory during the early years of the Federal Reserve System.

One of the first problems confronted when reading Phillips's (1920) *Bank Credit* is the realization that he does not explain how it is that he came to devise such a unique and transformative theorem. The main works in the literature addressing the evolution of his deposit multiplier theory are Mints (1945), Humphrey (1987) and Timberlake (1988) who each provide only a superficial overview. However, given the astonishing lack of references in Phillips's (1920) *Bank Credit*, it was essential to consult his doctoral dissertation of 1919 located at the archives of the Yale University library to see if there were any additional references that would provide some clues. Unfortunately, after comparing the two works there is very little difference between them to be found. A review of his dissertation only confirmed his acknowledgement in *Bank Credit* (1920) that he was motivated to build a mathematical expression of the expansion of deposits expressed briefly by Davenport (1913) in order to provide clarity. In his dissertation, the two persons to whom Phillips expresses gratitude for the clarification of his theorem are the

⁸ The ability to find out of print textbooks was only possible thanks to archive.org and hathitrust.org. These virtual libraries were enormously helpful in being able to locate, cross-reference and keyword search textbooks, making the task of cataloging over two hundred textbooks for a database less daunting than would have otherwise been the case.

mathematician Frank M. Morgan of Dartmouth and the money and banking expert, Fred R. Fairchild of Yale.

In the hopes of finding more information on the construction of Phillips's theorem I also consulted the archives for Chester A. Phillips at Dartmouth. Phillips was an assistant professor of banking and finance at the college from 1911 to 1917 and then full professor from 1918 to 1920, but his archives revealed no correspondence with either Morgan or Fairchild or anything related to bank credit theory. Similarly, the archives at the University of Iowa, where he was the Dean of the Business College from 1921 to 1950 contained very little useful information which would help to know more about him during the interwar period. As such, the only legacy that Phillips has left behind are the contributions of *Bank Credit* (1920) and *Business and the Banking Cycle* (1937), which deserve their proper recognition in monetary history.

In Chapter two, an original database was constructed to deepen our knowledge of the evolution of bank credit theory – as presented by American textbooks from 1876 to 2017. To understand the evolution of bank credit theory in the United States and when significant intellectual change occurred, all readily available U.S. economics and money and banking textbooks are surveyed.⁹ The study begins with Francis Amasa Walker's *Money* (1876) and ends with Heider's (2017) *Foundations of Macroeconomics* and includes a total of 218 texts over a 140 year period. The survey consists primarily of first editions - when available - to give clarity to the exact time that changes do occur.

The third section of the second chapter, "Textbook Models of Bank Credit Creation" describes the methodology for the construction of the database. In order to assess the changes that have occurred all textbooks are reviewed and scored with regard to how the authors explain whether "loans create deposits" or if banks can only lend out their excess reserves from the preexisting deposits they receive. The textbooks surveyed are exclusively U.S. textbooks which must include a discussion of the

⁹ All popular U.S. textbooks are included. The only texts excluded are the ones that were not readily available. A complete list of the included textbooks is available in the Appendix.

monetary system and include an explanation of how banks provide credit to the public sector which circulates as money. The most common textbooks are principles of economics, macroeconomics and money and banking.¹⁰ The few textbooks that do include a discussion of the monetary system but do not attempt to explain the role of banks and the creation of money are included in the survey as “abstaining” from the discussion of bank credit theory. Most of these are advanced textbooks.

As such, each textbook has been identified as supporting one of four possible approaches:

- (1) Loans create deposits
- (2) Deposits create loans
- (3) Both are true under certain situations
- (4) The author abstains from discussing bank credit creation

A comparison of these textbooks written over the course of a century lays bare the striking influence of just three authors whose analytical frameworks became the most accepted and widely disseminated approaches of their time. This was readily apparent for the textbooks that appeared before the Second World War because these texts frequently cited reference texts at the end of each chapter and gave credit to authors where necessary. Consequently, it became evident that the main influence in American textbooks until 1920 was Macleod and those who imitated his approach, followed by Phillips from 1920 to 1948 (see the Appendix where the texts directly citing Phillips are listed). However, in the post-war period and perhaps due to the influence of Samuelson’s *Economics* (1948) the tendency to cite references in economics textbooks waned until it practically disappeared by the 1960s. This made it harder to explicitly understand who textbook authors were influenced by.

¹⁰ Advanced textbooks such as monetary theory and financial economics are examined but the vast majority do not discuss the mechanics of bank credit creation. The only advanced textbooks that includes this discussion is Freixas & Rochet (1997) *Microeconomics of Banking*. Textbooks that do not include a discussion of how money is created are not included in this survey. Textbooks that do include a discussion of money creation but fail to include the role of commercial banks are considered to “abstain.” See Appendix for details.

However, many of Samuelson's fingerprints can be detected and his influence can be seen in the way economics and money and banking texts began to copy his original 1948 presentation by the late 1960s.

Another interesting discovery in reading through textbooks came from following Samuelson's *Economics* through the first edition in 1948 to the twelfth edition in 1985 to see if there were any changes. Samuelson wrote the first eleven editions (1948-1980) as a sole author, with Peter Temin brought on to collaborate in the tenth edition.¹¹ However, in the twelfth edition of *Economics* (1985), now with his permanent co-author William Nordhaus taking the lead role for changes to the text, the original 1948 reference to monopoly banks creating money was dropped and only the small Lilliputian bank model was shown in the twelfth and subsequent editions. This is important because the findings here show that Samuelson had a unique manner of presenting bank credit theory which was to present both limiting cases of either a large monopoly bank or Lilliputian banking model where banks are incapable of lending anything but excess reserves. But it was not Samuelson himself that dropped the reference to monopoly banks in 1985.

Finally, one last important observation that helped trace the evolution of bank credit theory was the discovery that in Peterson's (1941) *Money and Banking* there exists the first known presentation of the now ubiquitous deposit expansion table. This is the table commonly shown today where excess reserves flow from bank one to bank two and so on, until the multiple expansion of bank deposits has reached its limit. Peterson explains that he had replicated this from the February 1940 *Federal Reserve Bulletin* (1940, p. 100).¹² However, Peterson warns the reader that the

¹¹ In researching the history of *Economics*, it appears that already by the eighth and ninth editions, prior to Peter Temin coming on board for the tenth edition, Samuelson had already grown very weary of the constant updates that were needed to keep his textbook as the number one best seller.

¹² Following Peterson's (1941) reference of the February 1940 *Federal Reserve Bulletin*, I researched more of these reports and found other interesting visual representations which were designed to instruct the lay person in how the banking system worked. Federal Reserve Bulletins were monthly reports sent free of charge to member banks which were designed to aid them understand the Federal Reserve System of which they were a

inherent assumptions behind this characterization make the model “devious” (1941, p. 373) as it assumed other banks in the system were neither expanding or contracting their loans so that the individual bank could not expand its deposits above the amount of its excess reserves. This same table was used by Samuelson (1948) and its popularity spread with the success of *Economics*. Consequently, when Nordhaus removes the mention of monopoly banks in the twelfth edition of *Economics* (1985), the 1980s and 1990s became a period where the most widely disseminated textbooks commonly showed that it was impossible for an individual bank to “create” credit.

In Chapter three data is taken from a number of different sources to illustrate more vividly Phillips’s contention that open market operations in 1922, 1924 and 1927 created systemic leverage in certain sectors of the banking system. The data came from the U.S. Bureau of Labor Statistics, the National Bureau of Economic Research as well as the Saint Louis Federal Reserve Economic Data (FRED) website.¹³ Additional historical sources used were the Federal Reserve’s (1943) annual *Banking and Monetary Statistics* report, Friedman and Schwartz’s (1970) *Monetary Statistics of the United States* and Phillips’s (1937) *Business and the Banking Cycle*.

By presenting this data in a new light it was possible to better illustrate Phillips’s (1937) argument that massive credit expansion provoked by the enormous growth in government securities in the 1917-1919 period led to an unorthodox monetary policy framework in the 1920s that likely contributed to the lack of institutional focus on appropriate credit control strategies that addressed asset inflation as well as consumer inflation. Moreover, the data supports Phillips’s claim that money center banks became more highly leveraged as early as 1922 and maintained this throughout the 1920s. This contrasts with the more accepted theory that it was not until after 1927 that bank credit growth became excessive (see for example Eichengreen 2002).

part of. In many cases these illustrations were specifically planned for bankers themselves to be able to explain to their customers how the banking system provisions credit money.

¹³ The Federal Reserve Economic Data website is <https://fred.stlouisfed.org>

Chapter 1

Chester A. Phillips and the Original Deposit Multiplier: A Missing Link in Monetary Economics

Chapter Abstract

The idea that an individual bank can create money is no longer a marginalized view. But missing in the literature is an explanation for why the formerly mainstream theory of bank credit creation of the early twentieth century was suddenly overturned in the immediate postwar period and replaced by a new paradigm where only the banking system as a whole can create money. At the heart of this story is the widespread adoption in the 1920s of Chester A. Phillips's deposit multiplier and the subsequent modification of his model to fit a changed institutional setting in the late 1940s. In the original equation, individual banks did create money and their expansion potential was a function of both the required reserve ratio and the fraction of loan-created deposits that stayed at the bank. However, the later part of Phillips's formula was discarded in the postwar period and the widespread adoption of a "simple" deposit multiplier completely removed the individual bank's credit creation process from the story. As a result there was a dramatic transformation in American economic thought from individual banks as creators of money to that of mere intermediaries of deposits. A reassessment will show that a different frame of analysis developed in the postwar period which changed the original deposit multiplier to a limiting case and that Phillips's model should be regarded as a missing link between two radically different views on banking and money supply creation in the history of monetary economics.

1.1 Introduction

Phillips's principal contribution to the study of economics consists in his work on the multiple expansion of deposits. Prior to the publication of *Bank Credit* in 1920, the idea that individual banks could create a multiple expansion of loans based on a new deposit was so widespread that Phillips called it the "time-worn theory of bank credit" (1920, p. 130). Mainstream textbooks of his era followed nearly verbatim the work of Henry Dunning Macleod's *The Theory and Practice of Banking*, whose first edition appeared in 1856 and continued to be published into the early 1900s. According to Macleod a commercial bank is "not an office for 'borrowing' and 'lending' money," instead it is a "Manufactory of Credit" (1891: II, p. 594). Phillips agreed that commercial banks were not "money lenders" and when a bank makes a loan, it expands its balance sheet with both assets and liabilities increasing by the same amount. But Phillips disagreed that individual banks were simply small-scale versions of the banking system. Instead, he offered a more pragmatic conceptualization where banks were non-homogenous strategic agents in competition with others which causes each individual bank to lend either a little more or a little less than the new deposit it receives. Afterwards, it is the bank's inability to retain its newly created deposits that results in a multiple expansion of loans throughout the banking system.

Phillips showed that under competition for scarce reserves - which he accepts are supplied exogenously by the monetary authorities - an individual bank's power to create money is limited not only by its reserve requirement but also by the ability to retain its newly created loans at the bank and attract new deposits. He suggests that in the unlikely event that a bank did not lose excess reserves from borrowers redeeming bank credit for hard cash or writing checks that were cashed at competing banks, then the expanding bank could create loans at a multiple of its cash deposits just like the banking system as a whole. This was the extreme monopoly bank version espoused by Macleod's followers and Phillips (1920, p.74) does concede to the argument of his contemporaries that if all banks are expanding

credit *at the same time* while the central bank adds reserves to the banking system then an individual bank could also create credit at a multiple of its cash deposits without suffering a net loss of reserves. However, he thought that this “old view” of bank credit creation with no net loss of reserves to competitors was unrealistic and not backed by empirical evidence.

Phillips’s deposit multiplier formula therefore had two interrelated parts to estimate the lending potential of any individual bank. For a bank receiving a new cash deposit the total loan that could be made was a function of *both* the required reserve ratio and the fraction of loan-created deposits that stayed or returned to the bank. The loan-created deposits in Phillips’s original equation represent a return-of-reserves coefficient and varied between one and zero. This allowed for two limiting cases where individual banks resembled single bank monopolists, when the coefficient equals one (no loss of reserves), or the equally extreme Lilliputian bank model where it equals zero and individual banks lose all their excess reserves. The banking system has a coefficient equal to one - regardless of the individual bank’s position - and creates total loans equal to the reciprocal of its reserve ratio. Phillips then showed that the summation of each individual bank’s deposit creation (whether using the monopoly or Lilliputian bank model) resulted in the same total deposit expansion for the system as a whole.

The structure of the paper is as follows. Section 2 provides a brief biographical summary of Chester A. Phillips and his career at the University of Iowa. Section 3 then examines the construction of Phillips’s bank credit multiplier and how it was materially different than what came before it. Section 4 discusses the rise and fall of Phillips’s equation and what factors were most likely responsible to the changing view on credit creation by individual banks in the postwar period. Section 5 concludes the chapter.

1.2 Chester A. Phillips

Chester Arthur Phillips (1882-1976) was born on a farm in Scipio Township, Indiana on July 17, 1882. He was the son of a minister, attended public schools and graduated in 1904 from Central College, a Christian institution in Huntington, Indiana. He worked one year as a high-school principal in Weston, Ohio from 1904-05 and attended summer school at Yale in 1905 before returning to Central College for two years in 1905-07 to be the chair of the English and History department. In 1907, at the age of twenty-five, he moved east with his wife, five year-old daughter, and two year-old son to Connecticut where he attended Yale and received his undergraduate degree in 1908. While completing his master's degree at Yale he worked his way through school as an assistant professor of economics from 1909-10 and then moved a few hours away to New Hampshire where he was an assistant professor of banking and finance at Dartmouth College from 1911 to 1917, and then full professor from 1918 to 1920. While at Dartmouth and completing his doctoral thesis at Yale, he edited his first book, *Readings in Money and Banking* (1916) and also reviewed five books on money and banking for journal publications between 1914 and 1920.

In 1919 he finished his doctoral dissertation *A Study in Bank Credit*¹⁴ on the expansion of bank credit and published a nearly identical version as a textbook in 1920. However, neither version provide an historical account of bank credit theory.¹⁵ In fact, Phillips (1919, p. 31) tells the reader he will not give, "in detail discussion of the historical development of the treatment of the theory of banking theory" and

¹⁴ A copy of this unpublished doctoral dissertation (Phillips 1919) can only be found at the archives section of the Yale University Library.

¹⁵ Humphrey (1987, pp. 5-8) does give a helpful account of the economists who advanced the evolution of the deposit multiplier. He cites James Pennington (1777-1862) as the first to trace the initial expansion process of bank deposits as money, followed by Robert Torrens (1780-1864) who outlined the lending, redeposit, and multiplier aspects of bank credit creation. Thomas Joplin (1790-1847) showed bankers' desired reserve ratios affected total deposit creation and Alfred Marshall (1842-1924) added the mathematical statement for the summation of a geometric series. Herbert Joseph Davenport (1861-1931) made the distinction between the expansion power of a single monopoly bank and a small competitive bank in a multibank system. Finally, Phillips (1920) tied it all together in one equation.

this sentence is subsequently dropped in the 1920 publication which further illustrates that his work focuses more on the nuts-and-bolts of bank credit and not the theory. The only person he does compliment in both versions is Herbert Joseph Davenport (1913), whose work *Economics of Enterprise*, according to Phillips, was the “exception” to an otherwise confusing array of banking texts. Phillips cites Davenport for correctly pointing out the difference between an individual isolated bank and a competitive bank within a larger banking system. Yet, Phillips says Davenport’s analysis gives only a “fragmentary” view of the exposition on the multiple expansion of bank credit for which Phillips is most widely known.¹⁶

There are very few and minor differences between Phillips’s dissertation and the version published a year later and the dissertation unfortunately does not give any better indication on how he arrived at his novel theorem.¹⁷ One of the only clues comes from the Preface, which are identical in both versions except for the concluding paragraph where he thanks those who gave helpful ideas. In the 1920 publication he writes, “For invaluable suggestions I am grateful to Professors Ray B. Westerfield, Fred R. Fairchild and Irving Fisher, of Yale.”¹⁸ However, in the Preface to the 1919 dissertation he also thanks the professor of mathematics, Frank M. Morgan of Dartmouth, (where Phillips was also a professor) for “excellent suggestions at points involving mathematics.” As well, he says Fairchild “has made particularly valuable suggestions in connection with Chapter III” which he did not mention in the 1920 version. Considering that Chapter III, “The Philosophy of Bank Credit” is the only section where mathematical equations are involved, and for what Phillips is most remembered, then it would appear that Phillips clearly built upon the ideas of Davenport with Morgan and Fairchild offering clarifying thoughts.

¹⁶ See Section 1.3 for a more detailed analysis of Davenport’s influence on Phillips.

¹⁷ For example there are no discernible differences in the detailed footnotes between versions and Phillips only replaces the bibliography in the dissertation for an index in the 1920 version. The most notable change is that the 1920 version is presented as a textbook and provides a “Foreword to Teachers” as well as practice questions for instructors in the Appendix.

¹⁸ Westerfield and Fairchild were experts in money and banking at Yale and Westerfield’s (1921) five volume work *Banking Principles and Practice* was expressly designed to “give a comprehensive exposition of the theory and practice of commercial banking in the United States” (1921, p. v).

Phillips also thanks Irving Fisher, who perhaps also had a great influence on his research considering Fisher's eminent reputation as America's leading monetary economist following his revival of the "old" quantity theory of money in *Purchasing Power of Money* (1911) where he acknowledges the impact of bank credit on the price level - something which many economists of his time were hesitant to acknowledge (Dimand 1997). Fisher was a pioneer who made original contributions across a number of areas including capital theory, monetary theory, as well as financial economics, and his graduate students often applied mathematics to the study of money, prices and the financial markets.¹⁹ Phillips was no exception and the mathematical exposition of the expansion of bank deposits was a foundational improvement from the mostly anecdotal and often misleading discussions of bank credit creation of his era.

Phillips was widely cited²⁰ in the interwar period for his examination of the process of bank credit creation and could have stayed at Dartmouth, where he had received a raise in 1919 to \$3,600 a year (approximately \$57,000 in 2020 dollars) and a promotion to oversee the hiring for the economics department. However, in 1920, President Walter Jessup of the University of Iowa invested considerable effort in recruiting Phillips to be part of the College of Commerce which would open that following year. Jessup had convinced the university to increase salaries to be competitive with the top universities because he wanted to hire the best and the brightest to teach business, finance and economics at Iowa. He had already hired Frank Knight in 1918, who's dissertation in 1916 under Allyn Abbott Young²¹ at Cornell had won acclaim in 1917 and would be the basis for his widely-read *Risk, Uncertainty, and Profit* (1921). Phillips, now a well-known expert in money and banking, and former student of Irving Fisher, was regarded as the school's new crown jewel. He joined Knight at Iowa in 1920 where he taught three classes of his

¹⁹ See Dimand (2007) for a discussion of Irving Fisher and his students.

²⁰ Some of the more celebrated economists to cite Phillips (1920) in the interwar period for developing the deposit multiplier formula are J. M. Keynes (1930, pp. 24-25), James Harvey Rogers (1932, p. 3), Irving Fisher (1932, pp. 2-3), James W. Angell & Karel F. Ficek (1933, p. 1), F. A. Hayek (1933, pp. 153-172) and Fritz Machlup (1940, p. 240) .

²¹ Young was one of the originators of modern endogenous growth theory (See Merhling & Sandilands, 2002).

popular money and banking course each semester. Then, in a sudden turn of events, Phillips was promoted to be the first Dean of the College of Commerce in 1921. He subsequently hired two graduate students, Henry Simons and Wesley Mitchell, to fill the roster at Iowa, where they soon came under the influence of Frank Knight.

When Knight returned to Chicago in 1927, Simons and Mitchell followed. These three would lay the foundation for what would become known as the “Old Chicago” school.²² After they left, Knight returned occasionally to Iowa to teach summer classes and kept in touch with several of his former students. Phillips also taught a few summer sessions on money and banking at Chicago, and in 1932, he was one of only a dozen non-Chicago economists (including Irving Fisher) to participate in drafting and signing Simon’s six-page memorandum²³ on banking and monetary reforms which later became known as the Chicago Plan. The “manifesto,” as it was known at the time, called for the Federal Reserve to have greater control over the money supply as well as a 100% reserve requirement to end fractional reserve banking.

Phillips’s ties with the “Old Chicago” school and Irving Fisher show his ongoing participation in the idea of “credit control” to bring about monetary order and a stabilization of the price level.²⁴ Phillips elaborated his views on the role of bank credit in the economy in his third and final book, *Banking and the Business Cycle: A Study of the Great Depression in the United States* (1937), which was co-authored by

²² The “Old Chicago” school consisted of Frank Knight, Henry Simons, Wesley Mitchell, Lloyd Mints, Paul Douglas, Jacob Viner and Aaron Director who taught Nobel laureates Milton Friedman, George Stigler and James Buchanan.

²³ Known as the *Harris Manifesto*, the memorandum was signed by twelve Chicago economists, most notably: Aaron Director, Frank Knight, Lloyd Mints, Henry Schultz, and Jacob Viner. The most well-known non-Chicago economists were James W. Angell (Columbia), Irving Fisher (Yale), Chester A. Phillips (Iowa) and John H. Williams (Harvard) who supervised Lauchlin Currie’s Ph.D thesis, which had some ideas in common with the *Manifesto* (See Laidler & Sandilands 2010). Fisher (1935) proposed a similar reform in his book *100% Money*, which would abolish the fractional reserve system of bank credit creation and all bank deposits would be backed by 100% reserves.

²⁴ See Allen (1993) for a discussion of Irving Fisher and the 100 percent reserve proposal. Also see Dimand & Betancourt (2012) and Des Roches & Betancourt (2013) for discussion about Fisher and the American quantity theorists.

Richard W. Nelson, a former student and close friend of Knight while at Iowa as well as Thomas F. McManus, who did his doctoral thesis *Banking Operations in the United States in Relation to the Great Depression* (1934) under Phillips. In *Banking and the Business Cycle*, Phillips and his co-authors (herein simply referred to as Phillips) argued that the central bank was primarily responsible for the Great Depression because of their failure to keep reserves adequately scarce in the 1920s, and therefore, they failed to keep bank credit contained. Phillips's analysis lays in bibliographic obscurity despite anticipating some of the same monetary arguments from Friedman and Schwartz (1963) about the role the Federal Reserve played in the Great Depression.²⁵

During his long career, Phillips was a professor of economics and banking, an administrator, banker and Federal Reserve economist but the historical record has forgotten his contributions as a monetary theorist. Nevertheless, the history of monetary thought is replete with pragmatists describing in detail the banking practices of their time. *Bank Credit* (1920) fits that description and is presented as a textbook for those wanting to learn the principles of bank credit that Phillips first touched upon in *Readings in Money and Banking* (1916) and expanded upon with *Banking and the Business Cycle* (1937). Phillips, like his contemporaries in the interwar period, understood the process of bank credit creation and was very concerned about the ability of individual banks and the banking system as a whole creating a boom to bust cycle. However, this dynamic view of banks acting as non-homogenous strategic agents would be supplanted by a simplified model in the postwar monetary orthodoxy which together with the spread of modern macroeconomics, focused instead on general economic equilibrium models that relied on looking at the banking system as a whole and not independent agents. As a result, there was a dramatic transformation in American economic thought from individual banks as creators of money to that of mere intermediaries of deposits.

²⁵ Friedman and Schwartz's (1963) historical analysis focuses on exogenous monetary contractions as the cause of output and price contraction. In contrast, Phillips (1937) blamed the Federal Reserve for not containing bank credit in the 1920s which caused the boom and advocated for more expansionary policy in 1932 to offset the bust.

1.3 Phillips and the Bank Credit Multiplier

The purpose of the Federal Reserve Act of 1913 was to establish an elastic central bank currency in order to respond effectively to stresses in the banking system. Once the United States had a central bank, the debate then turned to the issue of how much credit could an individual bank create. That question was not adequately resolved until Phillips explained that banks do not have a license to print money. Instead, they earn income on the bills they discount and the loans they make. Banks can do this by either funding directly from its cash reserves or by expanding their balance sheet. But full reserve banking is not really banking, nor are banks simple “money lenders,” so they will choose the latter. Banks will expand their balance sheets and thereby take on liquidity risk in pursuit of earning a profit. The limits to an individual bank’s expansion will be either a little more or a little less than the new deposits it received (Phillips 1920, p. 34), depending on its ability to retain the newly created loans at the bank as well as attract new deposits to maintain legal reserve requirements.

Phillips endeavors to explain to his readers the “riddle of banking,” which is: how can the banking system multiply deposits, when individual banks seemingly cannot? Chick (1995) thinks that Phillips had perhaps discovered the first fallacy of composition. For instance, with a reserve ratio of twenty percent, how can the individual bank lend only eighty cents on the dollar if the banking system can create five dollars of deposit money per dollar of new reserves? Timberlake (1988) and Humphrey (1987), who have written the most authoritative papers on Phillips (1920) and the historical origins of the deposit multiplier respectively, claim that bankers of that era insisted they did not “create” money. On the other hand, many economists, as they came to understand that bank deposits were the same as promissory banknotes, argued the opposite extreme - that each bank was a small version of the banking system. In his book *Bank Credit*, Phillips explains how both views were wrong.

In his first chapter Phillips shows how the individual bank will make a loan by first creating a deposit (1920, p. 16). Afterwards, within a competitive banking system, it will eventually lose cash and reserves to other banks through the clearinghouse (p. 21). This happens when borrowers withdraw deposits for cash or write checks from their loan proceeds and those checks are deposited at a competitor bank. Phillips then explains that the newly received deposit at the competitor bank serves as the deposit against which that bank can now expand its loans. The process sees the entire banking system losing and receiving reserves and expanding together until the total deposit creation is a multiple of the total cash reserves provided by the monetary authorities (p. 38). These three steps (loan, drain, reflux) solve the riddle of banking whereby the banking system's ability to multiply loans comes through a series of secondary deposits at independent banks.

Phillips then proceeds in the second chapter to explain that the operations of a commercial bank are "so radically different from those of the money lender" (p. 13) that it is necessary from the outset to explain how banking extends loans in excess of capital or cash holdings. The money lender type of transaction temporarily transfers ownership of the money from one party to the other. In this sense, the money lender is merely an intermediary transferring purchasing power from one party to the next. On the other hand, the commercial bank has a balance sheet with assets and liabilities where loans appear as deposits and form part of the bank's liabilities owed to its customers. In a commercial bank, assets and liabilities grow together. The crucial difference is that when the commercial bank makes a loan, it expands its balance sheet with both assets and liabilities increasing by the same amount (p. 14). The bank therefore creates credit by adding to the borrower's deposit account the amount of the loan which shows as an addition to deposits under the bank's liabilities. Since the loan is also an asset of the bank, then due to double entry bookkeeping it will appear under the asset side of the balance sheet under loans.

To illustrate this process Phillips shows a newly formed commercial bank with \$100,000 in capital and \$50,000 in cash deposits from the shareholders. Following another \$25,000 in real "primary" deposits from customers (not "secondary")

deposits created from loan creation), both liabilities and assets (cash) have increased to a total of \$175,000. For clearing purposes the bank will also deposit \$45,000 of its cash at a major bank keeping total assets unchanged at \$175,000 (p. 16).

Assets	Liabilities
Cash \$130,000	Capital \$100,000
Due from Other Banks.. 45,000	Deposits 75,000
<u> </u>	<u> </u>
\$175,000	\$175,000

Next the bank makes a loan of \$20,000 which increases *both* assets and liabilities by that amount to a total of \$195,000 with the cash on hand *unchanged* at \$130,000.²⁶

Assets	Liabilities
Loans and Discounts . . . \$20,000	Capital \$100,000
Due from Other Banks . . 45,000	Undivided Profits 300
Cash 130,000	Deposits 94,700
<u> </u>	<u> </u>
\$195,000	\$195,000

It is true that banks could choose to fund the loan directly from its cash reserves (like a money lender) but full reserve banking is not really banking. Instead, banks will expand their balance sheets and thereby take on liquidity risk in pursuit of earning a

²⁶ The bank will deduct a fee (or 'discount' in the lingo of that era) for the credit transaction. The profit on this loan, or the 'discount,' amounts to \$300 which is booked immediately as an undivided profit to the owners and taken directly from the \$20,000 loan proceeds resulting in a net 'secondary' deposit of \$19,700 added to the liabilities. In addition, the bank would likely put some portion of its real cash reserves at a money center bank (for payment and clearing purposes) and this would appear as an asset to the bank.

profit. As a result, the bank sees an increase of “secondary” deposits due to its loan creation and this is added to its “primary” deposits.²⁷ Then, through another series of normal bank transactions (overdrafts, mortgages, purchase of national bank notes,²⁸ stock purchases, etc.) Phillips shows assets and liabilities increase to approximately \$242,000 while the cash position falls to just below \$90,000. He then states that this bank is barely two times leveraged and should want to earn a better profit for its shareholders (p. 20):

A glance at the statement shows that cash is equal to more than 50 per cent of the demand liabilities. A bank management eager to make a profitable record for its shareholders will be prompted to lend until demand liabilities, of which individual deposits are the main item, are from four to twenty times the cash or reserve.

Following a subsequent round of loans and no new “primary” customer deposits, Phillips’s hypothetical bank creates a total of approximately \$540,000 in “secondary” loans and discounts while its reserves (cash and deposits held with other banks for clearing), decline to under three percent of its total demand deposit liabilities. In Phillips’s demonstration a bank is not initially reliant upon deposits to make loans and the individual bank’s leverage would be a result of both loan creation and a loss of reserves. Phillips explains, “The liberal loan policy of an individual bank is opposed, then, in the process of its execution, by a double check: as loans are extended (a) cash tends to diminish; and (b) deposit liabilities arising from loans tend to swell, - the prelude to a further loss of cash” (p. 21). Phillips adds that the loss of cash and clearing deposits are an *ex post* occurrence: “The immediate contraction of cash is,

²⁷ In his introduction, Phillips states that “borrowers extend credit to banks” (p. 2) by making a deposit, whether in cash or by check. A customer does not have an asset held for safe keeping in a bank. Instead the customer has increased the bank’s liabilities (and its assets) by the same amount. Therefore, since primary deposits are considered unsecured loans to the bank, primary and secondary deposits are co-mingled under the single line item of deposits.

²⁸ National bank notes circulated alongside Federal Reserve notes until 1935. In fact, in 1920, a customer could pay with gold coins, national bank notes, silver or Treasury certificates, Federal Reserve notes, or a bank check.

however, almost negligibly small” (p. 20). Banks make loans first and will continue to expand the balance sheet until “the ratio of reserve to deposit liabilities becomes what the bank management regards as normal or desirable” (p. 21). Phillips’s treatment of the bank loan process is much more like the position of loans creating deposits²⁹ than how it is presented in textbooks today where only deposits can create loans.³⁰

In Phillips’s demonstration, commercial banks are first and foremost the creators of money and will expand loans to a level where they can manage their liabilities against the inherent liquidity constraint of a mixed cash-credit banking system. It is only after they have reached the natural limits of expansion within a competitive banking system that they are forced to reconcile new loan expansion with their ability to find and retain reserves. Phillips thus begins *Bank Credit* by first illustrating the mechanics of the banking principle and then examining that process within the explicit constraint of reserve scarcity imposed by monetary authorities. He writes (1920, p. xiv) that, “The familiar texts of Dunbar, White, Holdsworth, Scott and Moulton contain suitable introductory or collateral material,” however, the purpose of [the theory presented here] is primarily not to expose the fallacy of the false, but to demonstrate, clarify, and enforce the truth of the true.” Singling out Moulton (1917) he asks, “what is the fundamental error?” (1920, p.93). Phillips answers by saying:

²⁹ See Moore (1988) or Wray (1998) for an explanation of endogenous money supply theory where central banks target interest rates and must therefore provide reserves on demand if they wish to control the Bank rate. In the endogenous story, individual banks interact with the public and create purchasing power through deposit loans and the monetary authorities accommodate the increase in economic activity by adding reserves. Phillips also believes that banks make loans which creates deposits but they must then compete for scarce reserves which he assumes are provided exogenously by the monetary authorities. Phillips’s deposit multiplier therefore differs slightly from the endogenous money supply approach, but the operational policy of the monetary authorities was not the main premise of *Bank Credit*. More importantly, Phillips’s deposit multiplier differs from the traditional postwar view where only the banking system as a whole creates money from a change in exogenous reserves.

³⁰ See Samuelson’s *Economics* (1948, 1995) which established this precedent which is still followed today in popular introductory and macroeconomic textbooks in the United States, such as Krugman (2008), Mankiw (2014) etc.

In the first place, he assumes that an individual bank can increase its loans by several times—five times—the amount of its surplus reserve without losing cash to other banks in the system,—a mistaken contention that is traceable to his failure to distinguish carefully between the operations of an isolated bank, that would not lose cash as a result of loan expansion, and the operations of a bank that is only one of many units in a banking system, where loan expansion tends to result in a loss of cash by the bank whose loans are expanding. This lack of clearness of distinction between individual and collective banking lies at the root of the fallacy that permeates his discussion (Phillips 1920, p. 93).

Phillips builds upon this older view of bank credit creation first popularized by Macleod (1891) but then adds that once an individual bank becomes leveraged similar to the banking system, then the further expansion of loans is a “prelude to loss of cash” (1920, p. 20). Phillips compares his approach to that of bank lending in Horace White’s (1918) *Money and Banking*, where he asks: “Would not unfavorable clearing house balances preclude the possibility of the bank considered lending \$200,000 on the basis of \$60,000 in money?” (p. 33). In contrast to his view of adverse clearing balances, Phillips notes the prevailing misconception by authors such as White, when he writes:

Observing that an individual bank, as well as banks taken collectively, commonly has loans equal to several times the reserve, the theorist has reasoned that a given addition to the reserves of an individual bank would place the receiving institution in a position to make a manifold increase in its own loans (p. 33).

To Phillips, the process of bank credit creation was reflexive. The expanding bank loses some of its reserves once its newly created credit is cashed outside the bank. This forms new primary deposits for the banks receiving them who then write new loans but also lose reserves to other banks, including the original expanding bank.

Once fully leveraged, an individual bank that creates a loan in excess of its required reserves will soon need to obtain additional money in the form of new primary deposits, an interbank loan or a loan from the central bank's discount window. Phillips's presentation differs from textbook authors of his era who implied that although banks would suffer adverse clearing balances, the money circulating in the system would return just in time so that there was no net loss of reserves and the individual bank would appear similar to the banking system at large. By improving upon this somewhat simplistic view of bank deposit creation, Phillips had shown that credit both ebbs and flows and that the central concern in a mixed cash-credit banking system is liquidity to match the flows of money and credit - not the ability of individual banks to create new money from deposits. In this regard Phillips credits Davenport (1913) who first illustrated this fallacy when discussing the difference between an isolated bank versus the banking system as a whole:

Only in the case the bank in question were the only bank in a community, and in the degree that the community were isolated in business relations from other communities, would it be true that the credit granted by the bank which received the reserves could be very greatly extended. But it is still true that the same total amount of extension would be possible, only that this would be possible not, in the larger part, by the bank first obtaining the reserves, but mostly by other banks. The granting of credit by the one bank means the transfer of reserves to other banks. Each bank, as it, in turn, lends to its customers, is losing reserves to other banks, but is, in turn, gaining reserves at the expense of the other banks - if at the same time the banking activity of these other banks is maintained. Here, as elsewhere, the economic process appears one way as an aggregate and another way as viewed in its competitive and separatist aspects.

(Davenport 1913, p.287)

Phillips not only advanced Davenport's observation, but banking theory in general when he also illustrated that under the newly elastic Federal Reserve money individual banks would still be subject to the discipline of the currency principle if the

central bank maintained strict control of the amount of reserves in the system. Having thus far upheld the classic banking view, he now had to reconcile specifically how the banking system could still multiply deposits, if many individual banks also faced inherent liquidity constraints that prevented them from freely multiplying new deposits. It is here, in “The Philosophy of Bank Credit,” that Phillips unravels the banking paradox by explaining how a bank’s inability to retain its newly created deposits results in a multiple expansion of loans throughout the banking system.

The third chapter, “The Philosophy of Bank Credit,” is where Phillips solves the “riddle of banking” (p. 34) and introduces the most comprehensive version of the reserve to base-money multiplier for which he is so often cited.³¹ To illustrate the mechanics of the reserve to deposit ratio, Phillips merges all banks in the country into one hypothetical “amalgamated bank, *i.e.*, the banking system” (p.39) which would not lose any reserves as a result of its loan expansion and where its k-factor of one (1) would be similar to a monopoly bank. From here he attempts to show “how great an addition an individual bank could make to its loans and discounts as a result of the net addition of a given amount of primary deposits” (p. 59).

Phillips shows that for a bank with a reserve to deposit ratio (r) and an additional cash deposit of (c), then loan expansion (x) will be determined by $x = c (1-r)$. He further develops the model by showing that a percentage of loans (k) will be withdrawn and returned to the same bank so that once $(1-k)$ are withdrawn and (kr) returned, then the loan expansion formula (p. 55) for a single bank is:

$$x = \frac{c(1-r)}{kr + 1 - k}$$

³¹ Keynes (1930), Hayek (1933) and Fisher (1932) credit Phillips for developing the deposit multiplier. Afterwards, Crick (1927), Rogers (1933) and Angell & Ficek (1933) add a refinement of the fundamental ideas presented by Phillips (1920) whereby the public would hold lawful money outside of the banking system and thereby act to limit deposit expansion itself. Brunner & Meltzer (1964) call this the “Phillips Tradition” which was “a series of papers in the twenties and early thirties developed the original statement by Phillips” (1964, p. 5).

For an individual bank, its capacity to expand loans given a new deposit is determined by both its reserve ratio and its “derivative deposit-loan ratio” or k-factor. Phillips writes, “The application of the formula to any given bank is simple. Take a deposited cash accretion of \$1,000 in the case of a bank having a reserve-deposits ratio of 10 per cent and a derivative deposit-loan ratio of 20 per cent” (p. 67). Under these conditions:

$$c = \$1,000 \quad r = 0.10 \quad \text{and} \quad k = 0.20$$

Phillips continues, “Making substitutions in the formula, in order to ascertain the loan expansion practicable on the basis of the new deposited cash amounting to \$1,000,” (p. 67) we have new loans (x) as:

$$x = \frac{1000(1 - 0.10)}{0.02 + 1 - 0.20} = \frac{900}{0.82} \quad \text{or} \quad \$1097.56$$

Because the bank did not lose one hundred percent of the new loan, then it still has some of those loan proceeds at the bank, registered as deposits, which in turn does not draw down its reserves. The inclusion of the k-factor means that unless the bank is a Lilliputian country bank that loses one hundred percent of its new loans, then the total expansion upon a receipt of new primary deposits will always be slightly *more* than the new reserves received. As the k-factor for derivative deposits increases from zero, so does the individual bank’s power to expand credit beyond its initial receipt of new reserves. For instance, with a k-factor of 0.8, resembling a bank with greater market power where checks drawn on that bank are likely redeposited at the same bank, then there would be little loss of cash by that bank and it could expand similar to the banking system as a whole. Making these changes where:

$$c = \$1,000 \quad r = 0.10 \quad \text{and } k = 0.80$$

$$x = \frac{1000(1 - 0.10)}{0.08 + 1 - 0.80} = \frac{900}{0.28} \quad \text{or } \$3,214$$

On the other hand, a bank that loses one hundred percent of its new loan creation will have no derivative deposits remaining and suffer the maximum loss of deposits after setting aside the required reserve. Here, in what is representative of the postwar limiting case, the bank receives \$1,000, sets aside \$100 and creates a loan of \$900 which is then completely lost to other banks in the system, never to return:

$$c = \$1,000 \quad r = 0.10 \quad \text{and } k = 0$$

$$x = \frac{1000(1 - 0.10)}{0 + 1 - 0} = \frac{900}{1} \quad \text{or } \$900$$

In comparison, neither a pure monopoly bank nor the banking system as a whole will lose any reserves as the k-factor of one (1) ensures the maximum expansion given a new addition of primary reserves:

$$c = \$1,000 \quad r = 0.10 \quad \text{and } k = 1$$

$$x = \frac{1000(1 - 0.10)}{0.1 + 1 - 1} = \frac{900}{0.1} \quad \text{or } \$9,000$$

To help clarify the shift in economic thought over the interwar period regarding the power of individual banks to create credit, a side-by-side comparison of three different representative models is shown below in Table 1.1.³²

Retained Reserves (RR); Loans (L); Total Deposits (TD)									
	Monopoly Bank (k=0.8)			Phillips Bank (k=0.2)			Postwar Bank (k=0)		
	RR	L	TD	RR	L	TD	RR	L	TD
(1)	357	3214	3571	122	1098	1220	100	900	1000
(2)	229	2067	2296	107	964	1071	90	810	900
(3)	147	1328	1475	94	846	940	81	729	810
(4)	95	855	950	83	743	826	72.9	656	729
(5)	61	550	611	72	652	724	65.6	590	656
(6)	39	354	393	64	573	637	59	531	590
(7)	26	228	254	56	503	559	53.1	478	531
(8)	16	148	164	49	441	490	47.8	430	478
(9)	11	96	107	43	387	430	43	387	430
(10)	7	61	68	38	340	378	38.7	348	387
Total	1,000	9,000	10,000	1,000	9,000	10,000	1,000	9,000	10,000

Source: Own elaboration

Here the banks have k-factors of 0.8 for the powerful pre-Phillips monopoly bank, which was the dominant view of individual bank credit creation from 1860 to 1920, then Phillips's bank which has a k-factor of 0.2 and finally the postwar era bank which has a k-factor of zero. Each bank starts with a primary deposit of \$1,000 from which it creates new loans. Phillips concludes that irrespective of the k-factors of

³² Banks create new loans from residual derivative deposits (DD) and total deposits (TD) equal primary plus (DD).

$$\text{Derivative Deposits (DD)} = (1-k) * x$$

$$\text{and Retained Reserves (RR)} = c - (1-k) * x$$

$$\text{and Loans (L)} = \frac{c(1-r)}{kr + 1 - k}$$

$$\text{and Total Deposits (TD)} = RR + L$$

individual banks the “multiplicative importance of reserves” (p. 339) is due to the summation of the series of deposits created across all individual banks within the banking system. For this reason the aggregated total is the same regardless of the individual bank’s market power.

The great achievement of Phillips was to separate out the individual bank from the banking system and look at them individually. The fact that the total deposit expansion is equal to the inverse of the reserve ratio ($1/r$) is well known and not in question. However, Phillips’s point was that this aggregated deposit multiplication can occur from any number of representative banking models. In the 1920s and 1930s, Phillips’s deposit multiplier theory was widely adopted and overturned the “old view” of bank credit creation which only showed one extreme case of banks acting like single bank monopolies. Timberlake (1988) writes that while, “Phillips’s work refuted the popular notion that an individual bank expands deposits by a multiple of new reserves [he also] understood very well that the individual bank is indeed a deposit creator” (1988, p. 306).

The elegance of Phillips’s equation is that it bridges the gap between two seemingly competing views of banks as either simple intermediaries or those that are capable of a multiple expansion of deposits similar to the banking system as a whole. Banks are both intermediaries for the deposits they receive as well as creators of money. Phillips’s interpretation of bank credit creation fit readily into the intellectual frame of the interwar period and in some ways proved to be a bookend to the banking and currency school debates following the abandonment of the gold standard at the outbreak of World War I. However, economists went from holding one extreme view of banking at the start of the interwar period to holding the polar opposite view in the postwar period based upon a selective and somewhat suspect interpretation of Phillips’s original deposit multiplier. In the history of monetary economics, Phillips’s original formula was a brief but causal link between these two radically different perspectives of bank credit creation.

1.4 From Credit Creation to Intermediation

Since the banking system's aggregate credit expansion is the same under a pure monopoly or Lilliputian model, the shortened version of Phillips's formula is still relevant to the explanation of any fractional reserve banking system. But by simplifying the deposit multiplier and removing the return-of-reserves coefficient, only the Lilliputian form remained in the postwar pedagogy and the credit creation story was therefore discarded. Phillips did not uphold this extreme anti-credit view which was popularized in the postwar period because he understood that commercial banks can *a priori* create deposit money. Left unanswered in the literature are the questions: Why did Phillips's novel contribution cease to be used in the original form since the return-of-reserves coefficient could have simply been set to zero and an explanation given to support why banks would lose all of their excess reserves? And if the original model was both technical and teachable, why did only a limiting case survive?

Three main factors led to the postwar modification of Phillips's original model. First, real events during the interwar period altered the institutional background dramatically. In 1920, the Federal Reserve found itself under fire for the dramatic fall in consumer prices following a rapid rise in the discount rate. Consequently, the Federal Reserve changed from interest rate targeting to reserve rationing in an attempt to control the supply of domestic bank credit. This, in addition to the deposit multiplier theory, created the impression that the money supply reacted solely to changes in central bank reserve policy. Then, following the Great Depression, a fall in the demand for credit resulted in banks accumulating excess reserves from 1934-1940. Finally, during the Second World War, instead of making substantial commercial loans and investments, banks became large holders of government bonds which was a marked reversal from the 1920s.

The second factor was that Paul Samuelson's textbook, *Economics: An Introductory Analysis* (1948), explained the process of bank credit expansion within the context of this narrow postwar institutional setting. In *Economics*, he chose to show only the Lilliputian form of deposit creation as a workable model due to what he deemed an appropriate representation of the American banking system at that particular time. Third, Phillips retired in 1950 and his departure meant he did not have the opportunity to challenge the simplified version of his original model which would take hold in the 1960s. As a result, his novel contribution would be lost in the postwar period. These three factors led to a sea change in opinion where banks went from maximizing their creation of bank credit under the constraint of reserve scarcity, to one where banks were mere intermediaries of deposits. As a result, the oversimplification of Phillips's model in the postwar period led to just as much confusion about the process of money creation as that which preceded the publication of *Bank Credit* in 1920.

A survey of fifteen of the most popular textbooks³³ from 1922 to 1938 reveal that Phillips's *Bank Credit* is directly referenced in eight of the fifteen textbooks surveyed with an additional two textbooks using Phillips's line of analysis without citation. The remaining textbooks that discuss bank credit reference White's (1918) view that banks are a "manufacturer of credit" which reinforces the argument that the consensus view in the interwar period in all cases upheld some form of the "banking principle" where individual commercial banks create deposits when making loans. While Phillips's exposition may have been represented in half of the leading textbooks, most authors of that era still preferred verbal explanations over the use of mathematics. As a result, Phillips's original deposit expansion equation appeared in just two of the fifteen textbooks surveyed during the interwar period.³⁴ The

³³ This survey only includes textbook authors who discuss bank credit in the 1920s - 1930s. Authors that discuss bank credit creation and do not cite Phillips are usually from textbooks whose first edition was prior to the publication of *Bank Credit* (1920) or where the author upheld the alternative view of banks as "manufacturers of credit."

³⁴ The two textbooks of the interwar period to reproduce Phillips's original equation are Dewey and Shugrue's *Banking and Credit* (1922, p.287) and William Kiekhoffer's *Economic Principles, Problems and Policies* (1937 p. 316)

remaining authors adopted only selected elements of his analysis with their main focus being that he had overturned the “old view” of a large multiple expansion of deposits and shown that the average individual bank could only create a loan for an amount slightly in excess of the new deposit they received.

In the immediate postwar period, from 1946 to 1950, a subsequent survey of ten of the most popular texts reveals that similar to the interwar period, the majority of the textbooks surveyed still included the essence of Phillips’s findings, where individual banks can expand their balance sheet prior to receiving a new deposit and will be subject to a loss of reserves to competing banks. However, Phillips’s *Bank Credit* is directly referenced only three times³⁵ and in the only textbook that shows his original deposit expansion formula (Boulding, 1948) Phillips is not directly cited.³⁶

The most significant change to the deposit expansion formula is introduced by Paul Samuelson’s *Economics: An Introductory Analysis* (1948), where an individual bank sets aside the required reserve and then lends its excess reserves of which one hundred percent leave the expanding bank, never to return. While Samuelson presents the idea of banking as simple and unexciting, due to their large holdings of government bonds, in another textbook from the same year the author says this is because: “These bonds were purchased mainly with created deposits” (Meyers 1948, p. 354).³⁷ This ongoing representation of banks as the creators of money was still the dominant view in the late 1940s. Nevertheless, even though Phillips was the first to publish algebraic formulas for the deposit expansion potential of banks and the

³⁵ In the immediate postwar period, George Halm’s *Monetary Theory* (1946, pp. 37-58) and Lester Chandler’s *Economics of Money and Banking* (1949, p.111) directly cites Phillips’s *Bank Credit*. The other textbook to cite Phillips is F.W. Taussig’s *Principles of Economics*, who does not mention *Bank Credit* in the third edition of Volume I (1927) but does include a reference to him in the fourth edition of Volume I (1947, p. 434).

³⁶ Kenneth Boulding’s *Economic Analysis* (1948, p. 343) shows individual banks expanding their balance sheet prior to receiving a new deposit and he also shows a modified version of Phillips’s original equation where the coefficient (k) represents a loss of deposit (instead of return of deposit) where total loans (L) = $[C(1-r)] / [r + k(1-r)]$. So whereas in Phillips’s hypothetical bank a loss of 80 percent gave a k-factor of 0.20, in Boulding’s example k would equal 0.80.

³⁷ That banks purchased government securities with bank credit lies at the heart of Phillips’s (1937) argument in *Banking and the Business Cycle*.

banking system, it would be Samuelson's "elementary" algebra, not Phillips's, that conquered the economics profession in the postwar period.³⁸

In the largest-selling economics textbook of all time, Samuelson begins his discussion of the banking system and deposit creation by referencing the uniqueness of commercial banks for being the only organizations able to provide bank money (Samuelson 1948, p.310), but he notes that except for this function, "the modern American commercial bank seemed at the war's end to be gradually becoming hardly more than a holder of government bonds" (p. 312). He writes, "Whereas loans formed more than half of bank assets in the 1920's, by the late 1940's they were down to only about a sixth" and "By the beginning of 1947, bank holdings of government securities were more than three times as great as their loans, and interest on these securities covered practically all their running expenses" (ibid).

The low demand for private credit and the wartime policy of pegging Treasury rates (until 1951) to support the government bond market (see Hetzel and Leach 2001) had dramatically shifted the postwar institutional background relative to how banks operated in the 1920s. Moreover, Samuelson writes that "Unlike England or Canada where a few large banks with hundreds of branches are dominant, the United States has tended to rely upon many independent, relatively small, localized units" (1948 p. 311). As a result, "The ordinary commercial bank is a relatively simple and unexciting business concern" (p. 313).

In the section titled "The Creation of Bank Deposits" he says, "one of the most interesting aspects of money and credit" is the process called the "multiple expansion of bank deposits" (p. 323). This process "is little understood" and "according to false explanations, the managers of an ordinary bank are able, by some use of their fountain pens, to lend several dollars for each dollar left on deposit with them" (p. 324). But, "as every banker knows ... any money making a loan will soon leave his bank" (ibid). Samuelson then asks rhetorically, if a bank has a reserve

³⁸ Samuelson's equation for the expansion of bank deposits with a required reserve ratio of (x) is $1 / (1-x)$.

requirement of twenty percent, can it expand its loans and investments from an initial \$1,000 deposit by \$4,000? In direct opposition to Phillips who says a bank would first expand loans until it was similar to the banking system as a whole and then worry about reserve drains, Samuelson says this is an impossible situation for a *single small bank* because if the “bank is only one of many” then “only a fraction of the sums withdrawn will ever come back to the original bank in another customer’s deposit” (p. 325). Having implicitly set the “return-of-reserves” coefficient to zero he concludes, “as far as this bank is concerned, we are through. There is nothing more it can do until the public decides to bring in some more money on deposit” (p. 326).

Samuelson goes on to show the process of small individual banks setting aside the required reserve (in the first edition it is twenty percent), then writing a loan for the exact amount of the excess reserves and subsequently losing one hundred percent of that loan to the next bank, which continues the process until the aggregate of bank money created is five times the original deposit.³⁹ After modifying Phillips’s equation he concludes by addressing the prospect of a “single ‘monopoly bank’ (with many branches), serving the whole nation” (p. 330). Here the monopoly bank (p. 330):

...would be able to do at once what we have said each small bank cannot do. It could write checks freely to pay for securities or loans, knowing that the people to whom are paid would always deposit their proceeds in the one and only monopoly bank. In countries like England, where there is a “big 5” group of branch banks, or like Canada where there are a few large banks, or in states like California where there are a few great multiple-branch banks - in such cases a bank may be able to lend out more than its legal excess reserves, knowing that part of the money will come back to itself in later generations. However, these so-called “derivative” or “self-returning” deposits are not important for the United States, and calling attention to them often only confuses the beginning student.

³⁹ Samuelson shows the “elementary algebra” for the summation series with a excess reserve (x) being 80% where: $\$1,000 = (1 / (1-x)) = \$1,000 (1/0.20) = \$1,000 (5) = \$5,000$

While Samuelson does not attribute the “multiple expansion of bank deposits” to anyone, Phillips’s paternity is clearly visible. Samuelson says, “The banking system as a whole can do what each small bank cannot do” (p. 324) which is almost verbatim Phillips’s celebrated remark, “What is true for the banking system as an aggregate is not true for an individual bank” (Phillips, 1920, p. 40). As well, the use of the terms “derivative” deposits, the “return-of-deposits” coefficient and the explanation of small country banks versus monopoly banks is clearly from Phillips, or others,⁴⁰ who followed the analysis of *Bank Credit*. However, Samuelson’s discussion of the powerless “single small bank” versus the single monopoly bank’s ability to lend out more than its legal excess reserves, is countervailed by his exclusion of Phillips’s k-factor (here called “self-returning” or “return-of-deposits”) which solves for both situations. Samuelson's claim that including “derivative” deposits would confuse the student is belied by his subsequent explanation of leakages⁴¹ of bank money into cash, where he adds some qualifications to the explanation of bank deposit creation.⁴² It is not entirely clear why Samuelson thinks the student can calculate total loan expansion as a function of required reserves *and* reserve leakages, but cannot calculate the “return-of-reserves” coefficient using the same “elementary algebra.”

⁴⁰ Samuelson studied under many notable economists who were all very familiar with Phillips’s *Bank Credit* (1920). Samuelson entered the University of Chicago in 1932 at the age of sixteen, received his Ph.D from Harvard and left for MIT in 1940. At Chicago he studied under Frank Knight, Henry Simons, Lloyd Mints and others who drafted the “Chicago Plan” monetary reform. At Harvard were Frank Taussig and Joseph Schumpeter who both wrote about bank credit and Taussig (1947) even cites Phillips (1920). At MIT, *Banking and Credit* (1922) was the last book written by Davis Dewey, the Chairman of MIT’s economics department who retired in 1940. Dewey, known for his empirical work on economic history, references Phillips’s *Bank Credit* (1920) over fifty times.

⁴¹ Some textbook authors in the 1930s included reference to cash drains first mentioned by Phillips (1920, p.39) and then introduced by Crick (1927), as well as Rogers (1933) and Angell & Ficek (1933) whereby the public would hold lawful money outside of the banking system and thereby act to limit deposit expansion itself.

⁴² Here Samuelson adds in leakages of bank credit redeemed for lawful money and kept outside of the banking system where the required reserve (r) and leakage (l) equals $\$1,000 \times 1/(r + l) = \$1,000 (1/(0.20 + 0.02)) = \$4,545.45$ of new deposits and not $\$5,000$ as would be the case without leakages.

Certainly, the intention here is not to assign blame, but instead to clarify how Phillips's "self-returning" deposit coefficient was eventually lost after the interwar period because this seemingly harmless step is what discarded the credit creation story and eventually led to the view of banks as nothing more than simple intermediaries of deposits. Samuelson's explanation for why the potential for bank credit creation was not explicitly shown is that he thinks "derivative" deposits are "not important for the United States" (p. 330) in 1947 due to the large number of small independent banks and the lack of a single monopoly bank. Samuelson's modification of Phillips's original equation and the overall de-emphasized role of money seems reasonable given the institutional setting of the time where it was realistic to treat central bank reserves as an outside asset and to build up monetary theory from that assumption.

However, Samuelson clearly says where there are a few large banks, like in California, the banks could lend more than their excess reserves. Samuelson's popularization of the Lilliputian bank model, which replaced Phillips's more accurate formula, should therefore be seen as a special case limited to the single small bank in the immediate postwar period where banking concentration was at a historic low⁴³ and where banks had expanded their balance sheets, not to extend loans, but instead to purchase government bonds. Samuelson's foundational assumptions were based on specific historical conditions that were already changing.

Samuelson's *Economics* went through eleven editions in which he was the sole author and it became one of the most widely used textbooks in the United States for the next fifty years. Yet, as bank concentration rose steadily from its nadir in 1950, which was accompanied by vast structural changes in the U.S. banking industry that allowed more consolidation, the principal characteristic of bank credit expansion remained the Lilliputian bank model that he first introduced in 1948. By the 1960s, despite protestations that commercial banks did indeed create credit,⁴⁴ the

⁴³ The assets of the fifty largest banks in the United States in 1950 were just 37% of total bank assets. (*Statistical Abstract of the United States*, 1972, p. 447)

⁴⁴ See Gurley & Shaw (1960) as well as Tobin (1963).

reference to a single monopoly bank was eventually dropped from *Economics* and all that remained was the “simple” deposit multiplier without the original immediate postwar context.⁴⁵ Since most of the popular textbooks that followed Samuelson borrow heavily from his pedagogy (Skousen, 1997) subsequent authors appear to have reproduced Samuelson’s Lilliputian bank model of deposit expansion without the burden of presenting it as a special limiting case.

Schumpeter, who supervised Samuelson’s Ph.D dissertation at Harvard, saw the postwar shift in banking theory and noted that it was an analytical error to alter the process of bank credit creation laid out so well by Phillips and others of the interwar period. In the *History of Economic Analysis* (1954), he says that the new perspective of bank credit theory “alters the analytic situation profoundly” (1954, p. 1114) and his advice for those willing to discard real factors for simplicity is that:

... [it is] highly inadvisable to construe bank credit on the model of existing funds being withdrawn from previous uses by an entirely imaginary act of saving and then lent out by their owners. It is much more realistic to say that the banks ‘create credit’, that is, that they create deposits in their act of lending, than to say that they lend the deposits that have been entrusted to them... The theory of ‘credit creation’ not only recognizes patent facts without obscuring them by artificial constructions; it also brings out the peculiar mechanism of saving and investment that is characteristic of fully fledged capitalist society and the true role of banks in capitalist evolution. (Schumpeter 1954, p. 1114)

The financial crisis of 2008 brought the money multiplier story back into focus when it became apparent that traditional money supply theory, as it had been taught since the 1980s, failed to account for how some banks can create a cumulative rise in

⁴⁵ Samuelson wrote the first eleven editions (1948-1980) as a sole author. In the twelfth edition of *Economics* (1985), now with co-author William Nordhaus taking the lead role for changes to the text, the reference to monopoly banks creating money was dropped and only the small Lilliputian bank model remained without the original context. In fairness, it appears that Samuelson himself did not drop the reference to a monopoly bank.

credit money. It also became clear that a more detailed study of the history of the deposit multiplier was needed because Phillips (1920) is often mislabeled as the early originator of the postwar limiting case. While it is true that Phillips was interested in explaining how the aggregate money supply could be restrained - and believed that central banks could in principle control the amount of reserves and should do so - the reality is that central banks have chosen instead to set an official short-term interest rate and not target reserve quantities.⁴⁶ As such, the postwar deposit multiplier is clearly an unsuitable concept whereas Phillips's equation can still be used today to explain the manner in which the central bank, in unison with individual banks, work to create highly elastic credit money.

1.5 Conclusion

The idea that banks can independently “create credit” is no longer a marginalized view. But missing from the literature is a framework to understand how the “banking view” of money creation was so easily swept aside after the interwar period and replaced with an opposing view that banks were mere intermediaries of deposits. The seamless transition from one dominate theory to the other can only be understood by resurrecting Chester A. Phillips's original deposit multiplier from 1920 to see how it was modified to fit a changed institutional background. His original formula played a causal role in the reinterpretation of banking theory and was therefore a brief but missing link between two radically different assumptions of credit creation. Comparing Phillips's original equation with the postwar *Samuelsonian* version it becomes obvious that the part of Phillips's formula that estimated the credit creation capabilities of individual banks was set to zero after the war. This led to his widely recognized and uncontroversial formula for bank credit creation to be transformed. In turn, a new narrative emerged in the postwar monetary orthodoxy - one where banks were powerless intermediaries and it was *impossible* for them to create credit. In the postwar era only the banking system as a whole could “create” money.

⁴⁶ See Goodhart (1989), Bindseil (2004) and Humphrey (2001) for a discussion of central bank operational policy.

During the interwar period, the economics profession had a sophisticated understanding of the nature of credit money. But a different institutional background in the postwar period and the success of Samuelson's textbook *Economics*, led to the "simple" deposit multiplier forming the cornerstone of money supply theory in the twentieth century. While this shortened version of Phillips's original model is still relevant to the explanation of any fractional reserve banking system, the amended model is highly misleading and devoid of the proper context under which it was first presented as a special limiting case. Samuelson's modification may have been for simplicity to allow for the erection of a broader theory of the money supply. But the micro-foundations were never correct and valuable knowledge was lost. By removing Phillips's return-of-reserves coefficient the credit creation view was completely discarded and with that the powerful insight that certain individual banks could potentially start a credit induced boom and bust cycle.

Phillips's original framing of the deposit multiplier should therefore be remembered as an operationalization of the banking principle where the ability of a fractional reserve banking system to generate money, is dynamic and variable. When properly understood in this context it becomes clear that banks endogenously create money and only the willingness of the monetary authorities to maintain reserves scarce will determine whether the overall money supply is exogenous or endogenous. Under Phillips's framework, individual banks act as non-homogenous strategic agents trying to maximize their creation of credit but are constrained by the relative degree of reserve scarcity. This novel feature was removed from the original equation and the widespread adoption of a "simple" deposit multiplier led to a dramatic transformation in postwar American economic thought from individual banks as creators of money to that of only the banking system creating money. A reassessment of Phillips shows that he was a pragmatist who upheld the orthodox banking principle and that his original deposit multiplier formula should be regarded as a missing link between two radically different hypotheses in the evolution of monetary theory.

Chapter 2

Textbook Models of Bank Credit Creation from 1875 to 2019

Chapter Abstract

The evolution of bank credit theory – as presented by introductory textbooks - has not attracted the scholarly attention it deserves. In particular, the controversy over whether “loans create deposits” or whether banks can only lend out their preexisting deposits, lacks historical perspective which only textbooks can provide with clarity. As it stands today, students of monetary theory and non-specialist economists are left to imagine reasons for why the formerly mainstream theory that individual banks have the power to create credit was suddenly overturned in the 1980s and replaced by a new paradigm in which only the banking system - as a whole - can create credit money. This paper presents a survey of over two hundred American textbooks, from 1877 to 2017, to establish how the consensus view of bank credit creation has changed over time. The findings reveal that the evolution of bank credit theory found in textbooks follows the reasoning of three influential authors – Macleod (1853), Phillips (1920) and Samuelson (1948) - with near unanimous agreement from the 1830s to the 1970s that individual commercial banks create new money when making a loan. That line of analysis is replaced in the 1980s by the prevailing mainstream view that banks are mere intermediaries of preexisting deposits. This chapter explains how and why this change occurred.

2.1 Introduction

In our modern monetary system, both central banks and commercial banks issue bank credit, which forms the bulk of our money supply. This view was upheld for over a century by economics and banking textbooks where the authors explained that commercial banks can individually create credit money when they make a loan, purchase government bonds or buy other securities. However, in most textbooks since the early 1980s, banks only lent out their excess reserves and became simple intermediaries of preexisting money - not the creators of credit money *ex nihilo*. While the essential functions of banking had not changed, the description of the mechanics of money creation had.

A common misconception is that if the actual money supply process is no longer explained correctly in the introductory economics textbooks it is subsequently rectified in advanced texts such as macroeconomics, monetary theory or financial economics. Unfortunately, this is not the case.⁴⁷ The only contact most people will have with the money creation process is from their introductory and intermediate courses in economics and banking. As such, textbooks have been - and continue to be - the main vehicle to disseminate knowledge to the public of the workings of the monetary system (see for example Giraud 2017 and Medema 2012).

Rewriting the money creation story in the 1980s may have brought about logic and consistency with prevailing macroeconomic theory (Merhling 2000) but the new orthodoxy avoided reality. The origins of monetary thought are drawn from observed banking practice and marginalizing the role of banks has led to unnecessary confusion about how the banking system interacts with the economy (Goodhart 2010). This misunderstanding is then carried over into the real world where it misinforms policy and the public alike. As such, criticism has grown to

⁴⁷ In the research conducted here, there is no evidence that textbook authors provide a more detailed explanation of bank credit theory in graduate level textbooks as opposed to undergraduate or intermediate textbooks. In fact, greater detail is provided in the introductory textbook literature than in the more advanced texts.

include central bankers⁴⁸ who have explicitly stated that the discussion of banks and money creation in most textbooks is wrong. This is not a new realization for those working at central banks and there exists ample literature recognizing the ‘endogenous’ nature of the money supply,⁴⁹ but these critiques leave three important questions unresolved: when did this inaccurate account of credit creation become the new orthodoxy in textbook models, how did it happen, and why?

A proper challenge to the prevailing consensus that banks are simple intermediaries of preexisting deposit money requires support from historians of economics who study intellectual change. Accordingly, the evolution of bank credit theory – as presented by introductory and intermediate textbooks – is an important area of inquiry which has heretofore not attracted the scholarly attention it deserves. In particular, the controversy over whether “loans create deposits” or if banks can only lend out the excess reserves from the deposits they receive, lacks the historical perspective needed to put this dispute in context. Consequently, a survey of U.S. textbooks going back to the mid-nineteenth century was conducted to develop an objective measure of the magnitude of various changes regarding how mainstream bank credit theory is presented and explain how and when certain modifications occurred.

Historians of economics may consider textbooks as less important in the diffusion of economic thought than professional journal articles.⁵⁰ However, if we are to fully understand any theory, a knowledge of its historical evolution is essential to better comprehend its contemporary version. In the case of bank credit theory, the changes that occurred in textbooks during the 1980s overturned a century of orthodoxy. Yet, unlike previous modifications, this was a dramatic turn from previous approaches that was not preceded by scholarly debates in the professional journals, making textbooks - not the scholarly literature - the primary source to track the changing attitudes to bank credit theory.

⁴⁸ See Bindseil (2013), McLeay, et al (2014) and Deutsche Bundesbank Monthly Report (2017)

⁴⁹ See, for example, Kaldor (1982), Moore (1988), Palley (1996) and Wray (1998)

⁵⁰ See Medema (2012) and Giraud (2017).

Scholarly statements on bank credit were quite similar in the way they were presented from the 1930s until the 1970s. Then, a rift began to develop and by the 1980s the divergence between the professional literature and textbook pedagogy widened into an incomprehensible chasm - and did so without explanation to the reader. While an engagement with the textbook literature does reveal how this unique transformation came about, the textbook authors - perhaps consciously - do not treat it as a controversy or reveal the broader processes at work which may have brought about the change. This chapter, therefore, traces the diffusion of bank credit theory and offers an account of how the role of commercial banks, as creators of the money supply, was revised in the postwar neoclassical period.

The structure of this chapter is as follows: Section 2 provides background on the views of bank money creation by the three main authors who most influenced banking theory as taught in textbooks. Section 3 presents the survey of over two hundred textbooks and an evaluation of the evolution of money creation in textbooks. Section 4 discusses possible reasons for why the view on credit creation by individual banks changed so dramatically in the 1980s. Section 5 concludes.

2.2 Macleod, Phillips and Samuelson

Textbooks offer a unique window to the consensus opinion of their time. Although these texts reflect the views of their authors, the opinions of various writers on a wide range of questions are included to present an accepted view of the profession (Giraud 2014). While the general presentation of principles textbooks has evolved from the discursive to that of diagrammatic and mathematical economic models,⁵¹

⁵¹ See Colander (2010) and Solow (2005) for an account of how textbooks have changed over time. Solow writes, "There was a significant change between 1940 and 1990 in economics as a discipline and also in the way it sees itself. One way to describe it is to say that economics became a self-consciously technical subject..." (p. 89). Solow saw economics becoming increasingly data and model-driven with simplified representations of a much more complicated situation that interacted with norms and institutions. "There is, however, a twist, and I think it is important. If the logic of model-building, in economics anyway, is a drastic simplification, then one cannot expect any model to fit the facts in every detail." (p. 94). He concludes by saying that while newer models will incorporate a new way of perceiving the world, the "old models never die; they just fade away." (p. 94).

texts on money and banking have mostly sought to provide practical knowledge of banking and have therefore modeled the money creation process by drawing attention to the institutions and norms of their particular time and place. As the use of deposit money grew and evolved in the mid nineteenth century, banking theory followed a logical sequence in historical development where each generation of authors attempted to explain the provision of bank credit to the private sector and how that influences the overall supply of money. Those who most influenced the evolution of bank credit theory are the textbooks written by Henry Dunning Macleod (1853), Chester Arthur Phillips (1920) and Paul Samuelson (1948) whose analytical frameworks became the most accepted and widely reproduced approaches of their time.

Macleod Era (1853 - 1919)

Henry Dunning Macleod (1821-1902) was born in Edinburgh, Scotland, graduated from Trinity College, Cambridge in 1843 and published the *Theory and Practice of Banking* in 1853, which set the standard for money and banking texts until the early twentieth century.⁵² Macleod believed that money and credit were highly important for the long-run growth prospects of economies (Skaggs 2003) and his dissatisfaction⁵³ with what he regarded as the superficial treatment of monetary

⁵² Although this paper focuses exclusively on US textbooks, until the late nineteenth century, U.S. principles textbooks were, in many ways, modification of European texts, adapted for the U.S. situation. See, for example, Colander (2010) for background on the evolution of U.S. textbooks. Because of the early influence of European monetary thought in the U.S., Macleod is the primary reference text for U.S. textbooks on bank credit until 1920, after which the American economist Chester A. Phillips's *Bank Credit* became the main reference for U.S. textbook authors. Phillips's description of the "multiple expansion" of bank credit and "derivative deposits" influencing how much money a bank could create through loans, appears in the majority of textbooks from the 1920s to the 1960s. Samuelson's *Economics* (1948) also used Phillips's unique phrasing and drew a distinction between a monopoly bank and a unit bank system with no branch banking. This continued for nearly forty years until the twelfth edition in 1985 when the new co-author William D. Nordhaus removed Samuelson's reference to the "monopoly" bank, which cut any remaining ties with Phillips's presentation of bank credit theory and reflected a new era of textbooks teaching that banks are mere intermediaries of preexisting deposits.

⁵³ Prior to Macleod's publication, Gilbert's (1834) *History and Principles of Banking* was a primary reference text in England and the U.S., which Gilbert considered to be 'a grammar of banking' for the public at large (Gilbert 1837, p. 2). According to Gilbert, banks allow for an increase in the overall supply of money but the total supply

economics resulted in a representation of banking practice from a practitioners point of view⁵⁴ where he describes the principles and mechanisms of the money supply process of his time. He begins his discussion - in what would become a long tradition in money and banking texts - with a word of warning about the unnecessary but common confusion that occurs when authors mistake the relation of credit to money. One of the main misconceptions that Macleod addresses in Chapter III "The Theory of Credit" is the myth that banking originated from goldsmiths lending only a fraction of the money held as a deposit.⁵⁵ Instead, Macleod explains, the goldsmith is a dealer in credits, paying interest on money held and purchasing short-term bills of exchange *not* with cash on hand, but instead with "their own promissory notes, or their credit" which they create *ex nihilo* (1866: I, p. 117). He writes, "A banker is a trader who buys money and debts (bills of exchange), by creating other debts (his own notes)" (ibid) which in turn creates a liability against himself. The analytical tool he introduces to elucidate the process is the simplified balance sheet, where the advance of money (in his example £40,000) increases both assets and liabilities by the same amount from an initial cash position of £10,000. (1866: I, p. 117).

Initial Cash Position (1866: I, p. 117)

Assets	Liabilities
Cash £10,000	Capital £10,000
<hr style="width: 50%; margin: 0 auto;"/> £10,000	<hr style="width: 50%; margin: 0 auto;"/> £10,000

of bank money (notes) is determined by the public's demand (p. 146) for bank credit while the supply is tempered by the banker's desire for solvency (p. 158). Banks create credit when they issue their notes "by way of loan or discounting (buying) a bill of exchange for a sum less than face value" (p. 157). Gilbart says, "Every advance of money by a banker, let it be made in what way soever, is in fact a loan" which expands the money supply (p. 206).

⁵⁴ Macleod was appointed director of the Royal British Bank in 1853.

⁵⁵ Samuelson (1948) is the first author to resurrect the goldsmith analogy which Macleod found so troublesome and had persuaded other textbook authors to avoid for over a century.

Old form of Banking Accounts - with Bank Notes Created for Loans (1866: I, p. 117)

Assets	Liabilities
Cash £10,000	Capital £10,000
By Bills of Exchange. 40,000	Notes in circulation 40,000
_____	_____
£50,000	£50,000

Modern form - With Deposit Accounts Created for Loans (1866: I, p. 117)

Assets	Liabilities
Cash £10,000	Capital £10,000
By Bills of Exchange. 40,000	Deposits 40,000
_____	_____
£50,000	£50,000

According to Macleod, a commercial bank is “not an office for ‘borrowing’ and ‘lending’ money,” instead it is a “Manufactory of Credit.” (1891: II, p. 594). He explains that in the “old form” of banking, the “deposits” were not deposits in cash, but were represented by bank notes in circulation. “These apparent ‘deposits’ in cash, then, are nothing but credit created in exchange for the cash and bills which figure on the other side of the account as Assets” (1866: I, p. 117). Macleod’s influential text also appeared at an important time in banking when bank deposit money had just begun to supersede that of government fiat and commodity currency in circulation.⁵⁶ Noting the evolution in banking, Macleod states there is really no difference between the old way that banks “manufacture” credit with their notes and the modern way of creating bookkeeping entries. He says they are simply

⁵⁶ See Kindleberger, C. P. (2015) for a discussion on the history of banking and finance in Western Europe.

“two methods of doing the same thing” (1866: I, p. 123). However, “to anyone not conversant in the subject, it seems to be a deposit of actual cash” (ibid.)

Macleod says the classical writers treatment of money and banking were “merely a chaos of confusion and contradictions” (1866: I, pp. 142-143). He sought to clarify the careless thinking on monetary economics of his time and his text was the first to popularize the use of the simple “T-account” ledgers in order to explain the step-by-step process behind the provision of bank credit to the private sector. Macleod's theory of credit exposed the plumbing behind banking and had a lasting impact on the profession until the 1920s.

At the turn of the 19th century, the first popular U.S. textbooks to treat bank credit were Francis Amasa Walker's *Political Economy* and Edwin Seligman's *Principles of Economics*. U.S. texts in this era were in many ways a modification of European texts adapted for the U.S. situation and Macleod's influence can be seen throughout the discussion of bank credit. Macleod's analytical framework and terminology is visible in nearly all U.S. textbooks surveyed from Walker (1877) until the 1920s. However, following the establishment of the U.S. central bank in 1913, U.S. economists began to produce textbooks specifically for U.S. students during the interwar period.

Universities also began offering more classes in economics and a flurry of textbooks appeared on the market. Even America's leading economist, Irving Fisher,⁵⁷ wrote an introductory economics textbook in 1911 to appeal to the more technical and mathematical nature of economics. Moreover, Fisher's search for conceptual clarity in monetary matters likely influenced his student at Yale, Chester A. Phillips, whose textbook *Bank Credit* would usurp Macleod as the new primary source for textbooks during the interwar period.

Phillips Era (1920 - 1947)

Chester Arthur Phillips (1882-1976) was born on a farm in Scipio Township, Indiana, graduated from Yale in 1919 and published his dissertation thesis as a textbook

⁵⁷ Fisher (1911). See Tobin (1997) for a review of Fisher's textbook.

which was cited by Keynes, Fisher and Hayek among others.⁵⁸ Phillips explains in *Bank Credit* (1920) that contemporary texts on banking followed nearly verbatim the work of Macleod who had made it appear that any individual bank could create a multiple expansion of credit upon each new deposit it received. Phillips called this the “time-worn theory of bank credit” (1920 p. 130) and clarified the conventional thinking of his time by showing that the amount of credit an individual bank can create depends on both the total reserves in the banking system and its market power to retain its loan-created deposits, which he calls “derivative deposits.”

Phillips builds upon the older view of credit creation popularized by Macleod and adapts it to the peculiar institutional setting in the United States where the widespread presence of small “unit” banks created a large discrepancy in credit creation power between these small country banks and the city banks. Phillips was the first to elucidate the limits of credit creation for unit banks when competing with larger city banks for scarce reserves and his principal contribution to monetary economics is the original deposit-expansion equation which shows that individual banks do create credit money *ex nihilo* but their expansion potential is a function of both the required reserve ratio and the fraction of loan-created deposits that stayed at the bank.⁵⁹

Phillips showed that under competition for scarce reserves an individual bank’s power to create money is limited not only by its reserve requirement but also by its ability to retain its newly created loans at the bank and attract new deposits. His model allowed for any possible outcome as well as two limiting cases where individual banks resembled either single bank monopolists, when they lost no reserves, or rural unit banks who immediately lose all their excess reserves. He then

⁵⁸ James Harvey Rogers (1926), Keynes (1930), Fisher (1932), James W. Angell (1933), Hayek (1933), Machlup (1940) all cite Phillips (1920) for having developed the deposit multiplier formula.

⁵⁹ The individual bank’s loan expansion of (x), is a product of the new deposit (c) and the reserve ratio (r), as well as a percentage of loans (k) which will be withdrawn and returned to the same bank so that once (1-k) are withdrawn and (kr) returned, then the loan expansion formula for a single bank is: $x = c (1 - r) / (kr + 1 - k)$

went on to show that the banking system as a whole does not lose reserves so that total credit creation is simply equal to the reciprocal of its reserve ratio.⁶⁰

By allowing the amount of loan-created deposits that stayed at the bank to vary for each individual bank, Phillips's original equation demonstrated that unless the bank is a Lilliputian country bank that loses one hundred percent of its new loan-created deposits, then the total expansion upon a receipt of new primary deposits will always be slightly *more* than the new reserves received. The more that loans stay at the credit expanding bank, the more this individual bank can expand credit beyond its initial receipt of new deposits. Only a bank that loses one hundred percent of its new loan-created deposits will suffer the maximum loss of deposits after setting aside the required reserve.

In Phillips's demonstration, commercial banks are first and foremost the creators of money and will expand loans to a level where they can manage their liabilities against the inherent liquidity constraint of a mixed cash-credit banking system.⁶¹ It is only after they have reached the natural limits of expansion within a competitive banking system that they are forced to reconcile new loan expansion with their ability to find and retain reserves. Phillips thus begins *Bank Credit* by first illustrating the mechanics of the banking principle and then examining that process within the explicit constraint of reserve scarcity imposed by monetary authorities.

Phillips's interpretation of bank credit creation allowed for a more nuanced understanding of the peculiar institutional setting in the U.S. where both small country banks and large city banks competed for scarce reserves and individual bank credit creation is determined by its market power to retain and attract those reserves. By highlighting the possibility of the Federal Reserve to control the money

⁶⁰ Phillips showed that the summation of each individual bank's deposit creation (whether a monopoly or small country bank) resulted in the same total deposit expansion for the system as a whole where the banking system's loan creation (d) is determined by new deposit (c) and the reserve ratio (r), where: $d = c / r$

⁶¹ Tobin's (1963) theory of financial intermediaries follows Phillips' view that commercial banks don't possess an inexhaustible supply ("widow's cruse") of credit money and cannot expand their liabilities indefinitely. See Guttentag & Lindsay (1968) for a different view from Tobin (1963) on the uniqueness of commercial banks.

supply through reserves, Phillips's model fit readily into the intellectual frame of the interwar period following the abandonment of the gold standard at the outbreak of World War I. In the 1920s and 1930s, Phillips's deposit multiplier theory was widely cited by preeminent economists of his era and was quickly adopted⁶² in subsequent textbooks which overturned the "old view" of unrestrained bank credit creation where each individual bank acted as if it always had monopoly power.

Samuelson Era (1948 -Present)

Samuelson's *Economics* (1948) - the best-selling economics textbook of all time⁶³ - places the role of bank credit creation within the context of a post-World War II America. He writes, "the modern American commercial bank seemed at the war's end to be gradually becoming hardly more than a holder of government bonds."⁶⁴ But instead of highlighting the fact that banks had used their credit creation power during and immediately after the war to purchase government bonds,⁶⁵ Samuelson instead focused on the lack of commercial loan creation which appeared to undermine commercial banking's role as money creators.⁶⁶

⁶² An examination of fifty textbooks from the survey (from 1921-1945) reveal that Phillips's *Bank Credit* (1920) is directly referenced in twenty-four texts with an additional two textbooks using Phillips's line of analysis without citation. In the immediate postwar period, from 1946 to 1959, a survey of twenty-two textbooks reveal that similar to the interwar period, eight of the textbooks cited Phillips directly and the majority surveyed still included the essence of Phillips's findings, where individual banks can expand their balance sheet prior to receiving a new deposit and will be subject to a loss of reserves to competing banks.

⁶³ *Economics* has been translated into forty-one languages and in total has sold over four million copies.

⁶⁴ Samuelson says, "Whereas loans formed more than half of bank assets in the 1920's, by the late 1940's they were down to only about a sixth," and "By the beginning of 1947, bank holdings of government securities were more than three times as great as their loans, and interest on these securities covered practically all their running expenses" (1948, p. 312).

⁶⁵ In another textbook, Meyers (1948) says the commercial banks didn't stop using their credit creation power because, "These bonds were purchased mainly with created deposits" (1948, p. 354).

⁶⁶ Reflecting on the "money matters" controversy with Friedman, Samuelson says that his thinking while writing *Economics* (1948) was that money simply was not that important of a subject matter. But upon later reflection he didn't believe money does not matter, but that he does not believe that "only money matters."

He goes on to say that, “Unlike England or Canada where a few large banks with hundreds of branches are dominant, the United States has tended to rely upon many independent, relatively small, localized units” (1948 p. 311). As a result, “The ordinary commercial bank is a relatively simple and unexciting business concern” (p. 313). To illustrate the money creation process by these small individual commercial banks, Samuelson uses a model for deposit expansion first popularized⁶⁷ in the Federal Reserve Bulletin of May 1939⁶⁸ which depicted a group of unit banks that lost all of their excess reserves in a process of multiple deposit expansion identical to Phillips’s limiting case where each bank loses one hundred percent of their new loan-derived deposit credits.⁶⁹

Samuelson avoids many of the complexities inherent in the multiple expansion of bank deposits by presenting only the two most extreme cases first mentioned by Phillips. In *Economics* (1948) there are either small unit banks which have no power to expand loans beyond their excess reserves, or, a single “monopoly bank” (with many branches) which, “serving the whole nation, would be able to do at once what we have said each small bank cannot do” (1948 p. 330). Samuelson says:

⁶⁷ In the 1930s and 1940s the *Federal Reserve Bulletin* was a key source of data for economists writing about money and banking. Authors begin to cite the Federal Reserve Bulletins as a source for information on bank credit and reserves, with the earliest textbook being Bradford (1928, p. 298) who writes “The objectives which the Federal Reserve Board and the reserve banks have actually worked for in their control of the credit situation are to be found in *The Annual Report of the Federal Reserve Board* for various years and, to some extent, in the *Federal Reserve Bulletin*.” (1928, p. 298). These publications often aimed to show how the Fed was capable of controlling the credit money issued by commercial banks and tried to explain the process as simply as possible.

⁶⁸ The table in *The Federal Reserve System: Its Purposes and Functions* (May 1939, p.73) illustrates the deposit expansion that would occur among a group of small banks that after setting aside the required reserve each bank lost 100% of their new loan creation to the next bank. It is here in the *Federal Reserve Bulletin* of 1939 that the Lilliputian model of deposit expansion was first introduced to a wide audience of economists and subsequently repeated through textbooks. Peterson’s (1941) *Money and Banking* was the first to replicated the deposit expansion table exactly as it had appeared in the *Federal Reserve Bulletin*, but he warns the reader that the inherent assumptions behind this characterization make the model “devious” (1941, p. 373). as it assumed other banks in the system were neither expanding or contracting their loans so that the individual bank could not expand its deposits above the amount of its excess reserves.

⁶⁹ Samuelson (1948) does not cite Phillips (1920) directly but does use Phillips’s exact phrasing of “derivative” or “self-returning” deposits.

[The monopoly bank] could write checks freely to pay for securities or loans, knowing that the people to whom are paid would always deposit their proceeds in the one and only monopoly bank. In countries like England, where there is a “big 5” group of branch banks, or like Canada where there are a few large banks, or in states like California where there are a few great multiple-branch banks - in such cases a bank may be able to lend out more than its legal excess reserves, knowing that part of the money will come back to itself in later generations. However, these so-called “derivative” or “self-returning” deposits are not important for the United States, and calling attention to them often only confuses the beginning student. (Samuelson 1948, p. 330)

Samuelson’s separation of deposit creation into two limiting cases of small unit banks and a single monopoly bank appears to be more a matter of style than substance. However, when he asks the reader “can banks really create money?,” his over-simplification of the balance sheet changes for small unit banks confuses the loan creation process by combining two steps into one and therefore answering “no” when it should be “yes.” By failing to show that a new loan will first increase both assets (loan) and liabilities (deposits) for the small unit bank, the actual loan creation disappears. In Samuelson’s example, an original deposit of \$1,000 with a twenty percent reserve ratio means the bank can safely create \$800 in new loans. However, he skips over the well-established first step in money and banking texts since Macleod which showed the new loan-derived deposit added to the original deposit. In Samuelson’s example, the unit bank would simultaneously lose one hundred percent of its new loan so that it appears individual banks can only lend their excess reserves. Table 2.1 shows the typical first step in bank credit creation and below that a reproduction of Samuelson’s presentation in Economics (1948) which skips that first step.

Table 2.1 *Standard Bank Credit Creation Presentation (Macleod, Phillips, etc)*

Assets		Liabilities	
Cash	\$1,000	Original deposits	\$1,000
New Loan	800	New "loan-derived" deposit . . .	800
	\$1,800		\$1,800

Source: Own elaboration

Samuelson's Bank Credit Creation Presentation (1948, p. 326)

Assets		Liabilities	
Cash	\$200	Original deposits	\$1,000
New Loan	800		
	\$1,000		\$1,000

Samuelson created a cohesive vision that defined mainstream economics during an era of postwar neoclassicism.⁷⁰ Similar to other constrained optimization problems addressed in his textbook, the modification to Phillips's bank credit model followed a neoclassical conceptualization that reduced the number of variables in order to simplify the economic relations so that a geometric approach could solve the problem. Samuelson also revived the banker-goldsmith analogy that Macleod had appealed to generations of authors to avoid and was the first to popularize the term "fractional reserve banking" as well as the Federal Reserve's unit banking model⁷¹ of

⁷⁰ See Morgan & Rutherford (1998) for the transition to postwar neoclassicism general-equilibrium mathematics.

⁷¹ See Chapter one (pages 40-45) which explains that each subsequent bank receives a deposit from the previous bank and then simultaneously loses the entire amount of that new loan-created deposit to the next bank until the summation of the individual bank's deposit creation is representative of the banking system at large.

Although the unit bank example of the multiple expansion of bank deposits first appeared in the *Federal Reserve Bulletin* of May 1939, it did not become widespread until it was amplified by the success of *Economics*. This more

credit creation. The “neoclassical synthesis” (a term Samuelson introduced in the third edition) became a blueprint for future textbook authors and his lasting influence eventually helped reshape bank credit theory into a story of goldsmiths, fractional reserves and unit banks in virtually all textbooks that followed.

By 1980, *Economics* was in its eleventh edition and despite the fact that this canonical textbook had grown by over three hundred pages, the “Banking System and Deposit Creation” section was left virtually unchanged since the first edition. However, in the twelfth edition (1985), as well as all subsequent editions thereafter, the reference to a single monopoly bank was dropped by Samuelson’s new co-author,⁷² who was now tasked with making new updates to the textbook, leaving only the description of the small unit bank which loses one hundred percent of its excess reserves and does not individually create money when making loans. Banks acting like goldsmiths was now called “modern fractional reserve banking” and this view coupled with the widespread adoption of a “simple” deposit multiplier, virtually expunged the individual bank’s role in the credit creation process. Eventually, other textbook authors followed this same frame of analysis, and by the 1990s the mainstream view of bank credit creation had in some ways reverted back to the pre-Macleod view that bankers act like goldsmiths who only lend a fraction of the money they hold as a deposit.

2.3 Textbook Models of Bank Credit Creation

To understand the evolution of bank credit theory in the United States and when significant intellectual change occurred, all readily available U.S. economics and

narrow perspective marked a clear departure from Phillips’s (1920) model of deposit expansion where this was only one of many possibilities. Phillips, and the generations of authors that followed his line of analysis, held that the ability for an individual bank to retain its newly loan-created deposits at the bank, was on average greater than zero.

⁷² *Economics* (1985) is written by Paul Samuelson and co-authored and revised by William D. Nordhaus.

money and banking textbooks are surveyed.⁷³ The study begins with Francis Amasa Walker's *Money* (1876) and ends with Heidra's (2017) *Foundations of Macroeconomics* and includes a total of 218 texts over a 140 year period. The survey consists primarily of first editions - when available - to give clarity to the exact time that changes do occur.

In order to assess the changes that have occurred all textbooks are reviewed and scored with regard to how the authors explain whether "loans create deposits" or if banks can only lend out their excess reserves from the preexisting deposits they receive. As such, each textbook has been identified as supporting one of four possible approaches: (1) loans create deposits; (2) deposits create loans; (3) both are true under certain situations, or; (4) the author abstains from discussing bank credit creation.

The textbooks surveyed are exclusively U.S. textbooks which must include a discussion of the monetary system and include an explanation of how banks provide credit to the public sector which circulates as money. The most common textbooks are principles of economics, macroeconomics and money and banking.⁷⁴ The few textbooks that do include a discussion of the monetary system but do not attempt to explain the role of banks and the creation of money are included in the survey as "abstaining" from the discussion of bank credit theory. Most of the texts abstaining are advanced textbooks. Table 2.2 shows how the approaches changed over time.

⁷³ All popular U.S. textbooks are included. The only texts excluded are the ones that were not readily available. A full list of the included textbooks is available in the Appendix.

⁷⁴ Advanced textbooks such as monetary theory and financial economics are examined but the vast majority do not discuss the mechanics of bank credit creation. Textbooks that do not include a discussion of how money is created are not included in this survey. The only advanced textbooks that includes this discussion is Freixas (1997) *Microeconomics of Banking*.

Table 2.2 Textbook Models of Bank Credit Creation (1877 - 2017)

Years	LCD	BOTH	DCL	ABSTAIN	Total	LCD %	BOTH %	DCL %	ABSTAIN %
1870-1879	1	0	0	0	1	100%	0%	0%	0%
1880-1889	1	0	0	0	1	100%	0%	0%	0%
1890-1899	5	0	0	0	5	100%	0%	0%	0%
1900-1909	10	0	0	0	10	100%	0%	0%	0%
1910-1919	17	0	0	0	17	100%	0%	0%	0%
1920-1929	24	0	0	0	24	100%	0%	0%	0%
1930-1939	21	0	0	0	21	100%	0%	0%	0%
1940-1949	23	1	0	0	24	96%	4%	0%	0%
1950-1959	8	1	0	0	9	89%	11%	0%	0%
1960-1969	15	0	0	1	16	94%	0%	0%	6%
1970-1979	6	8	4	0	18	33%	44%	22%	0%
1980-1989	2	13	9	2	26	8%	50%	35%	8%
1990-1999	3	8	7	3	21	14%	38%	33%	14%
2000-2009	2	6	6	3	17	12%	35%	35%	18%
2010-2016	3	1	3	4	11	27%	9%	27%	36%
Total	141	38	29	13	221	64%	17%	13%	6%

Source: Own elaboration

The findings presented in Table 2.2 reveal five important insights. First, there are two distinct phases of intellectual change which occur after the relatively homogeneous period from 1876 to 1947 when the view that “loans create deposits” is unchallenged. For example, Boulding’s (1941) *Economic Analysis* says, “But a bank is much more than a ‘loan broker,’ and it does more than act as an intermediary between those who wish to lend and those who wish to borrow” (p. 366). The initial change to the orthodoxy occurs from 1948 to 1971 when Samuelson’s *Economics* (1948) is the first to break with tradition and introduce two limiting cases, where either the unit bank or monopoly bank exist, depending on the circumstances (here categorized as “both”). That initial change is then followed by the period after 1972 when the first “deposits create loans” textbook appears and finally when the monopoly bank is dropped in Samuelson’s 1985 *Economics* to join other textbooks teaching that only “deposits create loans,” where banks are simple intermediaries of preexisting deposits, incapable of creating deposits in the act of granting a loan.

Second, although Samuelson introduces the unit versus monopoly bank framework in 1948, it is not until the 1970s and 1980s that his “both” approach becomes mainstream. Samuelson’s ideas on bank credit therefore lagged other aspects of his Keynesian synthesis which were quickly adopted during the postwar neoclassical

period. This is likely due to the fact that the “both” approach is not a clear break with that period’s orthodoxy and authors writing textbooks in the 1950s and 1960s had already learned bank credit theory in the interwar period when there was unanimous agreement that banks can individually create credit money when they make a loan, purchase government bonds or buy other securities. Therefore, during this period we see little overall change to bank theory presentation.

The first textbook to make a clear break with orthodoxy and present the “deposits create loans” model appears in 1972.⁷⁵ Prior to this publication, the thirty-five textbooks surveyed from 1948 to 1971 show that only two textbooks follow Samuelson’s “both” approach while the other thirty-three follow Phillips’s more traditional “loans create deposits” view. It is not until the 1970s and 1980s that we observe a significant change when the share of “loans creates deposits” approach falls from ninety-four percent of the textbooks surveyed in the 1960s to just one third of the textbooks in the 1970s and then to an all time low of just eight percent in the 1980s before making a recent turnaround.

The most likely explanation for this sudden shift away from “loans create deposits” is that authors writing in the 1980s and 1990s were influenced by the popularity of Samuelson’s *Economics*, which dominated the textbook market in the 1950s and 1960s when these new authors were beginning to learn economics. The number of textbooks following Samuelson’s middle-of-the-road “both” approach jumped from

⁷⁵ The first instance of “deposits create loans” is Richard T. Gill’s (1972) *Economics & Public Interest* which replicates the Federal Reserve unit-banking model without comment. Following an introductory discussion of monetarism, he presents bank credit theory as the consequence of the “leverage that the Federal Reserve Board has over our money supply” (p.171). In Gill’s presentation, a hypothetical bank makes a loan from its excess reserves which ends up at another bank. He shows this process with a T-account where the new deposit at the receiving bank increases both assets and liabilities by the same amount, similar to how Macleod had shown it over a century prior. However, the similarity ends there and he makes no mention of the bank’s ability to create credit or even the possibility of a “monopoly” bank like Samuelson’s *Economics*. Instead, the multiple expansion of the money supply “cannot be accomplished by one small bank alone” (p. 174). He then proceeds to use the Federal Reserve’s unit banking model to illustrate the multiple expansion of deposits in the banking system and the discussion ends there.

just one other textbook author in the 1950s and 1960s to forty-four percent in the 1970s and peaked at fifty percent in the 1980s.

Another reason for the change may be due to the rise of the neoclassical-Keynesian synthesis from the 1950s to 1970s which saw money as a veil and held an exogenous-money position where banks must first receive reserves to then make a loan. Textbooks in the 1970s and 1980s also began to teach monetarism as well as the quantity theory of money. As the exogenous-money position became more popular by both the neoclassical synthesis and the monetarist approach the deposit-multiplier model also assumed the monetary base was exogenous. This was then incorporated into new mainstream macroeconomic models and coincided with the first appearance in textbooks of the phrase “money multiplier” in the late 1960s which aided in the spread of the “deposits creates loans” approach by the 1970s and 1980s.

Third, while the number of textbooks that claimed that banks can only lend out their excess reserves peaked in the 1980s at thirty-five percent, at no time period did this narrow view outnumber the combined amount of texts teaching that loans create deposits or that both views are true under certain conditions. In fact, the “both” and “loans create deposits” approaches still dominated the textbooks published in 1980s with fifteen textbooks versus nine textbooks teaching that only “deposits create loans.” Moreover, a growing number of textbook authors “abstained” from discussing bank credit creation as either an endogenous or exogenous approach.⁷⁶

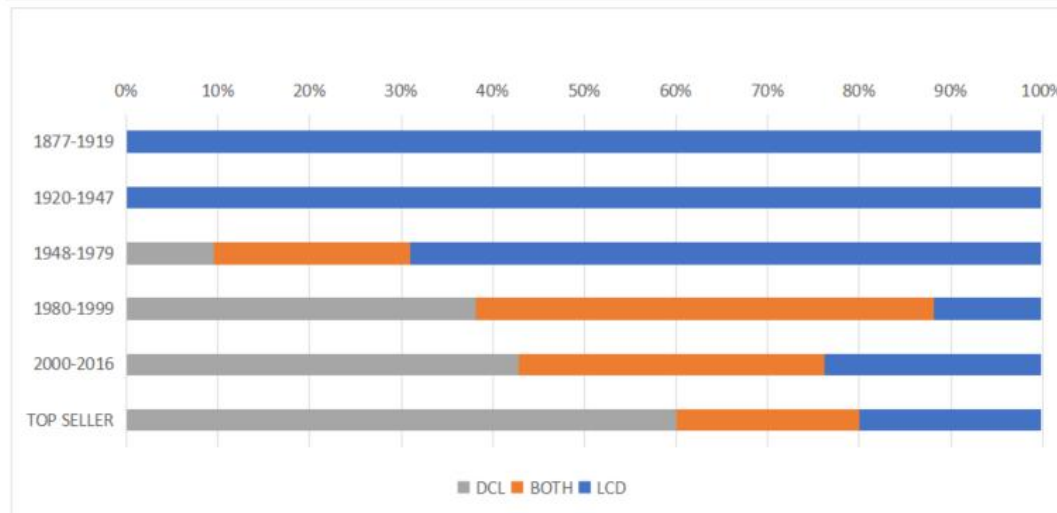
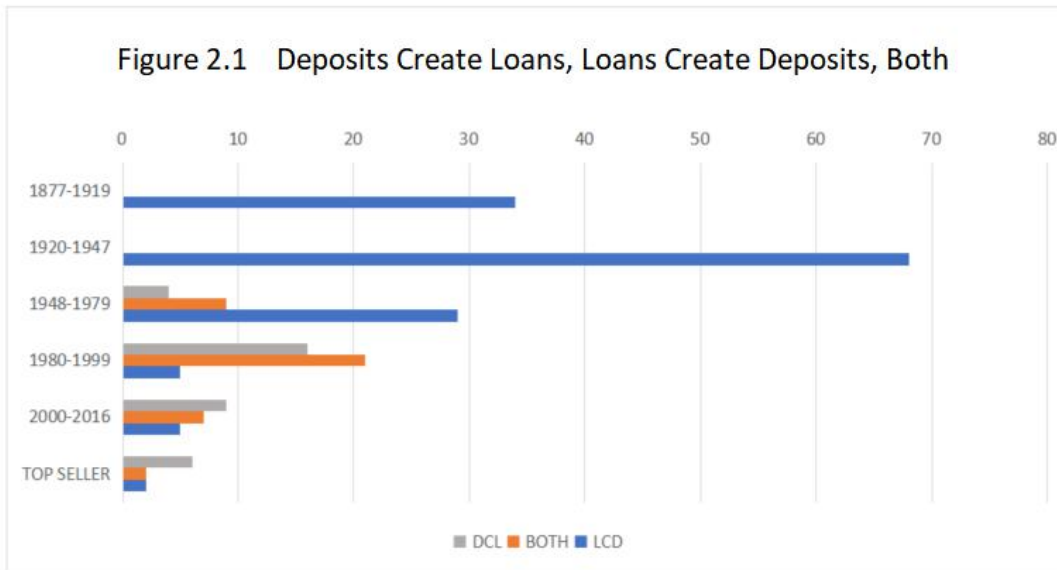
Fourth, although the previous point may seem to imply that the strict “deposits creates loans” view is a minority, nearly all texts from the 1970s to the present listed as “both” utilize the simplified Fed unit-banking model, and more importantly, follow Samuelson’s T-account approach which fails to show that a new loan will first increase both assets (loan) and liabilities (deposits). Therefore, the actual loan

⁷⁶ Interestingly, the more specialized financial economics and money and banking texts are the ones that frequently abstained from teaching the expansion of bank credit. This may be due to the fact that the once dominant “money multiplier” theory began to lose explanatory significance in the monetary transmission channel literature of the 1990s.

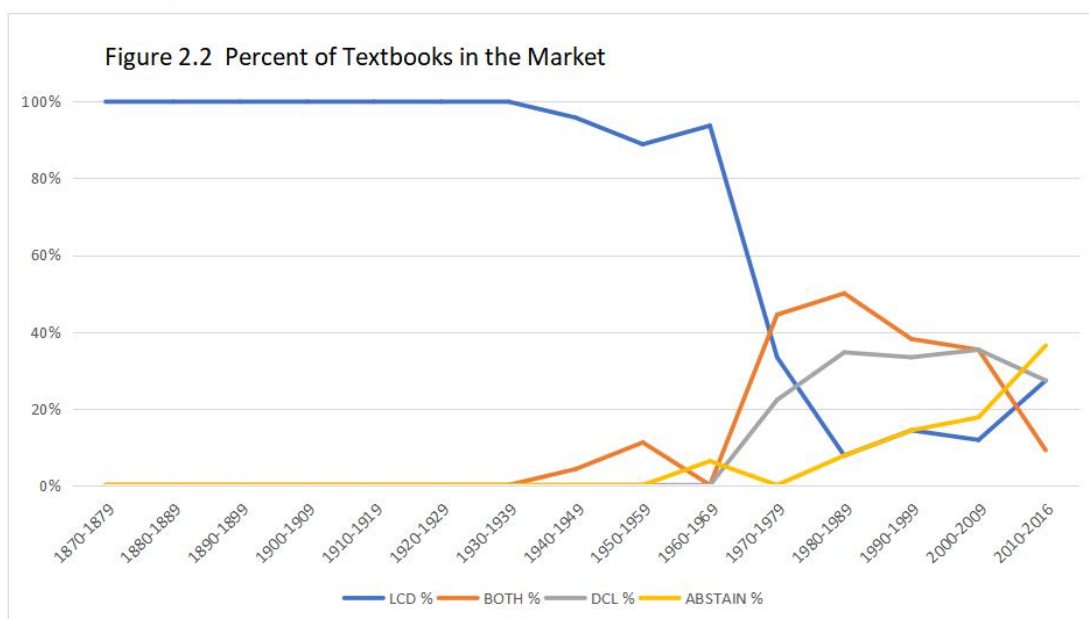
creation process had practically disappeared by the 1970s, and the only difference between a textbook being listed as “both” or “deposits creates loans” in the database is due to whether the author explicitly states that commercial banks have the power to create credit. Yet, under a semblance of prudence, these authors nearly unanimously say that while an individual bank could create credit, they immediately caution that the power to create credit beyond lending out excess reserves is unsafe and therefore would not be done.

Fifth, textbook publications peaked in the 1980s and the market has continued to consolidate and homogenize (Stiglitz 1988) with the “big five” publishers focusing on only a handful of best-selling authors. The consolidation of the American textbook industry since the 1980s has led to a situation where a small number of textbooks are the most assigned at American universities⁷⁷ and conveys the impression of consensus among economists. While the number of textbooks teaching the “deposits create loans” approach has declined in recent years to a minority view, when looking at only the most assigned textbooks, the “deposits create loans” is still the most widely disseminated approach to teaching bank credit theory, although it is much more constrained in its discussion than textbooks prior to the 1980s.

⁷⁷ The Open Syllabus Project surveys the most-assigned economic textbooks in the U.S. The top-10 textbooks for 2017 in descending order are Krugman (2013), Mankiw (2014), Taylor (1995), Blanchard (1997), Stiglitz (1994), Romer (2012), Dornbusch & Fischer (2011), Barro (1984), Miller (2001), Abel & Bernanke (2001).



Source: Own elaboration



Source: Own elaboration

2.4 Why Bank Credit Theory Changed

A comparison of textbooks written over the course of a century lays bare the striking influence of just three authors whose analytical frameworks became the most accepted and widely disseminated approaches of their time. However, the rise and fall of each of these author's influence in the textbook literature is driven by both the monetary policy and historical context of the period in question. Monetary theory, first and foremost, follows the monetary constraints of the economy which is influenced by the particular institutions of each country.⁷⁸ As these institutions change over time, monetary theory adapts and the influence over pedagogical approaches to bank credit theory becomes more understandable.

In the case of Macleod, the Bank Charter Act of 1844 left the Bank of England with a monopoly on bank note issuance which led to a consolidation of commercial banks who quickly learned to meet the demands of trade by providing credit through the act of creating a checking account deposit for their borrowers. At the time, this led to a debate over whether banks that do not issue bank notes are also able to create bank credit money out of nothing. Macleod (1866: II, p. 310) writes that the Act, passed under the government of Prime Minister Sir Robert Peel, "was quite mistaken in supposing that bankers only make advances out of bona fide capital." Macleod explained that adding money to a bank deposit account was the same as issuing bank notes and this "banking view" came to dominate discussions of bank credit theory in textbooks from England as well as the United States and many other parts of the world.

Fifty years after Macleod's publication the Swedish economist Knut Wicksell read a paper, while visiting London, affirming the dominance of the banking approach that loans create deposits. Wicksell imagined a future system where book-keeping credits could eventually become the only form of money. He says, "In a pure system of credit, where all payments were made by transference in the bank-books, the banks

⁷⁸ See for example Hicks (1967), Laidler (1977) and Rosselli (2013) for a historical perspective on monetary theory.

would be able to grant at any moment any amount of loans at any, however diminutive, rate of interest.” Wicksell explains that in a closed “giro” system, banks would be free to lend at the prevailing level of interest without restraint in something similar to Macleod’s view that the commercial banks were a “manufactory of credit.” (Wicksell 1907, p. 220)

Macleod’s banking view of credit money creation was the primary reference source for early twentieth century U.S. textbooks until Phillips’s (1920) *Bank Credit* overturned the idea that any one commercial bank held the same money creation power as the entire banking system. Phillips acknowledges that in theory an individual bank could create credit like Macleod had shown possible. However, the peculiarity of the U.S. banking institutions led to Phillips challenging the prevailing view that all banks were created equal. Due to the rapid economic growth from 1870 to 1920 in the U.S. and legislation during this period that greatly restricted or even prohibited branch banking, in 1920 the number of U.S. banks peaked at over 30,000. This made it virtually impossible for the majority of small “unit” banks to achieve the scale that banks in other countries could attain. As such, the long history of “unit banking” in the U.S. required an updated theory to explain to American students that the amount of credit an individual bank can create depends on both the total reserves in the banking system and the bank’s ability to retain its loan-created deposits.

Moreover, the establishment of the Federal Reserve in 1913 and the suspension of the classical gold standard during the First World War meant that the institutions regarding commercial banks and credit policies began to change. U.S. bankers and economists believed that under the reserve system, bank credit would be more widely available and they inquired as to how the newly established central bank would limit these new-found powers of credit creation.⁷⁹ The issue became more pertinent when, in its first year of operation, the Federal Reserve had to navigate a

⁷⁹ See for example Kemmerer (1919) for a contemporary discussion of the founding of the Federal Reserve. See also Betancourt (2010).

world decoupled from the international constraints of the gold standard followed by the rapid inflation and post-war deflation.

Imported inflation from gold flowing in from the belligerents caused the Federal Reserve to change its operational framework during the interwar period. First, the international abandonment of the Gold Standard in 1914 called for adjustment of Bagehot's classical theory where until 1914 national monetary policy had primarily been orchestrated through changes in the Bank rate similar to the Bank of England. Second, the post-war inflationary boom and subsequent deflationary recession of 1920-1921 led to a greater focus on the Federal Reserve's ability to *control* bank credit. For this reason, the Federal Reserve began experimenting with indirect targeting of reserve quantities instead of solely the Bank rate.⁸⁰ This emerging monetarist position - where the amount of money in circulation could be a fixed multiple of reserves provided by the central bank - became more widely accepted by Federal Reserve governors who spoke openly about their ability to control credit.⁸¹

The change in operational targets, from interest rate policy (which was still the explicit policy) to reserve quantity policy, coincided with the publication of *Bank Credit* in 1920 and was the first step in moving away from a predominantly endogenous view of the money supply process to that of where banks do create money endogenously, but the central bank could exert exogenous control over credit by targeting reserve balances.⁸² While the Fed no longer saw reserve requirements as a necessary basis for liquidity provision, it came to see required

⁸⁰ See for example Bindseil (2004) for an explanation of this change in operational targets. Bindseil argues that the Federal Reserve, instead of taking the blame for not raising interest rates in time to stabilize the price level after World War I, blames the commercial banks and not the level of the Bank rate set by the central bank.

⁸¹ See for example Benjamin Strong's (1922) discussion of the methods of regulating credit at the Federal Reserve.

⁸² Phillips's *Bank Credit* (1920) introduced a unique model to estimate the credit an individual bank can create. However, Phillips also believed that the Federal Reserve could control the amount of reserves and thereby control the total amount of credit. This idea of controlling reserves would go on to form the cornerstone of academic money supply theory in the twentieth century.

reserves as a tool for controlling credit.⁸³ Even though a strict quantity of reserves was never actually used as the operational target of monetary policy during the interwar period, the rationing of reserves was seen by the Federal Reserve as a way to manage domestic bank credit. As a result, by the 1920s, policy had transitioned from a defensive posture of fending off a series of crises at home and abroad to one of actively attempting to influence credit conditions through reserves.

In the 1920s the Federal Reserve System developed open-market operations as its principal tool of monetary policy and following the banking crisis of 1930-1932 and the subsequent Great Depression, even more attention was paid to the banking view popularized by Phillips and the policy demands for credit control. In the 1930s Phillips continued to be widely cited in the textbook literature after securing his reputation as a national authority in the field of money and banking in the 1920s.⁸⁴ Phillips, having studied under Fisher,⁸⁵ was a proponent of the quantity theory and believed strongly that the central bank had a duty to control the banking sector's credit expansion.⁸⁶ We can see this common theme in the textbooks of that era which reflected the orthodox policy-orientation based upon the monetary theory of the interwar period. Foster and Rogers (1936) write in *Money and Banking*:

“Adequate elasticity...cannot be attained, with safety, under the “banking” plan until sound means of credit control have been devised and made effective. In the meantime, the wise and practical course is to compromise between the two principles, departing from the “currency” plan only as far as improvement in credit control renders such departure safe. (p.179)

American textbook literature in the 1920s and 1930s reflected the Federal Reserve's sentiment and followed Phillips's pedagogic approach which stressed three main

⁸³ Phillips writes that If there is any weakness in the Federal Reserve system, it is that an inflation “might have been held in check by a regulation of reserve requirements” (1920, p.120).

⁸⁴ Phillips is directly cited in nearly half of the sixty-four textbooks surveyed from 1921-1946

⁸⁵ See Dimand (2007).

⁸⁶ See Phillips (1937) for his criticism of the Federal Reserve failure to control credit in the 1920s.

themes. First, they acknowledge the ability of an individual bank to create credit; second they highlight the unique structure of the U.S. banking system where the majority of commercial banks are small and independent which will limit their ability to create credit; third they emphasize how the Federal Reserve can and should assert control over the endogenous creation of bank credit through the direct control of reserves.

The historical panorama of the interwar period provides useful insights to understand how textbooks authors would first embrace Phillips's model and then let it quietly fade away after the postwar neoclassical period. This is because the nascent seeds of monetarist thought were already apparent in the 1920s and would later emerge in the textbook literature of the 1970s and 1980s - where the exogenous control over the money supply and money multipliers became the dominant approach by the 1980s. Yohe (1990) writes that this influenced academic thought where:

In a modern fractional reserve banking system it is not the money stock that is exogenous but bank reserves; hence an important twentieth-century extension of currency school doctrine was the development of reserve position or "supply push" theories of money stock determination featuring "money multipliers" and a variety of policy-influenced multiplicands.

The next institutional change to influence textbook presentations of bank credit theory is that commercial banks and central banks were heavily involved in financing the Second World War. In the 1930s and 1940s the Federal Reserve once again lost its independence to the Treasury and followed a low interest rate peg to facilitate government war expenditures. Commercial banks also contributed their credit creation powers to the war effort by buying government securities.

In both world wars the commercial banks played a leading part in Treasury financing. However direct lending to the government played an even more important role in

the Second World War. As a result, the government had taken control of the engine of inflation and the more deleterious effects of bank credit creation in the 1920s had become a distant memory. The institutional changes of the interwar period and the war finance programs pursued by the central banks meant that the postwar banking system was simply not the same it had been in the 1920s. Textbooks writers in the 1940s and 1950s were therefore faced with a new challenge to explain both what they knew the banking system was capable of being and the current reality of what it had become in the postwar period. Samuelson (1948) summarizes this clearly when he writes:

The modern American commercial bank seemed at the war's end to be gradually becoming hardly more than a holder of government bonds. Whereas loans formed more than half of bank assets in the 1920's, by the late 1940's they were down to only about a sixth...By the beginning of 1947, bank holdings of government securities were more than three times as great as their loans, and interest on these securities covered practically all their running expenses" (p. 312)

During this period textbook authors continued with the same orthodox line of analysis until the Great Inflation from 1965 to 1982 led to a double digit rise in prices. The last time that Phillips was directly cited in the textbook literature⁸⁷ was 1957 and the references to Phillips's "multiple expansion" of bank credit was subsequently replaced by the "money multiplier" lexicon in the 1960s. The emergence of monetarism provided a countervailing force to Keynesian doctrine which had favored policies to maintain full employment at the expense of inflation. At this dramatic period in economic history a viable answer seemed to be - according to Friedman (1968) - the central bank must stick to a monetary growth rule. Subsequently, the term "money multiplier" began to appear in more textbooks and the term soon became synonymous with the simplified Samuelson-Fed model of bank credit.

⁸⁷ Jome (1957) *Principles of Money and Banking*

One of the first appearances of the money multiplier is from Frazer and Yohe (1966) *Money and Banking*, where they write, “The reciprocal of the reserve requirement we call the money multiplier when it is used to indicate the magnitude of a change in deposits accompanying a change in reserves” (p. 30). Here, the central bank determines the quantity of loans and deposits in the economy by controlling the quantity of central bank money (reserves) which dovetailed neatly with the resurrected teaching of the quantity theory of money.

Other terms in the textbook literature also began to appear more frequently in the 1960s such as “fractional reserve banking” and “financial intermediaries” which when woven together told an alternative story of the credit creation process. Up until the 1970s textbooks were still explaining bank credit theory like Heilbroner (1965) *Understanding Macroeconomics*, who wrote that a bank “makes a loan by opening a new checking account for the firm and by crediting that account” with the loan amount (p. 149). However, in the 1970s, the alternate description of the commercial bank is notable. In Chisholm (1978) *Principles of Economics* he states that “commercial banks are called financial intermediaries since they perform the go-between task of ‘mating’ savers with investors” (p. 205). In the 1970s the lines between commercial banks and pure financial intermediation began to blur.

Prior to this period, commercial banks were always described as something more than just a financial intermediary. However, by the 1980s, they were frequently described as being *only* a financial intermediary. The development of macroeconomics in the post-war period and the inclusion of a simplified money multiplier into mainstream macroeconomic models appears to have contributed to an increased prevalence of the “deposits create loans” trend seen in the 1970s and 1980s. From the IS-LM framework to Real Business Cycle and Dynamic Stochastic General Equilibrium models to the more recent New Keynesian modeling, bank credit creation ceased to be a factor to contend with. Models are deliberately simplified representations of a much more complicated situations and here the models had little connection to instances where bank credit could expand and

contract.⁸⁸ As such, the powerless unit bank that immediately loses its excess reserves and simply intermediates was a much better fit for these models than a profit-maximizing bank expanding and contracting credit.

One of the few textbooks to reconcile these opposing views that developed in the 1970s and 1980s was Taylor & Hall's (1993) *Macroeconomics* which created a completely novel pedagogic approach to bank credit creation. While nearly all prior textbooks had taken for granted that the central bank targets the actual level of reserves in the banking system, Taylor explained that a central bank could choose to do that, or could instead decide to target the interest rate. In the former case (the standard textbook approach since the 1980s) the LM curve would be nearly vertical and in the latter case where a central bank sets an interest rate target then, "the LM curve is a horizontal line at the prescribed interest rate" (1993, p. 401). Taylor's practical explanation was drawn from observed central banking practice and allowed for either a horizontal or vertical LM curve, but his unique approach failed to become a new trend in textbooks.⁸⁹ However, since this is the widely accepted view by practicing central bankers, it may help explain why there has been a change back to "loans create deposits" as well as a growing trend in textbooks to abstain altogether from discussing bank credit.

The way in which an author presents the simplified T-account can either clarify or confuse the nature of bank credit expansion. As Macleod said, "to anyone not conversant in the subject, [bank credit] seems to be a deposit of actual cash" (1866, p.117). Modern money is a monetary claim created by banks and the ability of a bank to create loan-derived deposits has little to do with the level of excess reserves as is commonly demonstrated in textbooks since the 1970s. Instead credit creation is constrained by an individual bank's ability to lend profitably and retain the loan-

⁸⁸ Currently economists are working to integrate a financial sector into the DSGE framework. But as Backhouse and Laidler (2004) argue, much was already lost with the IS-LM framework.

⁸⁹ Taylor & Hall's (1993) depiction of both a horizontal and vertical money supply curve is unique for U.S. textbooks. A horizontal LM curve would allow for individual banks to create credit as the public demanded and the central bank would supply sufficient reserves to maintain its interest rate target. For more detail see Basil Moore's (1988) *Horizontalists and Verticalists: The Macroeconomics of Credit Money*.

derived deposits at the bank. This theory of bank credit, as first laid out by Macleod and later updated by Phillips, made assertions about observable relations between money and banking. However, various frameworks or approaches have been used since then to reinterpret this theory, which over time changed the focus to a more narrow interpretation. So much so, that approaches that superficially seem quite different, such as Samuelson versus Macleod under discussion here, are in fact complementary. Each offers a distinctive view of a possible reality. But U.S. textbook authors since the 1980s made it seem as if only one possible model existed instead of explaining to students that alternative explanations of bank credit theory were equally compelling depending on the institutional setting.

2.5 Conclusion

For over a century - from the 1870's to the 1970's - mainstream theory as seen in textbooks held that commercial banks can individually create credit money when they make a loan, purchase government bonds or buy other securities. However, in most textbooks since the early 1980s, banks became simple intermediaries of preexisting money, lending only their excess reserves - not the *creators* of credit money *ex nihilo*. The fact that this became the new standard approach is unusual given that it was a clear break from tradition as well as reality. Yet, despite the surprising contradictions that arose from this awkward juxtaposition no attempt has been made so far to compile a chronological history of monetary thought as shown in American textbooks to understand how, when and why it occurred.

To interpret the evolution of bank credit theory and determine when significant intellectual change occurred, a survey of 218 textbooks going back to the mid-nineteenth century was compiled to develop an objective measure of the timing and magnitude of various changes. The findings reveal there are two distinct phases of intellectual change which occur after the 1876 to 1947 period when the view that individual banks create new money when granting loans was unchallenged. The initial change occurs from 1948 to 1971 when Samuelson's *Economics* (1948) breaks

with tradition and popularizes the unit bank versus monopoly bank framework; and then from 1971 to the present when the first textbook presents a “deposits create loans” model and the monopoly bank model is dropped from *Economics* in 1985 to joins other textbooks where only the unit bank model describes the representative banking system and endogenous loan creation is removed from the story.

Despite the fact that the survey shows an abrupt change occurring in the 1980s the way we now see bank credit taught in textbooks is best understood as the result of a gradual process with various causal factors that culminated in a new standard textbook approach. The first is that authors writing textbooks in the 1950s and 1960s had already learned bank credit theory in the interwar period and continued to follow the classical banking approach where banks individually create credit money when they make a loan, purchase government bonds or buy other securities. However, authors writing textbooks in the 1970s and 1980s were more likely influenced by Samuelson’s new approach which divided banks into two groups and gave more prominence to the small unit bank model as well as the goal of controlling the money supply.

The switch to a new mainstream view in the 1980’s was also facilitated by the Federal Reserve’s own earlier role in first popularizing the small unit bank model as early as 1939 as well as its emphasis on targeting reserve quantities instead of the Bank rate. The development of a reserve position doctrine from the 1920s to the 1970s, where the central bank controlled the supply of bank reserves and “money multipliers” determined the money stock, aided in the acceptance of the unit banking model.

Finally, this approach to money supply determination was integrated into macroeconomic models in the post-war period which marginalized the role of money. These models deliberately simplified the inherent complexity of bank credit creation and from the IS-LM framework to Real Business Cycle and Dynamic Stochastic General Equilibrium models, money was always represented as a fixed quantity controlled by the monetary authorities. When Samuelson’s twelfth edition in 1985

dropped the reference to the monopoly bank - the model he had first introduced in 1948 - the mythology was complete and a century of orthodox "banking view" of money creation no longer fit into this new paradigm.

Chapter 3

Chester A. Phillips and the Consequences of Financing World War I with Bank Credit

Chapter Abstract

The monetization of government war bonds in World War I was primarily accomplished through the creation of credit by the commercial banks. In turn this led to a fundamental change in the underlying credit structure of the American banking system in the post-war period. Economic historians look to the monetary policy of the 1920s for clues to the 1930s depression. However, scholars have generally overlooked the rapid leveraging of the banking system that took place in just a few years time and how the decision to draft the commercial banks into the war effort would directly influence the Federal Reserve's operational policy in the post-war period. This paper examines the contribution of Chester A. Phillips who articulates in *Banking and the Business Cycle* (1937) that the overwhelming effort to finance the First World War through the commercial banking system led to an unorthodox operational policy in the 1920s attempting to maintain price stability while ignoring the actual transmission channels of bank credit creation and the excessive leverage that resulted. The purpose of this paper is to investigate if this claim is justified and whether Phillips's policy recommendation from over eighty years ago - that inflation targeting alone is not sufficient - is still relevant today.

3.1 Introduction

The literature covering the first two decades of the Federal Reserve is vast and there are many valid criticisms of Federal Reserve policies during its early years. Yet, regardless of its flaws during this turbulent period, scholars have neglected how the monetization of war bonds through bank credit creation resulted in both a rapid and compressed leveraging of the banking system as well as a shift to asset purchases instead of self-liquidating loans as was originally designed. This fundamental change in the credit structure of commercial banking favoring assets over short-term loans was maintained in the 1920s in part to avoid a prolonged deflation back to pre-war price levels. As a result, the Federal Reserve's obligation to finance the Treasury until 1919 and its subsequent role as the new fiduciary of the post-war international gold exchange standard likely contributed to the lack of institutional focus on appropriate credit control strategies that addressed asset inflation as well as consumer inflation.

While war is uniformly expensive, the different methods for financing it are almost always inflationary and carry their own unique consequences. Every other World War I belligerent had quit the gold standard and chose currency inflation as the primary expedient to finance the war, which would depreciate their currency against gold as a result. Currency debasement was necessary because the more established central banks in Europe had reached the limits to which bank credit could be marshaled to war due to the fact that their banking systems were already highly leveraged relative to their gold reserves.⁹⁰ In contrast, the United States was able to rely on the newly formed Federal Reserve System to draft commercial banks into the war effort, and could do so with seemingly little consequence following the amendment of June 21, 1917 to pool member bank's gold at the Reserve Banks and lowering reserve requirements on savings deposits to 3 percent. These events

⁹⁰ Phillips *et al.* (1937 p. 24) writes, "The European nations possessed of long-established central banking systems were forced to resort to irredeemable paper because of the fact that their systems had attained virtually maximum credit expansion during the period preceding the War; there was but little 'slack' in the European central banking systems at the outbreak of hostilities."

allowed for a sizeable and rapid expansion of bank credit to take place in the newly established Federal Reserve System without having to directly inflate the currency.⁹¹

This chapter is structured as follows. The second section gives a background on the Federal Reserve System as it was conceived prior to the First World War and how that subsequently changed. Section three reviews the Federal Reserve's monetary policy and operational policy targets in the 1920s, followed by Phillips's critique of that policy in part four. Section five examines the level of credit and leverage during the 1922-1928 period and investigates whether Phillips's (1937) claim is justified that the Federal Reserve's open market operations to stabilize the economy led to excessive leverage through bank credit creation. Section six concludes.

3.2 The Shadow of World War I on Federal Reserve Policy

The Federal Reserve Act was signed into law on December 23, 1913 after considerable debate about the inherent weaknesses of the American banking system during the National Banking Era (1863-1914). An inelastic currency, pyramided reserve structure, the concentration of reserves in New York and the occasional inability to provide sufficient credit were the main criticisms (Bordo & Wheelock 2011). Following the banking crisis of 1907, Congress moved towards reform and the National Monetary Commission recommended in 1912 the establishment of a central bank with regional branches that bankers would own and operate.

The Federal Reserve System was not fully operational until several years after its creation and wartime demands would soon dominate all other concerns following the outbreak of World War I in July 1914. Once the U.S. entered the war in April

⁹¹ See *The Report of the Committee on War Finance of the American Economic Association* (March, 1919), where they say: Recent improvements in our banking system, growing out of the establishment of the Federal Reserve System and its subsequent development, have made our reserve money more efficient than it formerly was; in other words, have enabled a dollar in reserve to do more money work than before. This in effect is equivalent to increasing the supply of reserve money.

1917 the role of the Federal Reserve System in American banking policy strayed considerably from the “real bills” framework of what the founders intended.⁹² Bank credit - as opposed to currency inflation or taxation - was the most opportunistic and expedient means for the U. S. government to finance the war and as a result the commercial banking system quickly went from purchasing short-term business loans to also monetizing Treasury debt through their powers to create bank credit. As opposed to simply printing money in America’s prior wars under the new system it was possible to “print money” in a more roundabout way (See Rockoff 2004).

As the scale of the First World War increased, what may have initially seemed convenient soon became indispensable to the war effort and bank credit was the initiating source of funds which would then be lent to the Allied Powers. To accomplish this the Federal Reserve actively marketed war bonds to the public through commercial banks and underwrote the initiative by lending to member banks at below market rates if the funds were used to buy the war debt. Either by directly purchasing the securities and creating new bookkeeping credits in favor of the government, or by indirectly using bank credit to lend to individuals who purchased the war bonds, commercial banks were a critical part of the war financing effort. Loans backed by government securities reached \$2 billion which represented over 91 percent of all Federal Reserve loans and discounts and 10 percent of the total war bonds which, once leveraged, effectively underwrote the entire issuance.⁹³

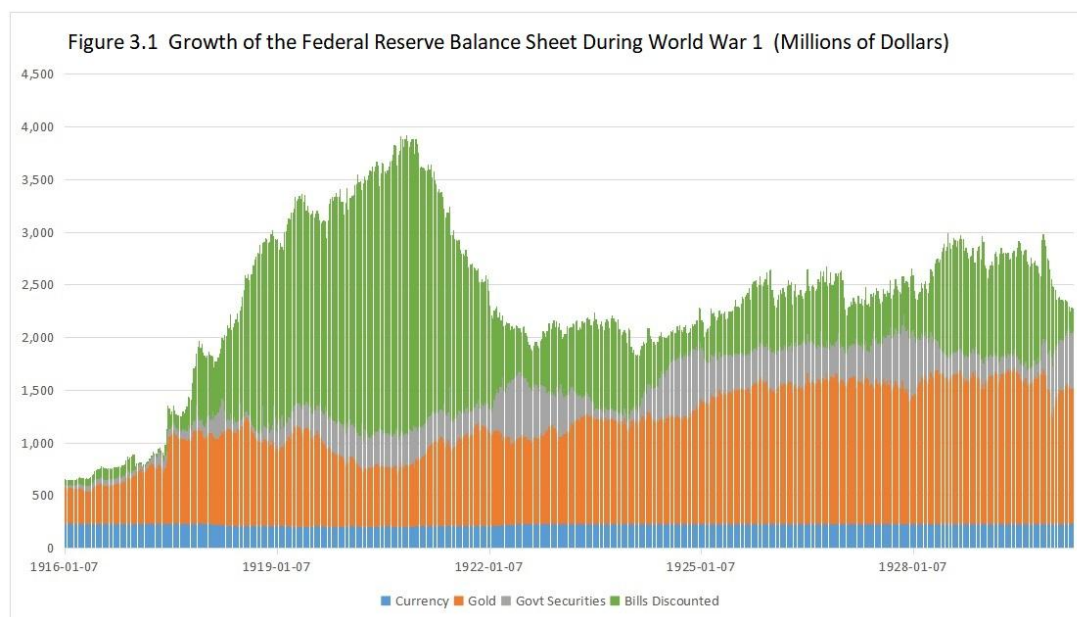
⁹² The real bills doctrine, also known as commercial loan theory, reflected the normal functioning of commercial banks of the era and was written into the Federal Reserve Act of 1913. Carter Glass, the chairman of the House Banking and Currency Committee and H. Parker Willis, of Columbia University, envisioned that credit offered to member banks would be collateralized by self-liquidating loans for productive purposes and not long-term investment loans which was the purvey of investment banks because they were not inherently self-liquidating.

⁹³ Given the 9.73 percent reserve ratio, the \$2 billion in loans could support \$20 billion in bank credit. Whittlesey (1943) writes: “Borrow and Buy,” constituted one of the distinctive features of financial policy during the First World War. A customer of a bank was allowed to buy a government bond and pay for it with the proceeds of a loan secured by the bond itself” (p. 13) and ... “The most important feature of Federal Reserve financing during and after the last war consisted of granting loans to member banks on the collateral of federal obligations. These reached a peak of nearly 2 billion dollars in May 1919; at that time they represented over 91 percent of all

The Federal Reserve System was originally set up so that Reserve Banks could support commercial banks to provide short-term loans to producers. Under normal conditions commercial banks issue their own private fiduciary, called bank credit to purchase self-liquidating loans, or “real bills” as they were known, where the repayment of the loan would come from the profits earned upon the sale of goods to the consumer, which in turn would extinguish the bank credit. In this way, bank credit expansion - subject to a reserve requirement - would ebb and flow with the needs of trade. Reserve Banks, in turn, would get business from the commercial banks when its members were hard pressed for funds.

Initially, business for Reserve Banks was slow in their first years of operation as they relied on purchasing eligible commercial paper presented by member banks at a “discount” to earn a profit and very little was presented. War financing created a new product line for their services and the sheer volume of financial intermediation (See Figure 3.1) in this short period made the Reserve Banks extraordinarily profitable (Hawtrey 1922). Commercial banks also found war finance profitable considering that Reserve Banks subsidized commercial banks by offering a preferential borrowing rate below the discount rate for purchases of war bonds. However, profit came with a cost to both their independence and the original intent of the Federal Reserve Act. The near simultaneous appearance of the Federal Reserve System and the outbreak of World War I forced the newly formed central bank to become temporarily inseparable from the financing needs of the Treasury (Wells 2017).

Federal Reserve loans and discounts. The Reserve Bank credit made available in this way helped to provide a substantial portion of the reserves upon which the growth of deposit credit was based” (p. 18).



Most economists of the World War I era believed it was better to raise taxes to fund the war, maintain adherence to the “real bills doctrine,” avoid inflation and allow speculation to be liquidated. Taxes, as opposed to borrowing, would make the true cost of war transparent,⁹⁴ and commercial bank financing of self-liquidating loans would keep the economy focused on business and not speculation. But the sheer size of the war precluded taxes from being the sole source of funding, and the vast demands placed on the various institutions tested many preconceived notions about sound finance. Severe economic and financial disturbances resulted in the design of monetary policy to stray significantly from what its founders intended and the ensuing behavior of the Federal Reserve turned out to be quite different than what was outlined in the Federal Reserve Act.

⁹⁴ Secretary of the Treasury, William Gibbs McAdoo, initially suggested that taxes should make up 50 percent and that excessive issues of debt would be inflationary. Weissman (1936) writes: “Taxation was important to the theory of war finance everywhere. It served to control inflation and to uphold the creditworthiness of governments in the eyes of their creditors.” J.P. Morgan, who initially helped raise funds for the Allies prior to the U.S. entering the war, felt that taxation should account for 20 percent of the funding, so as to not disrupt business. See for example Horn (2000).

Federal Reserve Banks are not government banks. Yet, from the moment the United States entered the war, the Federal Reserve System adopted the necessary policies to provide financial support to the Treasury. For Wilson's secretary of the Treasury, William Gibbs McAdoo, printing money was off the table. The issuance of fiat money in the Civil War had led to rampant inflation and a repeat of that could damage the reputation of the Federal Reserve and adversely affect support for the war. In contrast to the famous overutilisation of "Greenback" and "Greyback" money to finance the Civil War, the funding of the First World War therefore relied primarily on the sale of nearly \$20 billion in Treasury bonds⁹⁵ and \$4 billion in other debt instruments which made up 70 percent of the total cost of \$34 billion. Only 5 percent of the war was financed with direct money creation and the remaining 25 percent secured by taxes which acted to absorb the monetary inflation.⁹⁶

Few economists could be found to support direct money creation, but indirect monetization through the mechanics of bank finance was not seen as excessively problematic given the vast expansion of government powers during the war (See Rockoff 2004). Indeed, there were many who felt the government should do more than be a passive bystander in the efforts to steer the economy. Some economists of the era, like David Friday (1921), argued that the wartime effort was a success and businesses and banks were insured against the risk of loss. Mobilization therefore meant monetization and Treasury debt soon thereafter became the predominant form of collateral underpinning the credit structure of the American banking system. However, Phillips remarks in *Banking and the Business Cycle* that the looming consequences of using bank credit were not well known at the time.

Although it was considered at the time a temporary disturbance to the normal functioning of the system, the practical concerns of financing the war made it difficult for the Federal Reserve to wrest back control. The government could now

⁹⁵ War bonds were tax-exempt and the first Liberty Bond issue was a thirty-year bond bearing a 3.5% coupon.

⁹⁶ See Friedman and Schwartz (1963, p. 221) where they write that for the period from March 1917 to May 1919, "Of that total of \$34 billion, approximately 25 per cent was financed by explicit taxes plus nontax receipts; 70 per cent by explicit borrowing; and 5 per cent by direct money creation.

sell a bond to the commercial banks who could pay for it by borrowing the 10 percent reserve needed and finance the remainder with bank credit by adding numbers to a deposit account for the government. The use of commercial banks to purchase war bonds either directly or indirectly from bank credit creation - and not savings - explains a great deal of the wartime inflation⁹⁷ that persisted and the policy decisions that followed. By contrast, had the government sold the war bonds to the general public from prior savings the "war inflation" that occurred due to economic disruptions from 1917-1919 may have vanished following the Armistice.

"The power to wage war is the power to wage war successfully."⁹⁸ In that aim, the United States had entered the war in 1917 having made only limited preparations and by 1918 had mobilized nearly five million citizens and commanded nearly one fifth of the nation's resources. The rapid mobilization of men and resources was funded primarily by bank credit which was itself mainly a response to financial incentives. Despite unprecedented government intervention in the financial markets the ability to convert the economy to a war footing and then engage successfully on the battlefield gave newfound freedom to pursue non-market approaches. However, Withers (1924), an English economist and journalist warned that central banks during the war were, "making reckless use of a delicate machine which they did not understand and producing consequences which they neither foresaw nor recognized" (p. 16). As a consequence, the demands of World War I and its aftermath hang like a dark shadow over the entire period leading up to the Great Depression.

As mentioned previously, the total cost of World War I to the United States was approximately \$32 billion, or 52 percent of gross national product at the time and direct borrowing accounted for \$24 billion or 70 percent of the total (Friedman and

⁹⁷ Ibid: The monetary base rose from \$20.7 billion in 1916 to \$35.1 billion in 1920, or about 70 percent, while the price level increased 85 percent over the same period. Friedman and Schwartz (1963, p. 221) write, "Since the increase in bank-created money was matched primarily by an increase in government securities held by the banks or their customers, the rise in bank-created money may be regarded as indirectly associated with the financing of war expenditures."

⁹⁸ Future Chief Justice Charles Evans Hughes made that statement in a 1917 arguing for expansive war powers.

Schwartz 1963, p.221). However, had borrowing tapped existing household and corporate savings, interest rates would have had to rise considerably as there would have been a large liquidation of assets to raise the required capital. Either way, exclusive use of taxes and savings was not politically or economically feasible for a war of this scale. For this reason, the banking system became the printing press and the inevitable result was substantial credit inflation and a dramatic increase of deposits in the banking system.

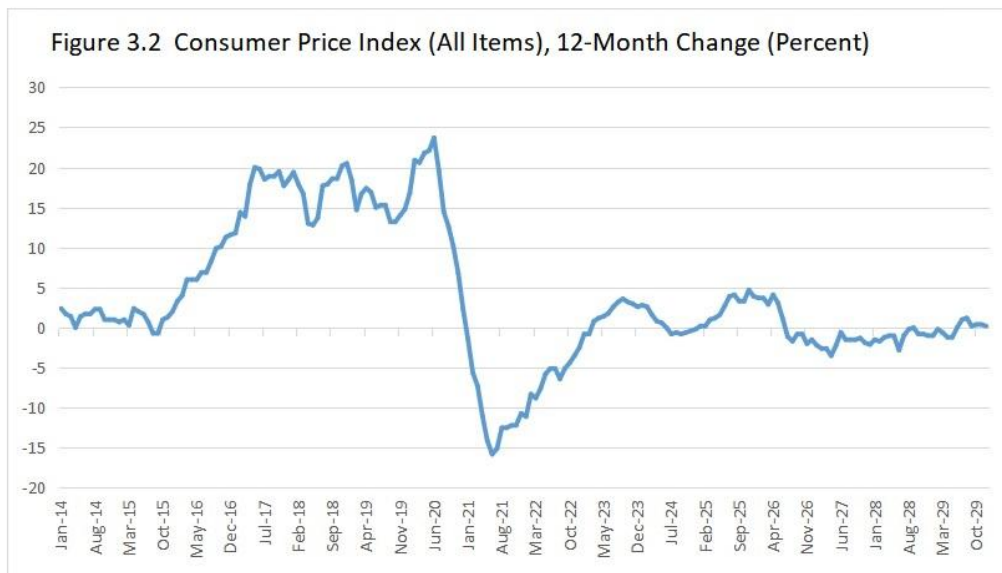
Entry into the war in 1917 unleashed massive U.S. federal spending which would require amendments to the original Federal Reserve Act to allow the Fed to make loans to member banks with government debt serving as collateral. Loans, or “discounts” to member banks purchasing war bonds at 3.5 percent who then borrowed against these at 3 percent was highly profitable (Fishe 1991). Moreover, each new purchase of government securities financed with bank credit creation circled back into the banking system appearing as new deposits and multiplied itself in much the same fashion as does the granting of loans to businesses.⁹⁹ In a reflexive manner, the purchase of war bonds and a policy of low and preferential interest rates increased banking reserves leading to a surge of available bank credit due to the multiple expansion credit through the system. In turn, credit conditions were easy, which resulted in extensive borrowing by households and businesses thriving on increased exports to Europe and ultimately fueling consumer price inflation at home.

Economic disruptions abroad led to increased demand, which was answered by extensive borrowing by businesses and households, which in turn stimulated economic growth while unemployment declined from 7.9 percent to 1.4 percent in this period.¹⁰⁰ By the time the United States declared war against Germany in April

⁹⁹ See for example Willis (1934) and Withers (1924) *Bankers and Credit* as well as Phillips (1920) *Bank Credit* and Phillips (1937) *Banking and the Business Cycle*

¹⁰⁰ See for example Broadberry & Harrison (2005). The decline was also driven by the military draft which lowered the available pool of young men from the civilian labor force as well as the increase manufacturing jobs created.

1917, wholesale prices had already risen 15 percent above the pre-war level. Upon entry into the war, the inflation rate jumped an additional 19.66 percent in 1917 which stirred a panic and led to the creation of the consumer price index that year.¹⁰¹ Cumulative inflation for the period of 1913-1919 reached 78 percent, slightly higher than the Second World War and just below the Great Inflation of 1970-1979 (see Figure 3.2).¹⁰² Prices continued to rise sharply for another year after the Armistice as passive supply of Federal Reserve credit continued until after the war due to demands from the Treasury. Inflation by then was a global phenomenon for those involved in the war. Keynes (1919 p.220) writes, "Inflation engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose."



Source: U.S. Bureau of Labor Statistics

Following the rapid increase in prices in the United States and the devastating currency inflations in Europe, it is hardly surprising that economists in the postwar period were decidedly anti-inflationist. The desirability of a stable price level in the immediate postwar period is evidenced in both Keynes's (1919) *Economic*

¹⁰¹ The Consumer Price Index was initiated in 1917 to calculate cost-of-living adjustments for wages.

¹⁰² World War II was nearly ten times that of the First World War but the inflation rate was lower at approximately 68% from 1940 to 1949 compared to 78% for 1913 to 1919 (Source: U.S. Bureau of Labor Statistics).

Consequences of the Peace and Irving Fisher's (1919) *Stabilizing the Dollar*. The debates in this era were mostly in agreement that run-away inflation caused uneven and unjust economic disturbances, but there was no clear consensus about the best way to control price fluctuations.

Many of those advocating for a stable price level considered price movements which occurred under a fractional reserve banking system within a gold standard as undesirable. Consequently, they believed replacing the gold standard with a managed currency could reduce price fluctuations. Fisher (1919 p.156) wrote that following the Armistice "... the general expectation seems to be of a decline in prices, which would, however, if sharp, be just as great an evil as the present high prices." Since the United States now had an index to calculate the general price level Fisher believed it would be possible to "stabilize" the dollar's value so as to not overly advantage or disadvantage the creditor in relation to the debtor. The only questions that need to be asked, according to Fisher (1919 p.157) were: Where do we stabilize the post-war price level now, and how do we keep it there? As to the first question Fisher writes:

Most existing contracts and understandings were made during the war. A rough estimate which I have made of existing indebtedness - bonds, notes, mortgages, bank loans, and other obligations - seems to indicate that their average duration is approximately two years. If then the price level should soon become what it was two years ago, say in 1916-17, it would seem wise to adopt that level as the start-off. (Fisher 1919, p. 158)

Answering how to keep it there, Fisher writes that one way this could be done is to:

... Shift the weight of the dollar (or the amount of gold bullion exchangeable for a gold certificate) up or down according as the purchasing power of the dollar (as measured by the index number of prices) goes down or up. Thus the purchasing power of the gold certificate will be kept constant in terms of goods while the weight of the gold dollar is allowed to fluctuate.

(Fisher 1919, p. 158)

In a discussion of this proposal before the American Economic Association, Benjamin M. Anderson (1919, p. 163), remarked that Fisher's proposal assumed instant redemption in gold, saying, "This plan, a refinement of the gold standard, and presupposing the gold standard, is too delicate and fragile a barque to navigate such troubled waters as the war has brought about." However, Anderson goes on to say that "Very many economists are interested in it and not a few public men. If adopted in the modified form which I suggest,¹⁰³ it seems to me that it would represent a very distinct improvement in our monetary system (1919, p. 165).¹⁰⁴

To stabilize their economy and the price level in the postwar period, Britain and France looked to restore the international gold standard. But the First World War had drained their gold reserves and the financing of the war through currency debasement by many nations would prevent the system from functioning exactly as it had prior to the war. In part this is because the war had unbalanced the system as gold flowed from Europe to the United States to pay for munitions, food, and other US exports. Therefore, as the end of the conflict neared, a decision by European belligerents had to be made as to whether to return to the gold standard and, if so, at what rate.

Although the Federal Reserve facilitated war finance at the expense of inflation during World War I, a reversal of fortunes placed New York above London as the world's leading financial center. When World War I began, the United States was a net debtor on international capital markets.¹⁰⁵ But the war had vaulted the United States to a new status as the world's largest holder of gold and the new fiduciary of the international gold standard. By consequence the United States was the leading creditor nation with a fully operational central bank and the world would now follow its decisions (Eichengreen 2007).

¹⁰³ The modifications proposed are in summary: (1) that it be done by international agreement; (2) that it be done only after prices have gone down to something like a stable normal level; (3) that changes under the plan be limited to 2 per cent or 2 1/4 per cent a year." (1919 p. 165).

¹⁰⁴ See Dimand (2003) for a discussion on the competing visions for the U.S. monetary system.

¹⁰⁵ Between 1914 and 1919 foreign investments in the United States fell from \$7.2 billion to \$3.3 billion as the war forced Britain and France to liquidate many of their investments in the United States. See Eichengreen (2007)

Anticipating that countries would eventually return to the gold standard meant demand for the yellow metal would rise as it was re-monetized. To make this institutional arrangement function in the postwar period, participating nations agreed upon a gold “exchange” standard where participating countries could hold their monetary reserves in foreign exchange convertible into gold. Returning to gold under this new monetary institution would allow the United States to choose between management of the new standard and domestic policy objectives as long as there was a surplus of gold to meet reserve requirements. Consequently, during the interwar period Federal Reserve policy oscillated between domestic objectives and the broader goals of the international gold exchange standard. However, it did not prevent discretionary management of the domestic economy. As Crabbe (1989, p. 427) writes:

The gold standard, however, did not play an active role in the implementation of policy, as the act required that Federal Reserve Banks maintain only a minimum ratio of gold reserves to currency and deposits. (The gold standard would have played a more active role had the act stipulated the maintenance of a specific gold reserve ratio.) Because the gold reserve requirement rarely restrained policy between 1914 and 1933, the Federal Reserve had broad discretionary powers to manage the nation's money supply in the advancement of domestic objectives.

The Armistice in November 1918 brought with it the expectation of falling prices as the inflation to deflation phenomenon following a war was widely anticipated. In 1919 many in the press also proactively called for a “liquidation” to bring prices and wages back to their pre-war levels (Moulton 1919). A feeling of uncertainty prevailed but money and credit were almost as easy after the war as it had been in 1917-18. There was still “the spirit of adventure and a readiness to take chances— especially with borrowed money” (Woytinsky 1945). After a short initial contraction in the first half of 1919, prices shot higher and ended the year up nearly 17% from the previous year as the volume of trade had expanded and profits remained high (Rockoff 2004).

The return of soldiers and pent-up demand sent the economy into high-gear as industries retooled to peacetime amid a third consecutive year of double-digit inflation.

The end of the war brought another year of spectacular profits for American businesses and this led to wild speculation in all areas of the economy. Warnings were issued by the Reserve Banks and a letter made public by the Board on June 10, 1919 stated, "The Federal Reserve Board is concerned over the existing tendency towards excessive speculation, and while ordinarily this could be corrected by an advance in discount rates at the federal reserve banks, it is not practicable to apply this check at this time because of government financing." Another statement from July said, "it is not the function of the Treasury, nor of the Federal Reserve banks, or the banking institutions of the country, to provide cheap money for stock speculation" (*Federal Reserve Bulletin*, July, 1919).

The Federal Reserve, having tried moral suasion, then resorted to the use of its primary tool, the discount rate. The New York Fed increased its discount rate from 4 percent in October 1919 to 7 percent in June 1920 in an attempt to reverse price inflation and arrest speculation. Rising interest rates were felt most directly by the agricultural sector as there had been a major expansion in production to meet the need for war commodities. When prices fell farmers failed to make payments on their loans forcing businesses and households to cut spending. Unemployment then rose from 4 percent to around 12 percent in 1921 as a severe depression took hold.¹⁰⁶

By mid 1921 consumer prices fell 16 percent from their highs, but a sizeable deflation in bank credit was not to be seen. The Federal Reserve banks had lent freely to their members so that instead of reducing their holdings they borrowed against their war bonds and commercial paper. Much of the new credit issued came

¹⁰⁶ Meltzer (2010) agrees with W. Mitchell (1929) that the deflation and recession of 1920-21 were in part due to insufficiently preemptive monetary policy. Meltzer writes, "Expansionary monetary policy clearly facilitated the inflation that took the wholesale price index from 76 in 1917 to 100 in 1920" (p. 111).

from regional Reserve banks in the South who were trying to carry businesses through the severe agricultural commodity price deflation (See Tallman & White 2017). In the second half of 1919 government securities held by the banks in the Federal Reserve system had declined by \$825 million, but loans, investment and rediscounts rose by \$1,759 million and net demand deposits rose by \$1,129 million (Phillips 1937), despite member banks loans growing 47 percent more than production from 1917 to 1919.¹⁰⁷

Date	Member	Change	Non-Mem	Change	GDP	Change	Price Index	Change
Jun-14	8,313		12,475		36,831		9.69	1%
Jun-15	8,764	5%	12,702	2%	39,048	6%	9.74	1%
Jun-16	10,315	18%	14,271	12%	50,117	28%	10.64	9%
Jun-17	12,453	21%	15,833	11%	60,278	20%	12.82	20%
Jun-18	18,507	49%	13,306	-16%	76,567	27%	15.06	17%
Jun-19	22,242	20%	14,330	8%	79,090	3%	17.3	15%
Jun-20	25,559	15%	16,125	13%	89,246	13%	20.04	16%
Jun-21	24,121	-6%	15,880	-2%	74,314	-17%	17.9	-11%
Jun-22	24,182	0%	15,774	-1%	74,140	0%	16.77	-6%
Jun-23	26,507	10%	17,230	9%	86,238	16%	17.07	2%
Jun-24	27,167	2%	18,013	5%	87,786	2%	17.1	0%
Jun-25	29,518	9%	19,312	7%	91,449	4%	17.53	3%
Jun-26	31,184	6%	20,378	6%	97,885	7%	17.7	1%
Jun-27	32,756	5%	20,994	3%	96,466	-1%	17.37	-2%
Jun-28	35,061	7%	22,204	6%	98,305	2%	17.13	-1%
Jun-29	35,711	2%	22,763	3%	104,600	6%	17.13	0%
Total Change	27,398	330%	10,288	82%	67,769	184%	7.44	77%

Source: Own elaboration from Federal Reserve Board 16th Annual Report, p.101

3.3 Monetary Policy and Operational Targets in the 1920s

The Federal Reserve's first use of the discount rate was intended to control the amount of bank credit outstanding and based on the well known workings of the Bank of England moving the "Bank rate" under the classical gold standard. In a July 1920 statement from the *Federal Reserve Bulletin*, they wrote, "The question constantly asked within the past few months has been the relationship noted between control of credit, the application of higher discount rates, and the actual

¹⁰⁷ Table 3.1 shows the growth in loans and investments (in millions of dollars) by member and non-member banks as well as the growth in nominal GDP (in millions of dollars) and the consumer price index.

expansion of operations. The general conclusion to be drawn is unmistakably to the effect that the operation of credit control through higher discount rates has had a marked success." (*Federal Reserve Bulletin*, July 1920, p. 665).

Two respected monetary economists of the era, O. M. W. Sprague and H. G. Moulton, conveyed the general attitude of 1920 concerning the efficacy of rate changes. Sprague (1921, p. 27) writes, "the discount rate of the reserve banks is clearly an effective means of checking credit expansion, but it is also evident that advancing rates influence the situation rather slowly." And Moulton (1920, p. 175) remarked that "a raising of the rate of discount at the federal reserve banks tends to increase the discount rates on all loans by member banks." However, this sentiment was based in part on the expectation that the central bank's interest rate policy would be guided by classical gold standard rules which were no longer firmly in place in the early 1920s.

Raising the discount rate put an immediate stop to speculative inflation in 1920, and liquidation of excess inventories plunged the price index at a rate not seen since the Civil War deflation. However, the basis for the monetary inflation - war bonds - that had become the new backing of the credit structure remained and was unlikely to be remedied by the discount rate alone. Consequently, if the credit inflation brought about by the war loans were to be quickly reversed, it could only be done by paying off part of the national debt. In England, a similar situation existed as the amount of currency created during the war was too large to contract by the Bank rate alone. Despite the higher discount rate, the commercial banks were still able to borrow freely and without premium (or penalty) at the discount window as their loans and war bonds served as eligible collateral. In fact, from 1919 to the end of 1921, aggregate borrowing by the commercial banks actually exceeded total bank reserves (See Meltzer 2010). Member bank discounts typically exceeded total reserve balances by as much as 50 percent from 1919 to the end of 1921. Initially gold and Federal Reserve notes deposited at the Federal Reserve banks constituted the main banking reserves, but during the Federal Reserve's discount rate hike cycle from

1919 to 1920 commercial banks were forced to borrow their reserves thus creating discounted reserves in the Federal Reserve system.¹⁰⁸

Following the substantial hikes in the discount rate from November 1919 to July 1920, wartime inflation was halted and speculation stopped. Borrowing and spending gave way to saving and investing. But the recession of 1920-21 was particularly striking for its extraordinary deflation - the most severe deflation in America's history since the Civil War. Despite having done what most contemporaries agreed needed to be done, Whittlesey remarked (1943, p. 20), "The Federal Reserve was caught in a cross-fire of criticism." He added that, "On the one hand it was attacked for having maintained too liberal a policy during and immediately after the war, and of having thereby contributed to inflation. On the other hand it was accused, particularly by the agricultural groups, of having brought about the postwar collapse in commodity prices by raising its rates too high" (ibid).

Eichengreen (1995, p. 120) remarks, "The Fed was determined to eliminate redundant money and credit so that speculative excesses would not recur. The policy came to be known as 'liquidation.' In December 1920, the Federal Reserve Board rejected the option of discount rate reductions on the grounds that they threatened to provoke renewed speculative excesses." The situation in late 1919 was the outcome of the previous five years of war and the U.S. monetary authorities sought to drive prices back to their pre-war levels. This was actually the expected course of action as previous high-inflation periods were always followed by prolonged deflation driving prices back to the previous level, or in some cases such as the post Civil War period, to below the prewar level. In 1920-21 the price level fell even faster than the 1930-33 decline and at about the same rate as the post Civil War deflation, although this time many consumer prices were "only" cut in half.

Woytinsky (1945, p. 18) observes, "Both the Civil War and World War I left some maladjustments that were temporary and more or less superficial, and others that

¹⁰⁸ Tallman and White (2017) remark that expansionary Reserve banks were able to borrow excess reserves from the other Reserve banks to continue lending emulating Bagehot's lender of last resort functionality.

remained in the economy like a hidden infection, with delayed action. Economic development after both wars was characterized by acceleration of prewar trends and by violent clashes of inflationary and deflationary forces.” Bordo (2010, p. 1) writes that although Fed officials became concerned about the run up in inflation in 1919, “The Treasury wanted to keep interest rates low and bond prices high to protect the commercial banks, which had absorbed its debt.” Although the Federal Reserve was founded on the “real bills” principle of endogenous money creation through self-liquidating commercial paper, the large amount of reserves created from Treasury debt from 1917-1920 offered a different model of money creation and control. Treasury war debt and the open market purchases of these government securities would form the basis of monetary control through open market operations in the 1920s.¹⁰⁹

During the First World War member banks borrowed heavily from the Reserve Banks and prior to 1923 monetary policy was conducted principally by changes in the discount rate. However, following the end of the war and the Federal Reserve’s attempt to quell inflation and speculation through raising the discount rate in 1920-1921, many member banks repaid a large part of their borrowing and the earnings of the Reserve Banks declined. In order to maintain operating income, a number of Reserve Banks bought a large amount of government securities in 1922 to earn the interest. These purchases also helped the economy recover from the 1920-1921 recession as member banks were once again flush with money to pay down their borrowing and begin lending again. Consequently, the large purchases by a number

¹⁰⁹ Prior to the First World War total government debt was only about \$1 billion, which were mainly long term bonds held by national banks. Consequently open-market operations in the government security market was not feasible. However, the war necessitated that the Federal Reserve support the Treasury for a market in its securities and Benjamin Strong and other Fed officials observed that coordinated purchases and sales influenced market interest rates and credit conditions. In 1923 the Open Market Investment Committee was established and due to the large supply of short-term government securities after the war the Fed began to use open-market operations as a new tool to conduct monetary policy. See for example Chandler (1949) and Meltzer (2010).

of Reserve Banks in 1922 can be considered the first open market operation in government securities.

The Federal Reserve made substantial open-market purchases of government securities again in 1924 and 1927, which to some observers at the time was controversial because open-market operations served to add new reserves to the banking system without member banks actually demanding new reserves as would be the case under the “real bills” mechanism (Willis 1922). The increase in bank reserves available for lending purposes therefore generated a large increase in demand deposits, but especially in “time” or savings deposits - irrespective of the demand for an increase in money from businesses seeking finance (Phillips 1937).

Economic historians therefore look to the Federal Reserve’s monetary policy of the 1922-1929 period for clues to whether their actions in some way led to the 1930s depression or if it was simply a failure to maintain monetary growth in the 1930s which turned a recession into a depression.¹¹⁰ Certainly, in hindsight, a more rigorous formulation of monetary policy could have served well to prevent policy errors. However, in the aftermath of the First World War the Federal Reserve was “faced with challenges for which it saw no precedent” (Tallman and Jacobson 2020) and learned to guide policy only after learning from its mistakes.

According to Meltzer (2010) there are three generally agreed upon policy errors in the early years of the Federal Reserve System. The first was the failure to persuade banks to restrict overall lending in 1919 following the Armistice in November 1918. The second error was the overly aggressive and rapid increase in the discount rate from 4 percent in October 1919 to 7 percent in June 1920, which precipitated a sharp deflationary recession from 1920-1921. The third policy error was the failure to act with the same decisiveness in the 1930s, following the stock market crash of

¹¹⁰ See Meltzer (2010) Chapter 2 about policy mistakes. Meltzer later writes: "If the Federal Reserve had maintained monetary growth, the country and the world would have avoided years of depression" (p. 728). "Nothing in theory or central banking practice can explain why the Federal Reserve did not respond to the failure of thousands of banks [in the early 1930s]" (p. 729).

1929. Today, the monetarist-driven perspective about policy errors is the most accepted (Nelson 2020). However, during the interwar period there were many overlapping theories of monetary policy stemming from either the belief that prior excesses needed to be liquidated or that deflation altogether must be averted. In the following section Phillips's critique is examined to see if the rapid leveraging of the American banking system and the open market operations of 1922, 1924 and 1927 created an environment where the Fed ignored the actual transmission channels of bank credit creation in their pursuit of stabilization policies.

3.4 Phillips's Bank Credit Critique of Monetary Policy

In their classic book, *A Monetary History of the United States*, Milton Friedman and Anna J. Schwartz (1963) attribute the high growth and low inflation of the 1920s to good management by the Federal Reserve. Interventions in 1924 and 1927 to stabilize prices and smooth the business cycle also worked to promote and expand the international gold standard by lowering domestic interest rates which would stem the inflow of gold and allow other nations to attract gold with their higher interest rates. However, Phillips (1937) contends in *Banking and the Business Cycle* that the focus on stabilization policies led to an unnecessary expansion of reserves during the 1920s that allowed commercial banks to use their credit-creation powers to purchase investments which could not be easily liquidated in a Fisherian debt-deflation.¹¹¹ To Phillips, this change to the underlying credit structure of the American banking system is in part what made recovery following the 1929 crash so elusive.

Phillips had made this same point previously when he wrote in *Bank Credit* (1920 p.9) that, "What the commercial banker ought assiduously to avoid, even where loans are based on time deposits, is the unliquid condition of the loan item that exists when his funds are invested heavily in fixed form, in real estate, equipment, etc.

¹¹¹ See Fisher (1933).

Repayment then becomes a matter not of days or months, but of years, and may be extremely uncertain.”

The purpose of this chapter is to investigate Phillips’s claims that bank credit expansion in the 1920s was mainly due to the Federal Reserve’s own policy decisions and to examine his recommendation that price stabilization policy alone is not sufficient. Let us first examine the critique, and then the evidence in section 3.5.

A brief summary of Phillips’s critique is as follows: The beginning of the long-lasting depression of the 1930s must first be traced to the First World War, which overrode the underlying framework of the Federal Reserve Act that had originally been designed to support a bill market similar to the example set by the London money market. Elasticity in the bill market would provide an almost automatic mechanism where commercial banks could acquire needed funds to finance trade but not engage in overly expansionary policy, as long as loans were made for “real” goods as opposed to “financial” transactions such as the stock market or long-term investments. Second, the drafting of the commercial banks into the war effort meant that bank credit was used to purchase the war bonds, and the proceeds of these funds returned to the banking system resulting in a multiple expansion of deposits beyond the needs of trade thereby creating a direct link between war financing and excess reserves which led to banks needing to lend these excess reserves.

Third, the amendment to the Federal Reserve Act in 1917 that concentrated gold at the reserve banks and the lower reserve requirement on savings or “time” deposits led to a rapid and compressed leveraging of the American banking system during the war, where the underlying credit structure was no longer based solely on short-term commercial loans but on long-term assets (war bonds) as well. These assets not only formed the basis for collateral against which banks could borrow from Reserve Banks and further expand bank credit but also became the basis for a new type of monetary policy - open market operations - which could easily add new reserves to the banking system. Fourth, the attempt to squeeze out inflationary excesses in the 1920-1921 period was cut short (because it was so severe) and as a result, the price deflation did not result in restoring the economy to a sustainable equilibrium. Finally,

and most importantly, a focus on stabilization policies in the 1922-1928 period and substantial open-market purchases in 1922, 1924 and 1927 inadvertently allowed bank credit creation to flow into assets but did not generate consumer price inflation which could have forced the Federal Reserve to tighten credit conditions.

Phillips's principal contribution to the study of monetary economics consists of his work on the multiple expansion of deposits presented in *Bank Credit* (1920).¹¹² He was widely cited in the interwar period for his examination of the process of bank credit creation and his analysis is like that of his contemporaries who were well versed in the pre-Federal Reserve monetary controversies of the National Banking Era. As such, *Bank Credit* devotes the first half to the study of the multiple expansion of deposits and the second half to the ability of the newly established Federal Reserve System to control credit. *Banking and the Business Cycle* (1937) should therefore be seen as an extension of his original work on the ability of banks to create credit and how the Federal Reserve has the ability to control this credit but failed to do so appropriately in the 1920s.

Bank Credit sought to clarify the muddled thinking that existed at the time regarding the fact that when a bank makes a loan the entire system will eventually multiple credit until it has reached the reciprocal of the reserve rate set by the central bank. Phillips's addition to monetary theory is that he presented the expansion of deposits as occurring where banks act as non-homogenous strategic agents in competition with others which causes each individual bank to lend either a little more or a little less than the new deposit it receives. Afterwards, it is the bank's inability to retain its newly created deposits that results in a multiple expansion of loans throughout the banking system. In *Banking and the Business Cycle*, Phillips builds upon his analysis of commercial loans creating the money supply and shows that commercial bank financing of government debt during the war also resulted in money coming back to the banks as deposits which allows for even more lending. He writes:

¹¹² Phillips showed that under competition for scarce reserves - which he accepts are supplied exogenously by the monetary authorities - an individual bank's power to create money is limited not only by its reserve requirement but also by the ability to retain its newly created loans at the bank and attract new deposits.

Thus it will be seen that loans and investments more than doubled in the six-year period from 1914 to 1920. With that doubling went a like increase in deposits for the entire banking system in the United States, since deposits, as just pointed out, are created principally by loans and investments. (1937, p. 20)

Whittlesey (1943) concurs when he writes in *The Banking System and War Finance*:

The most important feature of Federal Reserve financing during and after the last war consisted of granting loans to member banks on the collateral of federal obligations. These reached a peak of nearly 2 billion dollars in May 1919; at that time they represented over 91 percent of all Federal Reserve loans and discounts. The Reserve Bank credit made available in this way helped to provide a substantial portion of the reserves upon which the growth of deposit credit was based. Open market operations, on the other hand, were of relatively small proportions, consisting of purchases amounting in all to only about 300 million dollars. (Whittlesey 1943, p. 18)

Phillips (1937) says that to understand the 1920s boom and bust, "The monetary or bank credit theory occupies first rank in the chain of causation and explains the origin of the boom" (p. 4) and he draws an immediate distinction between understanding commodity price inflation during the war and investment inflation of the postwar period. He writes, "The post-War inflation in the United States was an investment credit inflation, however, as distinguished from the commodity credit inflation of War-time" (p. 4). Phillips stresses that a price inflation can be more easily remedied precisely because it is generally expected. However, asset price inflation - like that which occurred in the postwar period - was more pernicious because the asset inflation was unforeseen and the subsequent deflation of asset prices was not at all expected and made more difficult due to the relative illiquidity of those assets.

Phillips says this occurred in part due to the necessities of war which changed the credit structure from short-term self-liquidating loans to that of commercial banks holding long-term investments. While this was not intended, he contends that instead of purging themselves of long-term investments in the 1920s, commercial banks simply replaced one long term asset (war bonds) for another. This, says Phillips, was facilitated “unwittingly” by the Federal Reserve’s “managed currency experiment” to target price stability. He concludes by saying, “Lastly, the fact that in no previous depression had there been such a wholesale destruction of bank credit, attributable in large part in this instance to the entanglement of the banking system with the preceding investment and stock market frenzies, aids in explaining the unprecedented duration of the Great Depression” (p. 10).” Phillips adds:

In the modern world of finance, however, the most important single cause of inflation is the multiplication of bank credit by the banking machinery, resulting in an increase in the volume of purchasing power subject to check at a rate faster than the rate of increase in the volume of available goods. It is the latter form of inflation which will be discussed in the main here, as it was resorted to on an extensive scale by all countries participating in the War, and it was the predominant type of inflation in the case of the United States. (p. 14)

Central to the bank credit critique of the war and the immediate postwar period is that, “the purchase of investments by banks creates new deposits in the banking system in much the same fashion as does the granting of loans” (p. 6). The economy was therefore stimulated first by the purchase of war bonds, and the subsequent multiplication of deposits that occurs throughout the banking system. The economy was then stimulated again by the purchase of long-term commercial bonds, which altered the underlying credit structure away from short-term liquidity. But this cannot happen in total isolation because, he says:

The volume of reserves in the member banks, however, is subject to enlargement or diminution by the action of the Federal Reserve Banks; that is to say, the Reserve Banks may 'create' excess reserves for the member banks much as the member banks 'create' credit. The adoption of such a policy by the Reserve System on three separate occasions during the 'twenties was the significant action leading to an expansion of total bank credit during that period. (1920, p. 7)¹¹³

Phillips extends the instructive nature of *Bank Credit* (1920) where the act of purchasing a short-term commercial loan with bank credit multiplies the total purchasing power of an economy. In *Banking and the Business Cycle* (1937) he adds to this exposition by explaining that banks also "create" credit when they purchase assets and this has the same effect on the multiple expansion of deposits. This detail of banking theory, Phillips says, "... was neither understood nor recognized by writers on the subject until the period of War finance brought it into sharp relief" (p15). The multiple expansion of bank credit can therefore occur from the purchase of loans as well as investment assets whenever the proceeds are deposited back into the banking system. Phillips explains:

That banks "create" credit by granting loans has long been known and recognized. The precise nature of the process of creation of credit was not generally realized nor adequately analyzed, however, until after the termination of the World War. (p, 16)

In much the same way as Phillips writes in *Bank Credit* (1920) that the process of bank credit creation was not well understood - even by most economists, he adds that "The correlative process of the creation of bank credit, by means of purchases of investments on the part of the banks, is far from having universal recognition even today." As such, "It seems quite certain that some of those responsible for the way

¹¹³ These three separate occasions were the open-market operations of 1922, 1924 and 1927.

in which the War was financed in this country were not cognizant of the procedure by which it was done” (p. 16). They were, as Withers (1924, p. 58) puts it, “making reckless use of a delicate machine which they did not understand and producing consequences which they neither foresaw nor recognized.”

Phillips says the general public did not understand this process and he credits Hartley Withers in England as possibly the first person to make this critical observation. From the United States, he credits H. Parker Willis of Columbia University, who had worked with Carter Glass in drafting the Federal Reserve Act, and Benjamin M. Anderson,¹¹⁴ whose book *Effects of the War on Money*, written in 1919 and his subsequent writings for the *Chase Economic Bulletin* were very influential to Phillips for their explanations on why postwar inflation moved from commodities prices to asset prices.¹¹⁵ Phillips explains how these works influenced his writings:

Our purpose has been in large part that of developing the underlying theoretical portion of their works into an explanation of the depression in this country. Of American economists writing before the event, Dr. B. M. Anderson, Jr. and Professor H. Parker Willis were perhaps most conversant with the nature of the post-War banking developments leading up to the 1929 panic, and our own knowledge has been enriched by their analyses. (1937, p. viii).

¹¹⁴ Benjamin M. Anderson was a well respected economist and vocal critic of Federal Reserve monetary policy in the 1920s. Following a brief academic career at Columbia and then Harvard he moved back to New York City to join the National Bank of Commerce in 1918 and then Chase Bank in 1920 as the new editor of the bank's *Chase Economic Bulletin*. In these bulletins he focuses on what he argues is an overly simplistic view of price stabilization policy and the problems associated with managing debts from the First World War and the effect these policies have on the banking system.

¹¹⁵ Phillips also mentions Ralph A. Young's study for the National Industrial Conference Board, *The Banking Situation* in the United States, proved an invaluable guide. As well he says Professor T. E. Gregory “has unknowingly aided in smoothing several knotty points.” (1937 p. viii)

The goal of the Federal Reserve System was to provide economic stability. However, by the 1920s, how to achieve that goal had evolved. Consequently, the Fed has both contributed to economic stability and also been a source of instability at times.

Phillips credits Anderson for recognizing very early in the 1920s some of the incipient sources of instability provoked by the Federal Reserve's goals to stabilize prices and the business cycle as well as promote the international gold exchange standard. In particular Anderson argued that credit conditions were too easy, given that member banks could borrow directly from the Fed - below market rates of interest - and that open market operations had injected new reserves into the system irrespective of whether they were needed to finance commercial trade. These excess reserves had inadvertently generated a large increase in time deposits which were then used as the basis to further extend loans thus adding undue purchasing power. Phillips explains this led to a rapid and compressed leveraging of the American banking system:

Under the spur of the policy of War finance pursued in this country, a comparable degree of expansion for the American system was compressed within half a decade. The result was a forcing process impinging upon a relatively stable pre-War price level, with the prompt and rapid rise in prices already indicated. (1937, p. 24)

Phillips contends that the main causes for that prolonged upturn and sharp downturn were monetary. While the argument he presents focuses on the use of bank credit, his overarching analysis in *Banking and the Business Cycle* is also influenced by the business cycle theory of the Austrians Mises and Hayek, whose ideas Anderson also supported.¹¹⁶ Phillips argued that monetary expansion in the form of bank credit spurred investment in excess of the actual savings in the economy, which then brought forward new borrowing for long-term investment

¹¹⁶ Ludwig von Mises and Friedrich A. Hayek did not support the price-level stabilization idea of Irving Fisher. Mises argued that stabilizing the price level to a "representative" index could be arbitrary. See for example Bellofiore (1998) and Selgin (1999).

projects. Phillips focuses his attention on the fact that between 1921 and 1928 time deposits had increased by 76 percent. This he compares to demand deposits, which had increased only 31 percent over the same period, the cause being that the minimum reserve requirements for time deposits had been set lower than demand deposits. As a result, there was a dramatic rise in construction and real estate prices, notably in Florida during the 1920s, as a byproduct of Federal Reserve policy, which led to excess reserves which found their way into savings accounts which could be highly leveraged by the commercial banks in the making of new loans.

Phillips saw Federal Reserve policy in the 1920s as having sponsored a substantial expansion in bank credit due to its policy of using open-market operations to increase reserves in 1922, 1924 and 1927, as well as its decision to keep a much lower minimum reserve on time deposits which banks could use as leverage to increase lending. As a result, the Fed's policy had created a serious but seemingly unnoticed disequilibrium in the actual savings to investment channel. The main reason that this was unnoticed was that the large productivity gains in the 1920s, which should have led to a falling price level, was offset by the Reserve Banks creating excess reserves over the same period, which in many ways canceled each other out to produce what seemed to be a stable price level.¹¹⁷

This idea of an inflationary expansion of credit above the existence of "real" savings is well ingrained in the narrative of the Austrian Business Cycle Theory, which was developed from the 1920s to the 1940s and is also similar in some ways to the Banking School adherents of the previous century who saw inflation as the consequence of an excess of money and credit over the needs of trade. The American monetary economist Edwin Kemmerer (1920, p.3) wrote that, "Although the term inflation in current discussion is used in a variety of meanings, there is one idea common to most uses of the word, namely, the idea of a supply of circulating media in excess of trade needs." Phillips's views of the monetary causes of the 1917

¹¹⁷ Laidler (2003) writes that Mises, Hayek and Robertson were "sceptical about the sufficiency of price level stability for the overall stability of the economy, and to propose price deflation at the economy's rate of productivity growth as a defence against the development of imbalances in financial markets" (p. 11).

to 1928 period certainly intersect with the Austrian theory of how a business cycle may happen and the Banking School definition of inflation as the excess supply of money relative to the needs of trade. To Phillips, the main cause of the investment over actual savings was first due to the decision to draft the commercial banks into the war effort and second due to the stabilization policies of the 1920s to manage the price level and smooth the business cycle with open market purchases.

The object of stabilization policies was to keep credit abundant in an attempt to promote stable growth without a rise or fall in the general price level. While so-called inflation targeting policies have been implemented by the world's central banks since the 1990s, the idea here is to illustrate that targeting consumer prices is not new, and may not prove effective in preventing the boom to bust cycle that the monetary policy is attempting to control. Eichengreen (2002) writes that some observers contend that monetary policy was too loose before 1927 and too tight later, drawing parallels "between the 'new economy' of the 1990s and the 'new age' of the 1920s" (p. 9). But whereas Eichengreen and the majority of other scholars show bank credit growth not exceeding trendline growth until 1927 (see for example Eichengreen 2002, p. 40) - which is precisely when the Fed in fact begins to react to stock market speculation - Phillips argues that excess bank credit growth was evident well before 1927 and could have been countered. To Phillips, the 1920s were an "experiment" in monetary management which was directly responsible to the financial crisis that ensued in the 1930s precisely because inflationary credit flowing to investment activities was not taken into account by the stabilization policies undertaken by the Federal Reserve.

3.5 Expansionary Policy Drove Further Credit Creation

Phillips's argument that the Federal Reserve did in fact provided excess credit during the 1920s is now examined. He writes that the various factors at play and the degree of "interdependence and circularity" (1937, p. 86) made it nearly impossible to determine direct cause and effect relationships. Consequently, the main contribution

in this section is to supply data which help to better illustrate Phillips's argument. From his statistical analysis, the primary responsibility for the expansion of credit was the provision of credit by the Federal Reserve through open-market operations instead of discounting bills when member banks had requested more credit. The initiating source of the credit inflation was therefore the open-market policy of the Federal Reserve board and the non-penalty discount rate which allowed continuous borrowing. Therefore, the analysis here will focus on relating the growth in demand and time deposits with the timings of open-market purchases and rediscounting. Gold flows and the sterilization argument is also analyzed here.

In providing excess credit in 1922, 1924 and particularly 1927, Phillips states:

The banks used their new reserves made available by Federal Reserve open-market action to purchase investments, thereby creating new deposits in the banking system. These new deposits took the form largely of time deposits, and hence reduced the average reserve-deposit ratio of the banking system, freeing reserves which in turn could be utilized in the purchase of more investments or to create new deposits by means of direct loan extensions. (1937 p. 24)

Table 3.2 shows the constituent elements of the money supply and the percentage change from year to year for the entire American banking system. While currency in circulation declined by 3 percent from 1921 to 1929, demand deposits increased by 31 percent and time deposits increased by 76 percent for a total increase in the money supply by 43 percent. Phillips explains that minimum average legal reserve requirements were reduced by approximately 50 percent from the previous National Banking Era so that the average reserve requirements of all banks during the National Banking Era are estimated to have been 21.09 percent, whereas under the provisions of the original Federal Reserve Act it declined to 11.61 percent and under the terms of the Amendment of June 21, 1917, to 9.76 percent, which allowed for a six fold increase in credit under the new system as compared to the older

institutional setting.¹¹⁸ Moreover, the Federal Reserve Act allowed the payment of interest on time deposits and under the original Federal Reserve Act reserves on time deposits were set at 5 percent and lowered to 3 percent under the 1917 Amendment. Consequently, commercial banks were economically encouraged to open time deposit accounts for their customers which Phillips writes, “frees reserves which may be used as the basis for further credit expansion” (1937, p.96).

Date	Currency	Change	Demand	Change	Time	Change	Total Money Supply	Change
Jun-21	4.07	-	17.09	-	11.3	-	32.46	-
Jun-22	3.66	-10%	18.18	6%	12.07	7%	33.91	4%
Jun-23	4.02	10%	18.85	4%	13.82	14%	36.69	8%
Jun-24	3.97	-1%	19.5	3%	14.86	8%	38.33	4%
Jun-25	3.95	-1%	21.65	11%	16.43	11%	42.03	10%
Jun-26	4.00	1%	22.31	3%	17.56	7%	43.87	4%
Jun-27	3.98	-1%	22.06	-1%	18.7	6%	44.74	2%
Jun-28	3.95	-1%	22.05	0%	20.22	8%	46.22	3%
Jun-29	3.94	0%	22.47	2%	19.86	-2%	46.27	0%
Total Change		-3%		31%		76%		43%

Source: Own elaboration from Friedman & Schwartz (1970)

Phillips explains that the increase of reserves by shifting to time deposits was just as stimulating to new lending as open-market purchases of securities by the Federal Reserve because of the increased leverage. Equally important to Phillips’s argument is that time deposits are not a necessity for the commercial operations of the economy and in some ways the rapid growth in saving deposits at the same time as open-market operations could be considered excess money in the economy, since this money essentially went directly from open-market operations to new savings accounts and was not used for active trade. Moreover, Table 3.3 shows that when looking at only the reporting member banks (who had direct access to Federal

¹¹⁸ Phillips (1937 p. 45) writes that “...prior to the establishment of the Federal Reserve System one dollar in reserve supported approximately five dollars in bank credit, or deposit currency, and that after the Federal Reserve System was inaugurated the same (gold) reserve could support at the maximum expansion a credit structure about six times as great.” He adds that, “The gold released from serving as a reserve base under the old system now serves as a basis for future credit expansion just as would that much new gold secured from the mines” (p. 48).

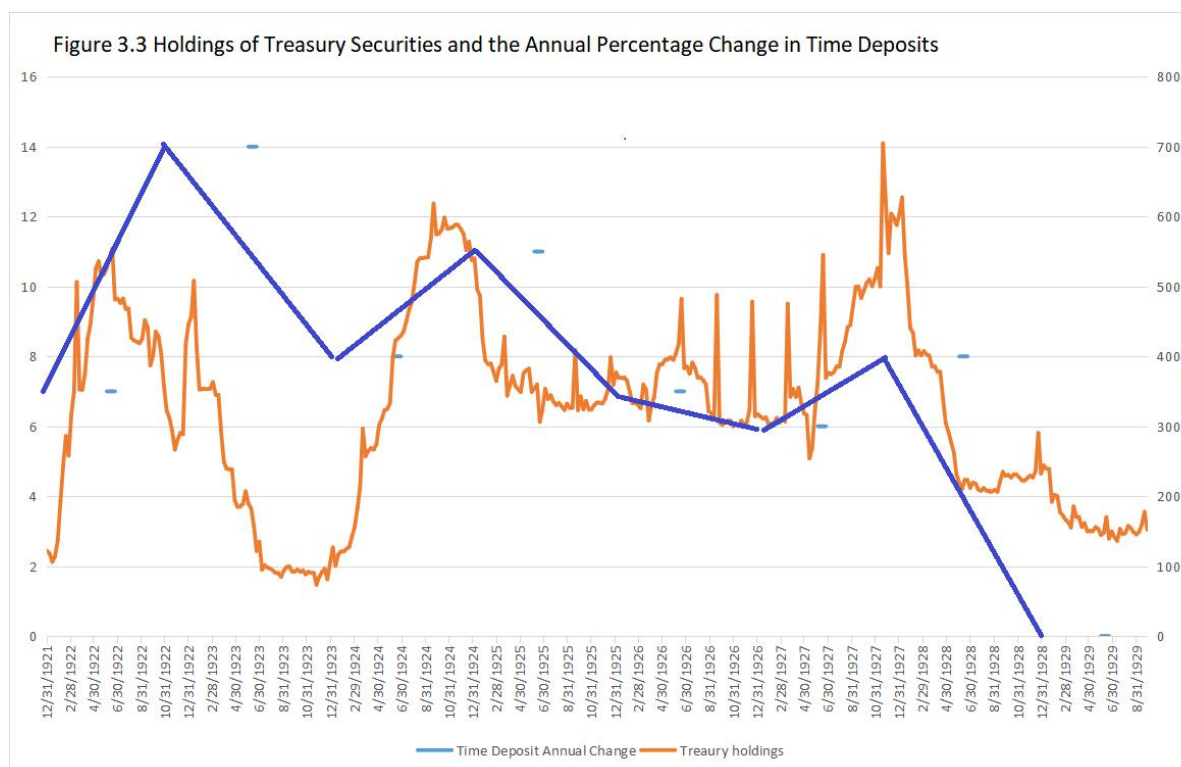
Reserve credit), the increase in time deposits over the period of 1921 to 1929 was 127 percent and the increase for New York City member banks was 334 percent. Phillips concludes that the outsized growth in time deposits was “especially pronounced in those centers most affected by open-market operations of the Reserve Banks” (1937, p. 98) and that “the greatest growth of time deposits coincided in points of time with the Federal Reserve open-market purchase of securities, and that this growth of time deposits was in each instance relatively greater than the growth of demand deposits.” (1937, p. 98).

Date	Member Banks				New York City Banks			
	Demand	Change	Time	Change	Demand	Change	Time	Change
Dec-21	10,247	-	3009	-	4219	-	290	-
Dec-22	11,146	9%	3720	24%	4325	3%	539	86%
Dec-23	11,127	0%	4083	10%	4264	-1%	609	13%
Dec-24	13,184	18%	4855	19%	5372	26%	814	34%
Dec-25	13,173	0%	5357	10%	5204	-3%	792	-3%
Dec-26	13,032	-1%	5768	8%	5094	-2%	902	14%
Dec-27	13,872	6%	6419	11%	5570	9%	1034	15%
Dec-28	13,399	-3%	6842	7%	5305	-5%	1198	16%
Oct-29	13,633	2%	6839	0%	5561	5%	1258	5%
Total Change		33%		127%		32%		334%

Source: Own elaboration from Phillips (1937 p. 97)

Following the initial open-market purchases in 1922 to buy government securities, this type of operation became an official policy tool in 1923 to manage the aggregate amount of credit. Purchases of Treasury securities occurred around the time that policy rates were lowered and would increase the availability of funds at the discount window. Figure 3.3 shows the holdings of Treasury securities by the Federal Reserve compared to the annual percentage increase in time deposits. To illustrate Phillips’s point, the lagged reporting of time deposits (shown as the dash mark) is transposed forward by six months to illustrate that the three open-market operations of 1922, 1924 and 1927 coincided with three sharp increases in time deposit expansion. Notably, while the size of open-market operations increased in line with the growth of the overall banking system, the rate of growth for time deposits declined indicating that the momentum in bank credit growth had peaked

in the 1922-1924 period and not in the 1927-1928 period that receives so much more attention from scholars.



Source: Own elaboration from the Federal Reserve's *Banking and Monetary Statistics* (1943) and Phillips (1937)

Phillips also astutely observes that there was a ratcheting effect that took place where open-market purchases and a reduction in the discount rate increased member reserves and encouraged member banks expand bank credit (especially time deposits). However, as shown in Figure 3.4, the sale of government securities to member banks - which reduces their balances with the Fed - did not effectively reduce their reserves as would be expected. Instead, member bank reserves increased following open-market purchases but did not decline as should normally occur following a reversal of policy. Consequently, member reserves increased from around \$1.6 billion in January 1922 to a high of 2.48 billion in January 1928, or roughly 55 percent, and commensurate with an increase in net demand and time deposits of the member banks over the same period from \$20.9 billion to \$32.27

billion, or about 55 percent. Open-market purchases only served to ratchet higher member bank reserves over the 1922-1927 period. Phillips writes that:

It is observable that 90 per cent of the increase in member bank reserves occurred in the three periods of Federal Reserve expansion, that all of the increases in investments and in net demand deposits were concentrated in those years, and that 80 per cent of the increase in total deposits coincided with Reserve credit expansion. Net demand deposits plus time deposits increased more in both 1922 and 1924, and in 1927 the increase was but slightly less, than the combined increase for all of the other five years of this period. The sequence of events leading to inflation clearly seems to have consisted of increased Federal Reserve open-market purchases, which resulted in increased member bank reserves; the new reserves were used by the member banks to add to their investment holdings, thus creating new deposits in the banking system (1937, p. 89).



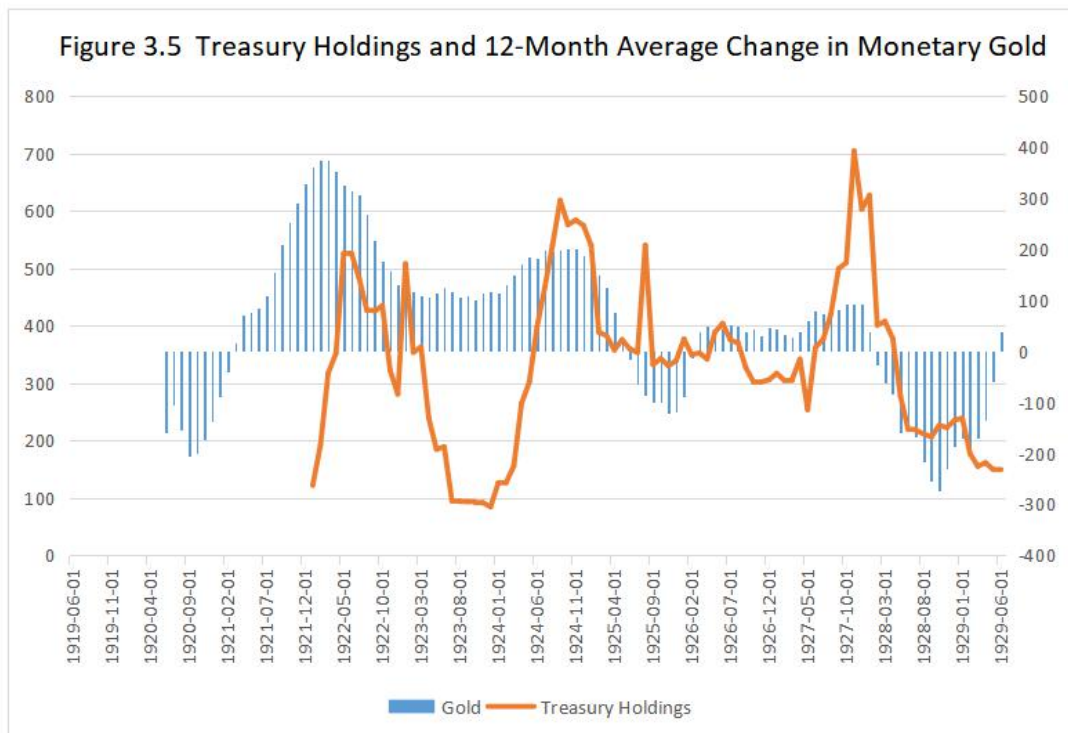
Source: Own elaboration from Phillips (1937) and Federal Reserve Bank of Saint Louis

Phillips acknowledges that one reason for the increase in banking reserves was the influx of gold from abroad, especially during the 1921-1923 period when there was a rapid reversal from losses to gains. This increase in gold reserves was partially offset through sterilization until the influx of gold tapered off considerably after 1923, making it less of an issue to consider after that time. Under the rules of the classical gold standard, a country receiving an inflow of gold would see its prices rise and a country losing gold would see prices fall. To avoid having to directly change the discount or Bank rate, sterilization would prevent gold inflows from becoming part of the monetary base that then leads to monetary expansion. Consequently, intervention through the sale of government bonds (when there was an inflow of gold) would take money out of circulation and offset the expected rise in prices. But this was not done for reasons that are subsequently explained here.

Federal Reserve Governor Benjamin Strong was a firm believer in controlling credit by offsetting gold inflows (see Hetzel 1985). However, Phillips contends that the idea that sterilization limited bank credit growth averts attention from the two main influences on bank credit growth during that period. First was the increase in systemic leverage which occurred following the Federal Reserve Act and the Amendment upon entering the First World War which reduced reserve requirements. As such, the leveraging of the economy from the 1917 to 1927 period (as compared to that which could have been done under the older National Banking Era) eclipsed any sterilization that may have slightly limited credit creation. Second were the purchases of government securities in 1922, 1924 and 1927. Phillips remarked that “the open-market and rediscount rate policies of the Federal Reserve Board were the dominant factors in stimulating the expansion of credit” (1937, p. 88) which as previously shown had a great and lasting effect on increasing member bank reserves and were much stronger than any perceived sterilization that occurred.

The typical praise afforded to the Fed for the 1922-1927 period includes the development of open-market operations which helped to offset the mild economic recessions of 1924 and 1927 and maintain price stability while also working to restore the international gold standard. However, Figure 3.5 shows that instead of

proactively sterilizing the rapid increase in gold flows from 1921 to 1923 with a sale of securities, open-market operations actually first purchased government securities around the same time there was a rise in gold inflows and sold when those flows tapered off or reversed. Considering that the initial open-market purchases were conducted by Reserve Banks to gain earning assets (to pay for expenses) the early effect of rising gold and open-market purchases of government securities could have greatly added to bank credit, instead of limiting credit creation. Moreover, the stock of monetary gold reserves was declining from 1927 to 1928 yet again the Federal Reserve first increased its purchase of government securities from March 1927 to December 1927, opposite of what would be expected if sterilizing gold flows.



Source: Own elaboration from the Federal Reserve Bank of Saint Louis

Phillips points out that in the 1920s the United States was not operating on a classical gold standard, but instead a hybrid version where the monetary authorities could choose to follow domestic objectives over international obligations. However, he does not address what likely was the main motivation for the open-market

purchases in 1924 and 1927. Historically, attention has centered on the Federal Reserve's macroeconomic stabilization. Friedman and Schwartz (1963) write that it was during this time that the Federal Reserve developed a policy to moderate the business cycle and maintain price stability. Phillips, as mentioned previously, described these policies as being a flawed "experiment." However, it would appear that the timing of open-market purchases in 1924 and 1927 was also designed to keep rates lower in the United States relative to England in order to aid England who would return to the gold standard in 1925.

Certainly, the management of the international gold exchange standard and domestic policy goals often conflicted, but in 1924 and 1927 they actually were complimentary as both gold inflows and a mild recession could be countered with open-market purchases when looked at from an interest rate differential perspective. Open-market purchases would push interest rates lower on government securities and compliment the lowering of the discount rate. This means that sterilization would come not from direct open-market sales of securities, but instead by indirectly decreasing Federal Reserve Bank credit to neutralize gold inflows. The other principle assets in addition to government securities were bills discounted and bills bought which were essentially loans to member banks. Therefore, sterilization of gold inflows did not come from the sale of government securities to "mop up" excess money because in order to compliment the lowering of the discount rate, open-market operations had to purchase, not sell, government securities.

The near simultaneous increase in government purchases and decrease in the discount rate makes credit conditions easier and would typically lead to a decrease in bills discounted and thus a decrease in bank indebtedness with the Reserve Banks. Therefore, on the one hand, sterilization came about indirectly from member banks decreasing the amount of bills presented to the Reserve Banks for discount and in theory would slow down new bank credit creation. On the other hand, the lower interest rate differential would encourage gold to flow out in the direction of the higher rate of return. The reason this is important to illustrate is that the Fed controlled the discount rate and open-market purchases but the level of bills

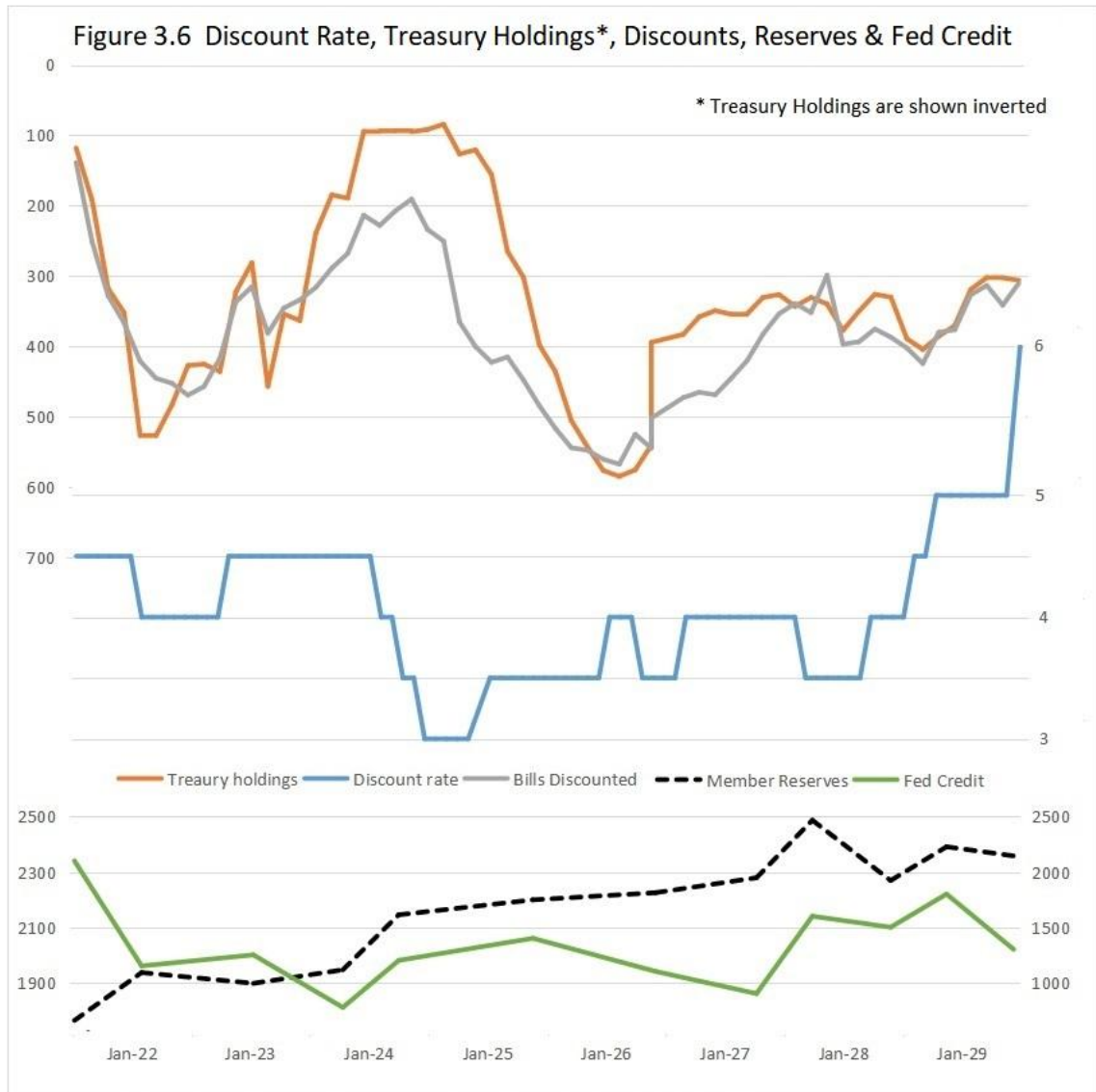
presented for discount would depend on the member banks. Consequently, overall Federal Reserve credit declined from 1921 to 1924, but member bank reserves increased substantially (see figure 3.6). Phillips points out that the reason this happened is due to the lag between movements in the open-market purchases of securities and the change in the discount rate which created an opportunity for banks to offset the contraction in reserve balances (when the Fed reversed its open-market purchases) by then rediscounting with the Reserve banks and “thus were able to maintain their total reserves virtually intact” (1937, p. 93).

Consequently, as Phillips points out, the open-market purchases inadvertently led to a much greater leveraging of bank credit than likely anticipated because member bank reserves only ratcheted higher. Banks, flush with new reserves following open-market purchases in 1922, 1924 and 1927 were able to offset the contraction in reserves following the reversal of the open-market purchases by then rediscounting with Reserve Banks in the short period of time where there was an opportunity to do so because open-market operations and the discount rate moved together but not exactly simultaneously. Banks were therefore able to maintain the larger reserve balances gained from the initial open-market purchase by avoiding the contraction in reserves. Here it is worth citing Phillips at length:

Chronologically and causally, the order of developments was as follows: Federal Reserve open-market purchases resulted in expansion of member bank reserve balances; this served to instigate increased purchases of investments by the member banks; and the credit generated thereby took the form largely of time deposits. The Reserve Banks pumped credit into the money market, inducing increased reserves in the banking system; the banks used the new reserves to purchase investments (later, to make loans on securities) which created more deposits in the banking system, and the increased deposits, being unneeded by business men and corporations as demand deposits for current transactions, were shifted to time deposits which would draw interest. This greater relative growth of time deposits operated to reduce the average reserve-deposit ratio, hence freeing reserves which in turn could be

used by the banks further to increase their investments and their loans on securities without any absolute increase in reserves. (1937 p.99)

To tie together Phillips's argument into one chart, in Figure 3.6 the Treasury securities held by the Federal reserve are this time reversed on the axis so that they mimic the moves in the discount rate. It is clear that the holdings of Treasury securities were continually in flux while the discount rate moved more infrequently. Bills discounted are also shown to illustrate how a rising discount rates make credit less available which encourages banks to bring bills to be discounted by the Reserve Banks. However, the amount of bills brought to the Reserve Banks for discount had a much closer relation with the purchases and sales of government securities through open-market operations than the actual movement in the discount rate. Finally, even though net Federal Reserve Bank credit actually fell from 1921 to 1924 - which traditionally is the argument made for why the Fed had a contractionary monetary policy during this period - member bank reserves still increased in 1922, 1924 and 1927 and remained high due to the member banks discounting eligible paper with the Reserve Banks after gaining new reserves following open-market purchases.



Source: Own elaboration from Federal Reserve Bank of Saint Louis

It is surprising to see that member bank reserves actually increased or remained constant during a time when Federal Reserve Bank credit decreased. According to Phillips the only explanation was the conversion of demand deposits into time deposits, “which brought about a progressive decline in the average reserve-deposit ratio for the banking system” and went “almost wholly unobserved at the time” (1937, p. 95). Moreover, due to the lower reserve requirements on time deposits, the 1920s was therefore a period of increased leverage in certain sectors of the banking system (where large transfers to time deposits occurred) as credit growth was not matched by an equal addition to reserves. Phillips also remarks that, “The

disproportionate growth of time deposits in the banking system beginning with 1922 was one of the most striking aspects of this whole period of credit growth” and had rate increases “occurred simultaneously with the sales of securities—it is improbable that the situation would have gotten so far out of hand” (1937, p. 95). Phillips concludes by saying:

If the recent cycle has proved so puzzling to so many students of its devious course and manifold phases, it is because the full effects of the creation and operation of this central banking system upon the commercial banks have not been widely nor adequately understood; nor, furthermore, have the influences of the changing structure of the American banking system upon the structure of production been fully realized. (1937 p.140)

In summary, the evidence supports Phillips’s claim that credit growth became more highly leveraged among the money center member banks in the 1920s. Moreover, while most of the literature concentrates on the late 1920s and stock market speculation as the leading cause of the 1929 crash, Phillips's analysis deserves consideration as well. While Phillips attributes most of the blame for the inadequate policy on the desire for price stabilization, he does not give adequate attention to England’s return to the gold standard which may have played a more important role in the easy money policies of 1924 and 1927. Nevertheless, he is correct to point out that banks pursued profit maximization strategies that increased systemic leverage which were not adequately addressed by the Federal Reserve in the 1920s and the failure to address this dynamic may be added to the list of possible reasons as to why the Fed was so slow to react to the banking crisis in the 1930s.

3.6 Conclusion

Chester A. Phillips’ (1937) *Banking and the Business Cycle* studied the role of bank credit in the business cycle, with a focus how the Federal Reserve’s stabilization policies caused it to possibly ignore the actual transmission channels of bank credit

creation in the 1920s which led to a long credit deflation in the 1930s. While the evidence supports Phillips's claim that credit grew and became more highly leveraged among the commercial banks - and certainly the money center member banks in the 1920s - it is not clear that only price stability was the central concern for the Federal Reserve. Using Phillips's arguments to concentrate on purchases of government securities, the data presented here indicate that the easy money policies from open-market operations in 1924 and 1927 were more likely due to a desire to lower interest rate differentials to aid England's return to the gold standard.

However, regardless of the overriding motives behind the large open-market operations of 1922, 1924 and 1927, the evidence presented here supports Phillips's claim that monetary policy which attempted to restrict credit in the 1920s was compromised by a fundamental change in the underlying structure of the American banking system in the post-war period. The overwhelming effort to finance the First World War through the commercial banking system led to an unorthodox operational policy in the 1920s that sought to balance price stability and a return to the international gold standard but seemed unaware of some of the peculiar transmission channels of bank credit creation. This is because even though net Federal Reserve Bank credit actually fell from 1921 to 1924 - which traditionally is the argument made for how the Fed sterilized gold inflows during this period - member bank reserves still increased in 1922, 1924 and 1927 and remained high due to the member banks discounting eligible paper with the Reserve Banks. Moreover, due to the lower reserve requirements on time deposits, the 1920s was therefore a period of increased leverage by the banking system as credit growth in some sectors was not matched by an equal addition to reserves.

Scholars have generally overlooked the rapid leveraging of the banking system that took place in the early years of the Federal Reserve System and how the decision to draft the commercial banks into the war effort would directly influence the operational policy in the post-war period. As a result, the Federal Reserve's obligation to finance the Treasury until 1919 and its subsequent role as the new fiduciary of the post-war international gold exchange standard likely contributed to

the lack of institutional focus on appropriate credit control strategies that addressed asset inflation as well as consumer inflation. Moreover, Phillips's contention that an economic expansion fueled by excessive bank credit growth would likely be followed by a slower recovery is upheld by a recent study by Jorda, Schularick & Taylor (2013). This chapter hopefully illustrates to scholars that while monetary policy tools differ across historical episodes, previous lessons may still inform modern circumstances.

Conclusions

i. Conclusions and final reflections

The inspiration for this thesis began following the observation that the bank-credit multiplier as first formulated by Chester A. Phillips revolutionized monetary theory in the 1920s but was subsequently altered and then forgotten. The motivation to study the origin of this discarded theorem came from the immediate and overpowering impression that the original version of the deposit-multiplier was much more robust than the simplified version taught in nearly every economics textbook. Contained within the original theorem is the concept that larger banks have a much greater ability to leverage existing reserves than smaller banks and this concept should be brought back to textbooks and integrated into financial models. Moreover, in the aftermath of the most recent financial crisis it became apparent that as a consequence of altering Phillips's original theorem the idea of what banking does had become confused. By portraying banks as merely bringing savers and borrowers together, the fundamentals of banking theory had been lost. Consequently, the way in which bank credit theory was taught in textbooks has made many economists and policymakers alike ill-equipped to identify the warning signs of increased leverage.

Following the most recent financial crisis of 2008 there is now a large literature that has highlighted the role of the creation of money by commercial banks. Renewed interest has brought greater awareness and better understanding but there are still very many unresolved issues. In order to fill in the gaps that have developed historians of economics may provide guidance. In this respect, the thesis

here reexamines the overlooked work on bank credit by Chester A. Phillips and shows why his work deserves to be remembered. Perhaps, the best reason to remember Phillips is that old ideas - if sufficiently forgotten - can become new again. Consequently, to appreciate Phillips's contributions when both the man and his original thoughts have gone unnoticed for nearly a century required both the introduction of his life history as well as the construction of a database to assess how his theorem spread in the interwar period and then changed in the postwar period.

Prior to the work presented here, there has never existed a chronicle of Phillips or exactly how he devised his novel theory of the multiple expansion of bank credit. However, resurrecting Phillips without a framework to understand how the "banking view" of money creation was so easily swept away after the interwar period was problematic. Therefore, this thesis contributes the first-ever compilation of data to track the evolution of economic thought regarding bank theory. From this database the research results show definitively, and for the first time, that Phillips's theorem - first presented in 1920 - overturned a previous century of orthodoxy to then become the dominant theory for nearly fifty years before his original conception eventually disappeared without a trace. The creation of a database to track the evolution of bank credit theory also shows that the idea that banks can independently "create credit" was never a marginalized view except for a brief period from 1980 to the early 2000s. This realization fills a critical gap in the debate over existing bank credit theories.

Bank credit theory is perhaps the most susceptible to evolutionary drift as it exists at the border between money and economics, while the concepts of what constitutes money and how to control it continue to blur. The seamless transition from one dominate theory to the other can only be understood by resurrecting Chester A. Phillips's original deposit multiplier from 1920 to see how it was modified to fit a changed institutional background in the postwar period. His original formula played a causal role in the reinterpretation of banking theory and was therefore a brief but missing link between two radically different assumptions of credit creation. Comparing Phillips's original equation with the postwar version, it becomes obvious

that the part of Phillips's formula that estimated the credit creation capabilities of individual banks was set to zero after the war. This led to his widely recognized and praised formula for bank credit creation to be transformed. In turn, a new narrative emerged in the postwar monetary orthodoxy - one where banks were powerless intermediaries and it was *impossible* for them to create credit. The models and theories made it appear so. Consequently, in the postwar era only the banking system as a whole could "create" money.

During the interwar period, the economics profession had a sophisticated understanding of the nature of credit money. The creation of bank credit - and by consequence the nation's money supply - was at the vanguard of monetary economics in the early twentieth century, but its importance diminished in the postwar era of modern macroeconomics. While there may not be any single "smoking gun" to attribute the wrong turn that developed in bank credit theory in the 1980s, at least the conspiracy theories that circulate about the ability of banks to create money can now be put to rest. The knowledge has always been there - since the very beginning - just presently hiding in plain sight. Perhaps the best explanation for the overturning of a century of classic bank credit theory is that the institutions changed in the postwar period and economists simply tried to describe their new surroundings. Particularly, the rise of the neoclassical-Keynesian synthesis from the 1950s to 1970s which saw money as a veil greatly contributed to the idea that banks must first receive reserves to then make a loan, and this was in turn integrated into new mainstream macroeconomic models.

In addition to a different institutional background in the postwar period the success of Samuelson's textbook *Economics*, led to Phillips's simplified deposit multiplier forming the cornerstone of money supply theory in the twentieth century. While this shortened version of Phillips's original model is still relevant to the explanation of any fractional reserve banking system, the amended model is highly misleading and devoid of the proper context under which it was first presented as a special limiting case. Subsequent modifications may have allowed for the erection of a broader theory of the money supply but the micro-foundations were never correct and

valuable knowledge was lost. By removing Phillips's return-of-reserves coefficient the credit creation view was completely discarded and with that the powerful insight that certain individual banks could potentially start a credit induced boom-and-bust cycle.

Phillips's original framing of the deposit multiplier should therefore be remembered as an operationalization of the banking principle where the ability of a fractional reserve banking system to generate money is dynamic and variable. When properly understood in this context, it becomes clear that banks endogenously create money and only the willingness of the monetary authorities to maintain reserves scarce will determine whether the overall money supply is exogenous or endogenous. Under Phillips's framework, individual banks act as non-homogenous strategic agents trying to maximize their creation of credit but are constrained by the relative degree of reserve scarcity. This novel feature was removed from the original equation and the widespread adoption of a "simple" deposit multiplier led to a dramatic transformation in postwar American economic thought from individual banks as creators of money to that of only the banking system creating money.

A reassessment of Phillips shows that he was a pragmatist who upheld the orthodox banking principle and that his original deposit multiplier formula should be regarded as a missing link between two radically different hypotheses in the evolution of monetary theory. Moreover, the novelty of Phillips's theorem is that it connects two ostensibly contradicting views of banks as either intermediating loanable funds or being capable of originating new loans in excess of the deposits received. In Phillips's equation, banks do both things. They intermediate the deposits they receive by bringing together borrowers and savers, but, more importantly, they are the creators of money. Phillips's argument, like Tobin (1963) would make forty years later, is that the individual creation of money by commercial banks is only limited to their ability to retain this newly created bank credit.

The research presented here shows that Phillips is the mediator who resolved the confusion surrounding bank credit theory as well as someone whose ideas are still

very much relevant today. Therefore, in addition to presenting the first biography of Phillips and a clear presentation of his novel theorem, as well as the first database regarding the evolution of bank credit theory, this thesis also ties together his first work in *Bank Credit* (1920) with his other important publication *Banking and the Business Cycle* (1937). When shown side by side, the two works appear linked because Phillips (1937) expands on his original work to show that the purchase of either government or corporate securities by the commercial banks had the same effect as the origination of business loans in the creation of deposit money throughout the banking system. This is important because this was not a widely discussed phenomenon until the 1930s, but by the 1950s it had already been mostly forgotten.

More importantly, this thesis examines Phillips's argument that the financing of the First World War led to an unorthodox monetary policy in the 1920s which allowed commercial banks to take on the role of investment banks. According to Phillips, the Federal Reserve found itself in uncharted waters after subsidizing a rapid leveraging of the American banking system and then opted for an "experiment" in monetary policy which had unforeseen consequences and in part explains the duration of the depression of the 1930s. In this regard, Phillips makes another spirited attempt to expand the scope of bank credit theory during one of the most fascinating episodes in economic history. The research presented here shows in more detail Phillips's argument and supports his conclusion that a rapid leveraging in the 1915-1919 period followed by open-market operations in the 1920s led to an over-expansion of bank credit in certain sectors and allowed credit to flow to long-term financing instead of short-term self liquidating loans.

The nexus between the financing of the First World War and the Great Depression has been sorely neglected since first introduced by Phillips in 1937. Today, scholars believe the Federal Reserve's operational policy during this period was flawed due to a great confusion in the economics profession about the relationship between monetary policy, inflation and economic activity in the absence of a close link to gold. However, for scholars studying war finance and the Federal Reserve monetary policy

of the 1920s this thesis also contributes to the historical understanding of the interwar period by highlighting the fact that the financing of the First World War by the commercial banks is the single transformative act that dislodged commercial banking from its “real bills” framework and led to a change in the underlying credit structure of American banking in the 1920s. Consequently, the investigation presented here opens up an interesting area for further research.

Economists studying this period believe the Federal Reserve’s operational policy was flawed in part due to adherence to the “real bills doctrine.” Phillips generally agrees but would prefer the reader to understand that monetary policy should reflect the reality of the banking situation. The fact that the Federal Reserve System was designed to work on the financing of short term loans was disrupted by the First World War, but the decision to not return to a “real bills” framework necessitated a new operational policy. However, Phillips explains that the policy of open-market operations was new and not well understood and had unforeseen consequences. Moreover, Phillips draws attention to the structural difference in the economy between consumer price inflation and asset price inflation and how open-market operations were able to stabilize consumer prices but led to an inflation of asset prices as early as 1922, and not the later 1920s as is so commonly perceived. Consequently, the unexpected movement in American commercial banking to the financing of long-term assets was incompatible with the “real bills” framework and to Phillips therein lies the problem with Federal Reserve operational policy in the 1920s and 1930s.

This thesis investigated Phillips’s assertion and concludes that his claim is justified. The Federal Reserve made substantial open-market purchases in 1922, 1924 and 1927. By lowering US interest rates, the purchases both promoted recovery from recessions in the United States and indirectly worked to sterilize gold inflows. But it was not until 1928 that the Federal Reserve began to act on the consequences of new credit inflation because it was financing the booming US stock market. Officials only then debated what, if any, steps they could take to ensure Federal Reserve credit was not used to fuel financial speculation. Phillips’s critique therefore centers

on the 1922 to 1928 period, where the Federal Reserve intervened to provide more reserves upon which the commercial banks could increase lending. However, as Phillips points out, the type of assets they were purchasing were long-term in nature and not short-term self liquidating loans.

A brief summary of his critique is as follows and is valuable to scholars studying war finance and the effect of bank credit on the real economy. The First World War overrode the underlying framework of the Federal Reserve Act, where commercial banks could not engage in overly expansionary policy as long as loans were made for “real” goods as opposed to “financial” transactions such as the stock market or long-term investments. Second, the drafting of the commercial banks into the war effort meant that bank credit was used to purchase the war bonds, and the proceeds of these funds returned to the banking system resulting in a multiple expansion of deposits thereby creating a direct link between war financing and excess reserves which led to banks looking to lend these excess reserves.

Third, the amendment to the Federal Reserve Act in 1917 that concentrated gold at the reserve banks and the lower reserve requirement on savings deposits led to a rapid and compressed leveraging of the American banking system during the war where the underlying credit structure was no longer based on short-term commercial loans but instead on long-term assets (war bonds). These assets then formed the basis for collateral against which banks could borrow from Reserve Banks and further expand bank credit. Fourth, the attempt to squeeze out inflationary excesses in the 1920-22 period was cut short (because it was so severe) and as a result, the price deflation did not result in restoring the economy to a sustainable equilibrium. It is worth noting again that Phillips’s main deflationist argument was that the bank credit inflation had helped fuel a consumer price inflation during the war, but what needed to be corrected in the 1920s was bringing about a more sustainable level of bank credit. In contrast, he argues the focus on consumer price inflation was in some ways misleading. This is because by focusing on price stability in the 1920s, ongoing bank credit growth resulted in a rise in asset price inflation,

which is much more difficult to cure because lenders become tied to the long-term prospects of their borrowers.

Finally, and most importantly, Phillips directs most of his attention to price stabilization policy in the 1922-1928 period, which he believes provoked the substantial open-market purchases in 1924 and 1927 which allowed bank credit creation to flow into assets and not consumer prices. Phillips contends that the implicit inflation targeting policy of the 1920s was a monetary “experiment” gone wrong, which allowed the Federal Reserve to disregard the actual transmission channels of bank credit creation which flowed into long-term assets and not short-term revolving loans. Phillips’ conclusion is that the decision to target price inflation alone is not a sufficient central bank policy and this critique is still relevant today. As well, Phillips’ claim that credit-intensive expansions tend to be followed by deeper recessions and slower recoveries is upheld by a recent study by Jorda, Schularick & Taylor (2013).

The conclusion presented here is that Phillips’s contributions are still relevant today and worth consideration when examining the interplay between bank credit, leverage and financial crisis. Phillips himself wrote that the “interdependence and circularity” (1937, p. 86) of these factors made it nearly impossible to determine direct cause and effect relationships. Consequently, much of the research done on financial crisis naturally occurs only after banking and financial crisis thrust the issue to the forefront. Phillips contends the reason for a lack of clear thinking regarding banking is that the relationship between the real economy and bank credit easily misunderstood and this leads to bad analysis and sub-optimal outcomes. In this respect, one of the commonalities between *Bank Credit* (1920) and *Business and the Banking Cycle* (1937) is that Phillips goes to great lengths to explain in clear terms just what many economists and the public at large is not able to see clearly. In *Bank Credit* (1920) Phillips’s main contribution to monetary theory was to show with a simple theorem that the role of the individual bank and its ability to create credit varied depending on each bank’s unique position in a competitive market. In *Business and the Banking Cycle* (1937) his main contribution to economic thought

was to expose the excess leverage that could result from commercial banks purchasing government bonds, where the proceeds given to the government from the creation of bank credit were then redeposited into the banking system which led to a further multiple expansion of deposits.

In many ways, Phillips's critique of the Federal Reserve during the 1920s dovetails with the accepted criticism of the Fed during the 1930s where the Federal Reserve was too concerned with the "real bills" doctrine and let banks fail during the early 1930s which led to the Great Depression. Phillips's critique is similar but runs the argument the other way. Commercial banks could in fact buy long-term assets like investment banks do, but the Federal Reserve System was set up under the explicit understanding that they would not do this. Therefore the operational policy in the 1920s was left struggling to find its way following the great leveraging of bank credit and inflation that occurred during the First World War and the subsequent focus on price stability in the 1920s.

While it is true that the Federal Reserve Act was intended to operate under the "real bills" doctrine the Act says little about the international aspects of money and credit. Consequently, one area of disagreement presented here is that it is not clear that price stability was the central concern for the Federal Reserve during the 1920s. Just as the First World War had led to an enormous volume of government debt, the aftermath of the war had made the United States the new fiduciary of the international gold exchange standard. As a result, the reliance on open-market operations in government securities could be done both to influence domestic money and credit conditions as well as affect the international interest rate differential.

The data presented in Chapter three indicate that Phillips is correct that the easy money policies from open-market operations in 1924 and 1927 likely created excess bank credit in the banking system. However, the stance taken here is that the actions taken by the Federal Reserve were more likely due to a desire to lower interest rate differentials to aid England's return to the gold standard. In this respect, Phillips does

not devote enough attention to the fact that the “real bills” doctrine was also understood to operate within the gold standard and that Federal Reserve System in the aftermath of the First World War would also be called on to strengthen the United States' position in the international economy.

The argument that international considerations played a factor is brought into sharp relief by the contrast between Federal Reserve Policy in the 1920s and 1930s. If for example, the 1920s were a demonstration of successful open-market operations to offset and economic downturn, then why did the Open Market Investment Committee oppose acquiring securities during the incipient signs of economic distress in 1930 and then raise rates in 1931? It is more plausible that the explanation for the difference between Federal Reserve policy before and after 1930 is that both the 1920s and 1930s must be viewed as an experiment, where open market operations were conducted for both domestic and international objectives.

By interpreting both the 1920s and 1930s as an experimental phase in the Federal Reserve System's early years, it is possible to augment Phillips's (1936) argument to show that by targeting either domestic price stability or other international objectives with open-market operations could inadvertently lead to excess credit creation flowing to assets. Consequently, if asset prices inflate without consumer price inflation providing a warning signal to central banks, they may fail to intervene and correct the course.

Nevertheless, regardless of the overriding motives behind the large open-market operations of 1922, 1924 and 1927, the evidence presented here supports Phillips's claim that monetary policy which attempted to restrict credit in the 1920s was compromised by a fundamental change in the underlying structure of the American banking system in the post-war period. As such, Phillips's views are not only interesting for historians studying war finance but also for scholars who want to better understand bank credit and the evolution of economic thought. This thesis therefore consolidates for the first time both the forgotten history of bank credit theory as well as Phillips's overlooked work on the causes of the Great Depression.

Finally, by adding a database to track the evolution of thought regarding bank credit theory this thesis allows researchers to appreciate the rise and fall of a forgotten economist whose ideas are still very much relevant today.

ii. Limitations of the study and future lines of research

The first obvious limitation of the present thesis is the decision to not trace the evolution of the money multiplier equation itself. By focusing on the conceptual clarification of Phillips's original deposit-multiplier and the impact it had on bank credit theory this thesis has not focused on tracing the evolution of the various money-multiplier equations that have appeared since 1920. While there are studies which have treated this subject, they generally begin from the postwar version of Phillips's equation, which leave open an area of future research to tie in Phillips and present a more complete history of the money-multiplier equation.

Moreover, while there is now for the first time a database of over two hundred American economics textbooks, the initial survey only concentrated on determining whether the textbook author supported one of four possible approaches: (1) loans create deposits; (2) deposits create loans; (3) both are true under certain situations or (4) the author abstains from discussing bank credit creation. However, now that the database has uncovered this list of textbooks it could easily be enlarged to research other aspects of bank credit theory. For example, keyword searches in the textbooks could uncover references to whether authors viewed bankers as merely providing the services of goldsmiths.¹¹⁹

Another limitation of this thesis relates to the biography of its subject itself. Like the equation, Phillips has been forgotten over time and it has been difficult to give

¹¹⁹ This example would be interesting because in Macleod's (1853) *Theory and Practice of Banking* he writes that the story that banking originated from goldsmiths lending only a fraction of the money held as a deposit is one of the most tempting myths for economists to fall for. Widening the scope of this research would allow future work to address a larger range of related issues such as when concepts such as goldsmith's performing fractional reserve banking came and left.

proper treatment to his life's accomplishments because of the lack of a historical record. What we do know is that he was the son of a minister who grew up on a farm in Indiana and started a family soon after graduating from Central College in Indiana. In 1907, at the age of twenty-five, he moved east with his wife, five year-old daughter and two year-old son to Connecticut where he attended Yale and received his undergraduate degree in 1908. While completing his master's degree at Yale he worked his way through school as an assistant professor of economics from 1909-10 and then moved a few hours away to New Hampshire where he was an assistant professor of banking and finance at Dartmouth College from 1911 to 1917 and then full professor from 1918 to 1920. While at Dartmouth and completing his doctoral thesis at Yale, he spent a summer teaching at Columbia University and published his dissertation thesis *A Study In Bank Credit* as a book the following year. However, little is known about Phillips during this time except that he was a student of Irving Fisher and thanked Fisher in the forward to *Bank Credit*.

In 1920, Phillips joined Frank Knight at the University of Iowa and in 1921 he became the first Dean at the College of Commerce, where he remained until he retired in 1950. Upon becoming the new Dean, he quickly hired two graduate students, Henry Simons and Wesley Mitchell who would later follow Frank Knight to Chicago in 1927. These three would lay the foundation for what would become known as the "Old Chicago" school. Phillips also taught a few summer sessions on money and banking at Chicago, and in 1932, he was one of only a dozen non-Chicago economists (including Irving Fisher) to participate in drafting and signing Henry Simon's six-page memorandum on banking and monetary reforms which later became known as the Chicago Plan. Phillips's ties with the "Old Chicago" school and Irving Fisher show his ongoing participation in the idea of "credit control" to bring about monetary order and a stabilization of the price level. However, while a signatory to the "manifesto" there is no other record of Phillips during this movement. For this reason, it would be interesting to do future research to compare Phillips's interpretative framework in *Banking and the Business Cycle* with the ideas of the Chicago Plan.

Unfortunately, the Chester A. Phillips archives at Dartmouth and the University of Iowa do not contain any information to better understand the man or this period in his life when he was still very much active in the debates on money and bank credit. Therefore, to continue this line of research into his life it may be worth studying Irving Fisher's archives at Yale University, as well as Frank Knight and Henry Simons's archives at the University of Chicago to see if any correspondence with Phillips was preserved.

Finally, the thesis here has focused on only two very specific aspects of Phillips's contributions. First, is the original deposit-multiplier and his dynamic view of banks acting as non-homogenous strategic agents. Second is his view that the way in which the First World War was financed with bank credit altered the course of the Federal Reserve System and contributed to the Great Depression. Phillips's views on how the central bank can and should control bank credit is addressed in the second half of *Bank Credit* (1920) and then continued in *Banking and the Business Cycle* (1937) which makes the treatment of that aspect the most obvious way to join his works together to show a common thread of analysis. However, while the creation bank credit and its control was given particular treatment, this thesis does not address Phillips's corresponding views on business cycles.

Therefore, *Banking and the Business Cycle* has much more to be said about it. For instance, Hayek was influenced by Phillips's theory on bank credit which appears in Hayek's (1933) *Monetary Theory and the Trade Cycle*. And in turn, Phillips is very much influenced by the business cycle theory of the Austrians. Here, there are certainly connections to be made, not only with Austrian Business Cycle Theory, but also a comparative analysis of the that theory and Phillips's more eclectic theory which remains to be done. This was not addressed because it has received some attention in the literature (see for example Rothbard 1975). Nevertheless, all these questions definitely provide a ground for an extensive research programme, which can be done in the years to come.

Finally, the importance of this thesis is a conceptual clarification of bank credit theory as it was originally framed which reveals that to control bank credit creation it is imperative to never lose sight that banks are non-homogeneous profit-maximizers as Phillips had originally conceived. It is now well understood that the interactions between the financial system and the real economy were a weak spot of modern macroeconomics. Consequently, an historical analysis of bank credit theory has aroused renewed interest since the 2008 crisis but very little scholarship has focused on the changing history of bank credit theory itself. As such, the current debates often show great confusion when reference is made to the creation of bank credit and the ability of central banks to control the money supply. The results of this study should therefore add clarity at a time when it is still being debated whether banks are mere financial intermediaries or the creators of money. The novelty of Phillips's theorem is that commercial banks do both things - a view that had been lost but hopefully now found.

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Appendix

Bank Credit Textbook Data Set

Loans Create Deposits (LCD); Deposits Create Loans (DCL); Both; Abstain (N/A)

Phillips No/Yes signifies if Phillips (1920) was directly mentioned in the textbook

Date	Author	Title (Edition)	LCD/DCL/Both	Phillips
1866	Macleod	Theory and Practice of Banking V1 & V2 (2/e) (UK)	LCD	No
1877	Walker, F.A.	Money (1/e)	LCD	No
1891	Dunbar	The Theory & History of Banking (1/e)	LCD	No
1893	Ely	Outlines of Economics (1/e)	LCD	No
1895	White	Money & Banking (1/e)	LCD	No
1895	Carroll	Principles and Practice of Finance	LCD	No
1896	Sumner	History of Banking in the US	LCD	No
1898	Bullock	Introduction to the Study of Economics (1/e)	LCD	No
1903	Scott, W. A.	Money & Banking (1/e)	LCD	No
1903	Aldrich	Money and Credit (1/e)	LCD	No
1903	Laughlin	Principles of Money (1/e)	LCD	No
1904	Fiske	The Modern Bank (1/e)	LCD	No
1904	Kinley	Money (1/e)	LCD	No
1905	Seligman, E.	Principles of Economics (1/e)	LCD	No
1907	Seager, H.	Introduction to Economics (3/e)	LCD	No
1908	Conant	Principles of Banking (2/e)	LCD	No
1908	Muhleman,	Monetary and Banking Systems (1/e)	LCD	No
1909	Johnson, A.	Introduction to Economics (1/e)	LCD	No
1910	Moxey	Practical Banking (1/e)	LCD	No
1911	Mead, E.	Economics (3/e)	LCD	No
1911	Vanderlip	Modern Banking (1/e)	LCD	No
1913	Marshall	Elementary Economics (1/e)	LCD	No

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
1913	Davenport	The Economics of Enterprise (1/e)	LCD	No
1913	Taylor	Principles of Economics (2/e)	LCD	No
1915	Taussig, F.	Principle of Economics (2/e)	LCD	No
1915	Ely & Wicker	Elementary Principles of Economics (1/e)	LCD	No
1915	Kniffin	Practical Work of a Bank (1/e)	LCD	No
1915	Harris	Practical Banking (1/e)	LCD	No
1916	O'Hara	Introduction to Economics (1/e)	LCD	No
1916	Moulton	Principles of Money & Banking (1/e)	LCD	No
1918	Agger	Organized Banking (1/e)	LCD	No
1918	Clay, H.	Economics (1/e)	LCD	No
1919	Turner	Introduction to Economics (1/e)	LCD	No
1919	Holdsworth	Money & Banking (3/e)	LCD	No
1919	Laing, G.	Introduction to Economics (1/e)	LCD	No
1920	Phillips, C.A.	Bank Credit (1/e)	LCD	---
1920	Carlton, F.	Elementary Economics (1/e)	LCD	No
1920	Steiner, W.	Some Aspects of Banking Theory (1/e)	LCD	No
1921	Fradenburgh	Elements of Economics (1/e)	LCD	No
1921	Kavanaugh	Bank Credit Methods and Practice (2/e)	LCD	No
1921	Westerfield	Banking Principles and Practice (1/e)	LCD	No
1921	Johnson	Money & Currency (2/e)	LCD	Yes
1922	Dewey	Banking & Credit (1/e)	LCD	Yes
1922	Fetter, F.	Modern Economic Problems (2/e)	LCD	No
1922	Riley	Economics (1/e)	LCD	No
1923	Williamson	Introduction to Economics (1/e)	LCD	No
1924	Bye, R.	Principles of Economics (1/e)	LCD	Yes
1925	Fay	Economics (1/e)	LCD	No
1925	Boucke	Principles of Economics	LCD	No
1927	Taussig, F.	Principles of Economics v.I (3/e)	LCD	No
1927	Rufener, L.	Principles of Economics	LCD	No
1927	Foster, W. T.	Money (3/e)	LCD	No
1927	Edie	Economics: Principles & Problems (1/e)	LCD	Yes
1928	Rodkey, R.	The Banking Process (2/e)	LCD	Yes
1928	Edie, L.	Money, Bank Credit & Prices (1/e)	LCD	No
1928	Bradford	Money (1/e)	LCD	Yes
1929	Kilborne	Principles of Money & Banking (2/e)	LCD	Yes
1929	Deibler, F.	Principles of Economics (1/e)	LCD	Yes

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
1929	Carver	Elementary Economics (1/e)	DCL	No
1930	Harris, C.	Banking Theory & Practice (1/e)	LCD	Yes
1930	Knight, B.	Economics	LCD	Yes
1930	Angell, N.	The Story of Money	LCD	No
1930	Fairchild & R.	Elementary Economics (2/e)	LCD	Yes
1931	Cross	Economics (1/e)	LCD	No
1932	Woodward	A Primer on Money (2/e)	LCD	No
1933	Steiner	Money & Banking (1/e)	LCD	Yes
1933	Riefler	Money, Credit & Banking (1/e)	LCD	Yes
1934	Rufener & F.	Money & Banking in the U.S.	LCD	No
1934	Garis, R.	Principles of Money Credit & Banking (1/e)	LCD	Yes
1935	Tippetts & W.	Money and Banking (5/e)	LCD	Yes
1935	Kemmerer, E.	Money (1/e)	LCD	Yes
1935	Leffler	Money & Credit (1/e)	LCD	Yes
1936	Foster & R.	Money & Banking (1/e)	LCD	Yes
1937	Frain	Introduction to Economics (1/e)	LCD	No
1937	Prather	Money & Banking (1/e)	LCD	Yes
1938	Luthringer	Money, Credit & Finance v4 (2/e)	LCD	No
1938	Hansen & G.	Principles of Economics (2/e)	LCD	No
1940	Moore, et al.	Modern Economics (1/e)	LCD	No
1940	James, F. C.	Economics of Money, Credit & Banking (3/e)	LCD	Yes
1941	Peterson	Money and Banking (1/e)	LCD	No
1941	Kiekhofer	Economic Principles, Problems, Policies (2/e)	LCD	Yes
1941	Meyers, A.	Elements of Modern Economics (2/e)	LCD	No
1941	Brown, C.	Introduction to Economics (1/e)	LCD	Yes
1941	Agger	Money & Banking Today	LCD	Yes
1942	Gemmill & B.	Economics: Principles and Problems v2 (2/e)	LCD	Yes
1943	Bowman & B.	Economic Analysis (1/e)	LCD	No
1945	Mints	A History of Banking Theory (1/e)	LCD	Yes
1946	Whittaker, E.	Elements of Economics (1/e)	LCD	No
1946	Halm, G.	Monetary Theory (2/e)	LCD	Yes
1946	Carlson, V.	Introduction to Modern Economics (1/e)	LCD	Yes
1946	Froman, L.	Principles of Economics (2/e)	LCD	No
1946	Ise, J.	Economics (1/e)	LCD	No
1947	Welfling	Money & Banking (1/e)	LCD	No
1948	Samuelson	Economics (1/e)	Both	Yes

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
1948	Tarshis, L.	Elements of Economics (1/e)	LCD	No
1948	Boulding, K.	Economic Analysis (3/e)	LCD	No
1948	Chandler, L.	Economics of Money & Banking (1/e)	LCD	Yes
1948	James, C. L.	Principles of Economics (7/e)	LCD	No
1948	O'Hara	Money & Banking (1/e)	LCD	No
1949	Spero, H.	Money and Banking (1/e)	LCD	No
1950	Morgan, T.	Introduction to Economics (1/e)	LCD	No
1950	Enke, S.	Intermediate Economic Theory (1/e)	LCD	No
1951	Mueller	Money & Banking (1/e)	LCD	Yes
1954	Bach, G.	Economics: An Introduction (1/e)	LCD	No
1956	Kent, R.	Money & Banking (3/e)	LCD	Yes
1957	Boland & B.	Money & Banking (1/e)	LCD	No
1957	Jome, H.	Principles of Money and Banking (1/e)	LCD	Yes
1957	Koivisto, W.	Principles and Problems of Modern Economics (1/e)	LCD	No
1959	Klise, E.	Money & Banking (1/e)	Both	Yes
1960	McConnell	Elementary Economics (1/e)	LCD	No
1960	Hailstones, T.	Basic Economics (1/e)	LCD	No
1961	Rodgers, R.	Banking (1/e)	LCD	No
1961	Ackley, G.	Macroeconomic Theory (1/e)	N/A	No
1962	Dye & Moore	Economics (1/e)	LCD	No
1962	Amer Bank A.	The Commercial Banking Industry (1/e)	LCD	No
1963	Reynolds, L.	Economics: A General Introduction (1/e)	LCD	No
1963	Murad, A..	Economics Principles & Problems (4/e)	LCD	No
1964	Wright, D.	Principles of Economics (1/e)	LCD	No
1965	Ward, R.	Economics: Principles and Means (1/e)	N/A	No
1965	Heilbroner, R.	Understanding Macroeconomics (3/e)	LCD	No
1966	Frazer & Yohe	Money & Banking (1/e)	LCD	No
1967	Duesenberry	Money & Credit (2/e)	LCD	No
1968	Kohler, H.	Scarcity Challenged: Intro to Economics (1/e)	LCD	No
1968	Leiter, R.	Modern Economics (1/e)	LCD	No
1968	Brandis, R.	Principles of Economics (1/e)	LCD	No
1969	Kasun, J.	Overview of Economics (1/e)	LCD	No
1971	Burger, A.	The Money Supply Process	Both	No
1972	Culbertson	Money & Banking (1/e)	LCD	No
1972	Gill, R.	Economics & Public Interest (2/e)	DCL	No
1974	Marshall, et al	The Monetary Process: Money & Banking	Both	No

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
1974	Peterson, W.	Income, Employment Economic Growth (3/e)	Both	No
1975	Boughton	Principles of Monetary Economics (1/e)	LCD	No
1975	Hogendorn, J.	Modern Economics (1/e)	DCL	No
1975	Hunt & S.	Introduction to Economics (2/e)	DCL	No
1975	Hutchinson	Money, Banking & the U.S. Economy (3/e)	DCL	No
1976	Johnson, D.	Macroeconomics: Money, Prices (1/e)	Both	No
1976	Solomon, L.	Macroeconomics (2/e)	Both	No
1977	Baird, C.	Elements of Macroeconomics (1/e)	Both	No
1977	Motley, B.	Money, Income, Wealth: Macroeconomics	Both	No
1978	Wonnacott	Macroeconomics (2/e)	DCL	No
1978	McKenzie	Modern Political Economy (1/e)	LCD	No
1978	Chisholm	Principles of Economics (1/e)	LCD	No
1979	Thomas, L.	Money, Banking & Economic Activity (1/e)	Both	No
1979	Cochran	Money, Banking & the Economy (4/e)	LCD	No
1980	Vernon, J.	Macroeconomics (1/e)	Both	No
1980	Poindexter	Money, Financial Markets & Economy (1/e)	Both	No
1980	Veseth, M.	Introductory Macroeconomics (1/e)	Both	No
1981	Simson, T.	Money, Banking & Economic Analysis (1/e)	Both	No
1981	Makinen, G.	Money, Banking & Economic Activity (1/e)	Both	No
1981	Mayer, et al	Money, Banking & the Economy (1/e)	Both	No
1981	Poindexter, J.	Macroeconomics (2/e)	Both	No
1982	McCarty, M.	Money & Banking (1/e)	Both	No
1982	Cathcart, C.	Money, Credit & Economic Activity (1/e)	Both	No
1983	Miller, N.	Macroeconomics (1/e)	Both	No
1983	Gwartney	Macroeconomics (1/e) [16]	DCL	No
1984	Veseth, M.	Introductory Macroeconomics (2/e)	DCL	No
1984	Barro, R.	Macroeconomics (1/e)	DCL	No
1984	Byrns & S.	Economics (2/e)	LCD	No
1984	Gordon, R.	Macroeconomics (3/e)	Both	No
1985	Bradeley, M.	Macroeconomics (2/e)	Both	No
1986	Baumol & Blin.	Economics: Principles & Policy (3/e)	DCL	No
1986	Mansfield, E.	Principles of Macroeconomics (5/e)	DCL	No
1987	Sargent, T.	Macroeconomic Theory (1/e)	N/A	No
1988	Compton	Principles of Banking (3/e)	LCD	No
1988	Thompson	Macroeconomics (2/e)	DCL	No
1988	Johnson & Rob.	Money & Banking (3/e)	DCL	No

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
1988	Huang, et al.	Foundations for Financial Economics	N/A	No
1989	Mishkin, F.	Money, Banking & Financial Markets (2/e)	DCL	No
1989	McCallum, B.	Monetary Economics (1/e)	N/A	No
1989	Bowden, E.	Economics (6/e)	N/A	No
1990	Lipsey, R.	Macroeconomics (9/e) (USA)	DCL	No
1991	Cargill, T.	Money, Finance & Monetary Policy (4/e)	Both	No
1991	Taylor & Hall	Macroeconomics (3/e)	Horizontal	No
1992	Boyes, W.	Macroeconomics (3/e)	DCL	No
1993	Spencer & A.	Contemporary Macroeconomics (8/e)	Both	No
1994	Case & Fair	Principles of Macroeconomics (3/e)	Both	No
1995	Brown, W.	Principles of Macroeconomics (1/e)	Both	No
1995	Hadjimichalakis	Money, Banking & Financial Markets (1/e)	DCL	No
1995	Taylor, J.	Principles of Macroeconomics (1/e)	DCL	No
1997	Blanchard, O.	Macroeconomics (1/e)	DCL	No
1997	Kennedy, P.	Macroeconomic Essentials for Media	LCD	No
1997	Eichberger, J.	Financial Economics (1/e)	N/A	No
1997	Freixas, X.	Microeconomics of Banking (1/e)	LCD	No
1997	Clark & Wilson	Survey of Economics (1/e)	Both	No
1998	Auerbach, Kot.	Macroeconomics (2/e)	LCD	No
1998	Miller, et al.	Macroeconomics (1/e)	N/A	No
1999	Bodie & Merton	Financial Economics (1/e)	N/A	No
1999	Miller, R.	Economics Today (10/e)	DCL	No
1999	Gottheil, F.	Principles of Macroeconomics (2/e)	DCL	No
1999	Sexton, R.	Exploring Macroeconomics (1/e)	Both	No
2000	Ekelund & Toll.	Macroeconomics (6/e)	DCL	No
2000	LeRoy, S.	Principles of Financial Economics	N/A	No
2000	Tregarthen	Macroeconomics (2/e)	Both	No
2001	Abel Bernanke	Macroeconomics (4/e)	Both	No
2001	Colander, D.	Macroeconomics (4/e)	N/A	No
2001	Macht, N.	Money and banking	N/A	No
2003	Mankiw, G.	Macroeconomics (5/e)	DCL	No
2003	O'Sullivan, A.	Macroeconomics: Principles (3/e)	DCL	No
2003	Bade & Parkin	Foundations of Macroeconomics (2/e)	Both	No
2003	Tucker, I.	Macroeconomics for Today (3/e)	Both	No
2005	Stiglitz & Walsh	Economics (4/e)	Both	No
2005	Miles & Scott	Macroeconomics (2/e) UK	LCD	No

Date	Author	Title (Edition)	LCD/DCL/Both Phillips	
2006	Cecchetti, S.	Money, Banking & Financial Markets (1/e)	DCL	No
2008	Hall, Lieberman	Macroeconomics (4/e)	DCL	No
2008	Clayton, G.	Economics: Principles & Practices	LCD	No
2009	Ball, L.	Money, Banking & Financial Markets (1/e)	DCL	No
2009	McConnel, Brue	Economics (18/e)	Both	No
2010	Welch & Welch	Economics: Theory & Practice (9/e)	DCL	No
2011	Dornbusch, Fischer	Macroeconomics (11/e)	LCD	No
2011	Benassy, J.	Macroeconomic Theory (1/e)	N/A	No
2012	Romer, D.	Advanced Macroeconomics (4/e)	LCD	No
2012	Hoover, K.	Applied Intermediate Macroeconomics (1/e)	N/A	No
2013	Krugman, Wells	Economics (5/e)	DCL	No
2013	Froyen, R.	Macroeconomics (10/e)	Both	No
2014	Ritter, et al.	Money, Banking, Financial Markets	LCD	No
2014	Williamson, S.	Macroeconomics (5/e)	N/A	No
2016	Mateer, et al.	Essentials of Economics (1/e)	DCL	No
2017	Heijdra, B.	Foundations of Modern Macroeconomics (3/e)	N/A	No