Bernanke and Kindleberger on financial crises, 1978-2002

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Abstract
Proposals of the Chairman Bernanke at the Federal Open Market Committee in the aftermath of Lehman Brothers failure in September 2008 echoed Kindleberger's rules of international lender of last resort. Regarding theoretical issue, the literature on monetary macroeconomics considers that both authors endorsed the credit view as opposed to the monetarist view. So one could conclude to a convergence. However, during his early academic years, Bernanke was far to embrace the Kindleberger's view on financial crises and banking panics. Furthermore, at the beginning of his tenure at the Board of the Federal Reserve System, he declared that his argument for nonmonetary effects of bank failures was an embellishment of the Friedman and Schwartz's story. So such a puzzle is an open invitation to lead a comparison of Bernanke's and Kindleberger's contributions on financial crises more closely. And such a comparison makes all the more sense as the two authors were engaged in a dialogue that the literature has missed.

Key words:
Charles Kindleberger, Ben Bernanke, financial crises, banking panics, financial accelerator.

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1. Introduction

On September 16, 2008, the day after the failure of Lehman Brothers, Chairman Ben Bernanke opened the meeting of the Federal Open Market Committee (2008, Sep. 16, p. 3) and declared: "There is another action item I would like to add, given what is happening, which is that there are very significant problems with dollar funding in other jurisdictions—in Europe and elsewhere. […] I would like to put on the table a request for authorization for swap lines. I prefer not to put a limit on it." Then, on October 13, 2008, the Board of Governors of the Federal Reserve System (2008) announced that the Dollar Swap Lines would be henceforth unlimited with a fixed rate. The Dollar Swap Line program then became the most important one decided by the Federal Reserve during the global financial crisis of 2007–09 and deeply let its mark in the history of international central banking. In announcing the unlimited provision of international liquidity granted to other central banks, Bernanke's declaration did echo with Kindleberger's rule. Indeed, from the late 1960s to the late 1970s, Charles Kindleberger, Professor at the Massachusetts Institute of Technology (MIT), had expounded a twofold recommendation about the action of the international lender of last resort, say, the Federal Reserve, through swap lines granted to other central banks: first, the swap lines should be

unlimited (Kindleberger, 1967 [1981, pp. 28-9]); second, the swap interest rate should not be a penalty or harsh rate (Kindleberger, 1978a, p. 225). As far as we know, Kindleberger is the sole economist who has recommended such a rule of conduct—a rule that applies to the lender of last resort among central banks.

So if Kindleberger's voice was in Bernanke's mouth the days after the failure of Lehman Brothers, there are reasons to believe that Bernanke could have in mind Kindleberger's contributions to the theory of financial crisis and lender of last resort. The first reason is that Bernanke was a PhD student at the MIT in the late 1970s and he could not ignore the work of Kindleberger (1973) on the Great Depression. Eichengreen (2011, p. 41) and Dimand (2014, p. 5) hint that Kindleberger had been Bernanke's teacher. In an address at the MIT, Bernanke (2006) paid tribute to many economists who contributed to the Economic Department reputation—Paul Samuelson, Franco Modigliani, Robert Solow, Charles Kindleberger, Rudiger Dornbusch, and Stanley Fischer, his PhD supervisor. The second reason is that the literature on monetary macroeconomics has often associated Kindleberger and Bernanke especially with regard to the "credit view" as opposed to the "money view" *à la* Friedman and Schwartz (1963)[1]. Borio, Kennedy and Prowse (1994, p. 22) argued that both authors focused on credit intermediation rather on money stock to understand changes in financial conditions. In addition, Eichengreen and Mitchener (2003, p. 11) claimed that, like Bernanke, Kindleberger emphasized the asymmetric information and agency problems in financial markets. More recently, Freixas (2018, p. 89) wrote: "Since Kindleberger (1978) classical book, it is well known that financial crises are intertwined with the increase in debt, credit booms and the soaring of asset prices", while "Friedman and Schwartz (1963) […] approach may be insufficient to explain contemporary crises. […] The criticism of the monetarist approach started with Bernanke (1983a) and has led to […] a major debate in monetary theory between the money and the credit view."

These interpretations might lead to conclude to a convergence between Bernanke and Kindleberger. However, they deserve a twofold caveat. The first is that, to our knowledge, there is no evidence that Bernanke would have actively followed to Kindleberger's MIT teaching. What can be found is Bernanke's (2002a, p. 200) testimony that "at MIT there was an economic history requirement but as it happened I didn't get interested in economic history until after I graduated." More explicitly, he pointed out that his growing interest in problems relating to asymmetric information and this interest "began in graduate school at MIT when I was a student of Peter Diamond" (Bernanke, 2002a, p. 204). More intriguingly, Bernanke (2002c) came to declare that, with regard to the Great Depression, "my argument for nonmonetary influences of bank failures is simply an embellishment of the Friedman-Schwartz story." So how Bernanke could have puzzlingly been close to Kindleberger and Friedman at the same time? The second caveat is that, as we shall detail, Bernanke (1983a) early questioned Kindleberger's *History of Financial*

[1] To avoid any confusion, we precise that our article deals with the money view *versus* credit view in the domain of financial crises, notably the Great Depression. We are not focused on the other the money view *versus* credit view in the domain of the transmission channel of monetary policy. On this debate on monetary policy transmission channels, see Hubbard (1995).

Crises and rather rested on Friedman and Schwartz's *Monetary History* (O'Sullivan, 2019). Dimand and Koehn (2008, p. 141) also underline that Bernanke (1983a) distanced himself from Kindleberger (1978a) notably on the question of rational behavior. Furthermore, Bernanke and Kindleberger interestingly engaged in a dialogue on the question of financial crises.[2] Such a dialogue has been overlooked in the literature and constitutes the Ariane's Thread of our investigation.

Charles Kindleberger (born in 1910) defended his PhD in 1937 under the supervision of James Angell at Columbia University and became economist at the Federal Reserve Bank of New York, at the Bank for International Settlements, and at the Board of Governors of the Federal Reserve System. After the Second World War and his appointment at the Office of Strategic Services and at the Department of State, he became professor in economics at the MIT for the long period (1948-1981). Ben Bernanke (born in 1953) defended his PhD in 1979 under the supervision of Stanley Fischer at the MIT. After a career as academics at Stanford University (1979-1985) and Princeton University (1985-2002), he became a member of the Board of Governors of the Federal Reserve System (2002-2005) and then Chairman of the Board of Governors (2006-2014). All in all, our study covers the period from the publication of Kindleberger's *Manias* in 1978 to Bernanke's appointment at the Board of the Federal Reserve System in 2002. The organization of the paper follows chronologically and analytically the dialogue between Kindleberger and Bernanke. At first, we present Kindleberger's analysis of financial crises (Section 2) and Bernanke's analysis of the Great Depression (Section 3), which paved the way of a dialogue between the two authors (Section 4). Then, we investigate how Bernanke and Gertler proposed different kind of models (Section 5) that finally depart from Kindleberger's analytical framework especially with regard to the exogeneity/endogeneity of financial bubbles (Section 6). We conclude on the enlightened perspectives drawn by the Bernanke-Kindleberger dialogue (Section 7).

2. Kindleberger on financial crisis

Before the publication of *Manias, Panics, and Crashes*, Kindleberger (1974, p. 20) started to explore the question of how the banking system had been vulnerable to financial markets instability during the Great Depression. For him, the key variable was not the quantity of money but the stock prices whose decline led banks in the

[2] Over the period 1982-2006, Bernanke (1982, 1983a-b, 1993, 2006), Bernanke and James (1991), Bernanke and Mihov (2000), quote 26 times (bibliography included) the work of Kindleberger (1973, 1978a, 1984). After that the Federal Reserve intervened as the international lender of last resort during the global financial crisis of 2007–09, Bernanke mentions Kindleberger only once and without specific bibliographical reference (Bernanke, Geithner and Paulson, 2019, p. 11). On the other side, Kindleberger (1986, 1992, 1996a-b, 1997b) quotes 12 times (bibliography included) the work of Bernanke (1983a) and of Bernanke and James (1991). We do not strictly survey in this paper all the works of Kindleberger and Bernanke but we focus on the specific area of financial crises in order to understand the underlying debate.

"call money" market to reduce their short-term loans to brokers. The call loan market, in which banks granted demand loans on collateral in the money market, was prone to the downward spiral of liquidity—the "race for liquidity" in Kindleberger's words—until it froze up with the stock market. Later, Kindleberger (1978a, pp. 107-8) restated more precisely the deflationary spiral of liquidity: "Prices fall. Expectations are reversed. […] To the extent that speculators are leveraged with borrowed money, the decline in prices leads to further calls on them for margin or cash, and to further liquidation. As prices fall further, […] the credit system itself appears shaky, and the race for liquidity is on." As a result, the spiral of liquidity appears as an endogenous phenomenon as well as the cause of the financial crisis and banking panics. So Kindleberger (1978a, pp. 9-10, 15-6) did not refer to the "exogenous shock" as the displacement itself but to events, which provoke changes in expectations or beliefs that are in motion among market participants: "*Causa remota* of the crisis is speculation and extended credit; *causa proxima* is some incident which snaps the confidence of the system, makes people think of the danger of a failure, and leads them to move from commodities, stocks, real estate […] back into cash. In itself, *causa proxima* may be trivial: a bankruptcy, […] a revelation, a refusal of credit to some borrowers" (ibid, p. 107).[3] Therefore, *causa proxima* (the adverse shock seen as exogenous) makes no sense without *causa remota* (the financial instability considered as endogenous).[4]

In order to avoid any misunderstanding in Kindelberger's writings, the question of (ir)rationality must be handled with care. First of all, Kindleberger (1978a, p. 28) underlined that "the relationship between rational individuals and the irrational whole is more complex" than the simple notion of "mob psychology." For Kindleberger (1978a, p. 41), "markets can on occasions—infrequent occasions, let me emphasize—act in destabilizing ways that are irrational overall, even when each participant in the market is acting rationally." In other words, "euphoric speculation […] leads to manias and panics based on rational behavior on the part of each participant that is irrational overall" (Kindleberger, 1978b, p. 107). This statement may be interpreted as a definition of systemic risk: rational behavior from individuals such as speculation and fire-sale strategy, far from helping the banking and financial system to return to its equilibrium, exacerbates instability of the

[3] In addition, Kindleberger (1978a, p. 84) emphasized that bubbles lead to frauds and "swindles" but this does not imply that frauds (*causa proxima*) would be the cause of the financial instability (*causa remota*). More precisely, bubbles can take place without frauds and, in turn, frauds are more prone to take place when bubbles appear. Cynical swindles inflate when some agents exploit the overoptimistic expectations of others and they are endogenous in nature, not the starting point of the financial collapse.

[4] Even if *A History of Financial Crises*—the subtitle of *Manias*—does not propose an original theoretical framework, it may be seen as an innovative contribution inasmuch as it infused the financial instability hypothesis as a key of interpretation of banking and financial history. Kindleberger (1978a, pp. 15-9) discovered the work of Minsky (1972) for the understanding of financial instability as an endogenous phenomenon. Later, Kindleberger (1991, p. 195) recognized that "[Hyman Minsky] had produced a model of economic and financial instability beautifully applicable to historical data. *Manias* has a serious message as it offers an alternative to the classic monetarist doctrine that markets are always right and governments mostly wrong, and to the theory of rational expectations that also believes that markets get prices right."

banking and financial system as a whole. So financial speculation, which is rational from the individual standpoint of market participants' behavior, can be destabilizing and finally seems irrational from the systemic standpoint—the word "euphoria" or "mania" depicts such "irrationality" (Kindleberger, 1978a, p. 17). Thus, Kindleberger's systemic-risk hypothesis is summed up as follows: "Each participant in the market, in trying to save himself, helps ruin all" (ibid, p. 162). Kindleberger departed from the rational-expectations hypothesis, not because he would have adhered to a loose notion of irrationality, but because he thought that rational-expectations hypothesis overlooked the destabilizing force driven by the systemic risk and hence overrated the ability of the banking and financial system to return to equilibrium.

Once the term of rationality and the systemic-risk hypothesis are clarified, the central notion in Kindleberger (1978a, pp. 23, 29, 42) is the instability or the "displacement" of expectations whereby the financial cycle is set in motion. In this respect, Kindleberger (1995, p. 36) referred to Keynes' (1936) beauty-contest model concerning capital gain: "In chapter 12 of *The General Theory*, [Keynes, 1936] writes of the absurd influence of day-to-day fluctuations of the market, the mass psychology of ignorant individuals, likely to change opinions in response to trivia, the fetish of liquidity, the stock market as a game of passing the debased half-crown, or Old Maid, or musical chairs, everyone interested in quick results." Despite that Chapter 12 might be in line with the notion of displacement of expectations, Kindleberger's interpretation of Chapter 12 remains incomplete—if not misleading. Indeed, Keynes (1936) did not describe the behavior of "ignorant individuals" but he rather showed how market participants in specific markets, where prospect of capital gain is significant, rationally attempt to anticipate the beliefs of the other participants. Once such a strategy is generalized, it cannot be reduced to a simple "mass psychology" or herding phenomenon but to complex higher-order beliefs. The market participants' beliefs about other participants' beliefs lead to an upward convention or a "bubble" (whereby liquidity applied to risky assets, everyone benefiting from capital gain) or a downward convention (whereby liquidity became fetishized, everyone suffering from capital loss). This being specified, the beauty-contest model with higher-order beliefs remains compatible with Kindleberger's systemic-risk hypothesis in that it strengthens *i*) his idea of expectation displacements and *ii*) the endogenous process of the financial crisis.

After having stressed the role of expectations or beliefs and their displacement in assets markets, Kindleberger (1978a, p. 15) dealt with the "instability of the credit system" meaning that the credit system is the conveyor belt of the changes in market participants' expectations and hence strengthens the process leading to financial crisis. Once the asset price dynamics is in motion, banks' creditworthiness goes hand in hand with the financial bubble and collapse, leading to systemic crisis and banks' failures. In turn, for Kindleberger (1997b, p. 1594), banks failures do not only increase the credit rationing but also "[push] prices down further, and further damage confidence." In other words, banks do not only suffer from the deterioration of the quality of the collateral but they participate to such

deterioration. All in all, Kindleberger emphasized the financial *causes* of the financial crisis and economic downturn in general, and of the Great Depression in particular. In this respect, during the 1960s and 1970s, three approaches were deeply discussed in the literature on the causes of the Great Depression: Friedman and Schwartz (1963), Temin (1976), and Kindleberger (1978a) respectively investigated the monetary, real and financial causes. Friedman and Schwartz famously argued that the contraction of the stock of money due to the collapse of the banking system was the driving factor, which would have been avoided or mitigated if the Federal Reserve would have created the appropriate quantity of money within the economy. Kindleberger (1973, p. 20; 1978a, p. 70; 1983, p. 58; 1997a, p. 21) doubted that the central bank management of the quantity of money would have been the main cause of the Great Depression. On the other hand, a new generation of Keynesians started in the 1970s a research program that was to rehabilitate the role of monetary policy.

3. Bernanke on the effects of financial crisis and on Kindleberger

Like Bernanke (1979) later did, Mishkin (1976, 1977) wrote his PhD at the MIT under the supervision of Stanley Fisher. Since the introduction, Mishkin (1977, p. 5) underlined: "The monetarist analysis of Milton Friedman and his disciples [Friedman and Schwartz, 1963; Friedman and Meiselman, 1963] has presented some impressive evidence that monetary policy is the critical determinant of aggregate demand and the business cycle", that monetary policy "has strong effects on consumer expenditure" and "has far stronger effects on the economy than indicated by the investment-oriented empirical work of […] Keynesian macro model builders." Actually, Mishkin's (1977, p. 9) purpose was to test the "liquidity" hypothesis according to which consumer expenditure is a function of household liabilities and financial asset holdings—that is, the consumer's "balance sheet status." Among the generation of New Keynesians, Mishkin (1978) was the first to publish a contribution on Great Depression.[5] The central idea is that the deterioration in agents' balance sheet at the onset of the Great Depression had been a major factor in the decline in economic activity.

Retrospectively, Mishkin's (1978) article on the Great Depression announced several topics that may be found in Bernanke's research program during two decades after his PhD defense. The first is the balance-sheet approach and the ensuing transmission mechanism: "Because other developments in the economy influence the balance-sheet position of American households, the household balance sheet must be viewed as endogenous. Balance-sheet changes thus cannot be said to have 'caused' a depression of greater severity, but rather must be viewed as

[5] Mishkin (2014, p. 293) indicated that Mishkin (1978) applied the ideas developed in his thesis (Mishkin, 1976) to the Great Depression. We have consulted Minsky (1977)—a facsimile published by the Federal Reserve of Boston—whose conclusion alluded to the Great Depression as a "further research" (ibid, p. 83).

structural transmission mechanisms through which deflationary policy and events could have affected the economy during the Great Depression period" (Mishkin, 1978, p. 919). The second topic is related to the Friedman and Schwartz (1963) approach to the Great Depression: "Because of the link between common stock prices and monetary policy, monetary forces could have been an important factor causing the Great Depression, as the monetarists contend" even if "the monetary transmission mechanism differs in important respects from that of Friedman and Schwartz" (ibid, p. 919). The third is the exogenous-shock assumption regarding changes in the stock prices: "This paper's analysis has so far treated changes in common stock prices as exogenous, yet there is much theoretical and empirical analysis that suggests that common stock prices are linked to changes in the money supply" (ibid, p. 935). On the other hand, Bernanke's research program on financial crises could not ignore the name of MIT professor Kindleberger (1973) that Mishkin (1978, pp. 919-20, fn. 4) quoted with Fisher (1933) as promoters of the view that price deflation did affect aggregate demand and increase the severity of the economic crisis.

Bernanke's (1979) PhD dissertation dealt with business cycle and real activity and made no mention of "financial crisis", "Great Depression" or "Friedman and Schwartz"—only one mention is made to Keynes (ibid, p. 102) about recent re-interpretations of Keynes with regard to disequilibrium theory. In his first paper on the Great Depression, Bernanke (1982, pp. 142-6) started to distinguish the *monetary channel* of financial crisis through which "bank failures" lead to a decline in the quantity of inside money and hence to economic downturn (that is, the Friedman-Schwartz explanation) from the *credit channel* through which the "intermediary system (firms as well as banks)" impacts the cost of credit intermediation and hence economic activity. It is argued that the Friedman-Schwartz explanation could not prevail in a world with imperfect markets and with transaction costs.[6] The key argument of Bernanke (1983a, pp. 261, 268) is that, beyond the distinction between the "monetary effects studied by Friedman and Schwartz" and "the nonmonetary effects of the financial crisis", both approaches deal with the *effects* of the banking crises and not with the *causes* of the financial collapses. One can here note a *quid pro quo* in Bernanke's (1983a, pp. 261, 268) interpretation in which Friedman and Schwartz are supposed to study the monetary *effects*, whereas they are known to have addressed the monetary *causes* of the Great Depression. On the other hand, Bernanke (1995, p. 3) did acknowledge that, according to Friedman and Schwartz's argument, the causality runs from the quantity of money to output and prices "so

[6] The differentiation of the "monetary channel" with the "credit channel" is underlined at length in the first version of the paper (Bernanke, 1982, pp. 142-6), while it is softened and placed in a footnote of the *American Economic Review* version (Bernanke, 1983a, p. 263, fn. 17), in which one can read: "the phenomena emphasized by Friedman and Schwartz—the effects of the contraction of the banking system on the quantity of the transactions medium and on real output—are also impossible in a complete-markets world." According to Calomiris (1993, p. 72), Bernanke's approach "was not a rejection of Friedman and Schwartz's argument that monetary shocks were important. Its main contribution was to show that monetary shocks, and other disturbances during the early phase of the Depression, had long-run effects largely because they affected the institutional structure of credit markets and the balance sheets of borrowers."

that the Great Depression can reasonably be described as having been caused by monetary forces" (Bernanke, 2002c).

In any event, Bernanke (1982, p. 135) argued that "financial crises, whatever their source, may be disruptive of the capacity of the intermediary sector to perform its integrative function" and Bernanke (1983a, p. 257, fn. 2) recognized that his "paper does not address the causes of the initial 1929-30 downturn." In addition to the fact that Bernanke (1982, 1983a) mainly studied the *effects* and not the *causes* of the financial crisis, he departed from Kindleberger (1978a) in other respects. First, it is claimed that Kindleberger (1978a) "ha[s] frequently argued that crises are fundamentally grounded in irrationality" (Bernanke, 1982, p. 159) and "ha[s] in several places argued for the inherent instability of the financial system, but in doing so ha[s] has to depart from the assumption of rational economic behavior" (Bernanke, 1983a, p. 258). However, as seen above, this interpretation does not strictly correspond to the systemic-risk hypothesis according to which "manias and panics [are] based on rational behavior on the part of each participant that is irrational overall" (Kindleberger, 1978b, p. 107), that is, rational actions taken *ex ante* by individuals so as to mitigate the costs of their financial positions precisely worsen the systemic disturbances, which appear *ex post* irrational. Second, for Bernanke (1982, p. 159), a formal analysis of financial crisis is missing in Kindleberger's contributions contrary to the work of Blanchard and Watson (1982) and Diamond and Dybvig (1983). However, the lack of modelling in Kindleberger's *History of Financial Crises* also applies to Friedman and Schwartz's *Monetary History*—the difference lying on the fact that the former was a qualitative, while the later was a quantitative approach. Third, for Bernanke (1983a, p. 258), Kindleberger has not emphasized "the effects of financial crisis on the real costs of credit intermediation." Indeed, Kindleberger (1978a, p. 3) rather focused on the causes and, more generally, he was "not interested in the business cycle as such, the rhythm of economic expansion and contraction, but only in the financial crisis that is the culmination of a period of expansion and leads to downturn."

4. Kindleberger on Bernanke

Despite Bernanke's (1983a) skepticism about Kindleberger's contribution on financial crises, Bernanke (1993, p. 50) one decade later quoted Kindleberger (1973, 1978a), with Fisher (1933), as "important" references related to "some economists who have emphasized credit's macroeconomic role and importance." Bernanke (1993, p. 62) went as far as to put on the same footing Kindleberger (1973) and New Keynesians (Mishkin, 1978; Bernanke, 1983a) for having "suggested that borrower distress arising from deflation was an important factor in the [Great] Depression." On the other hand, Kindleberger (1996a, p. 60) points out Bernanke's (1983a) article with regard to the importance of credit rationing as a component of financial crises—the credit view. Kindleberger (1997b, p. 1594) added that Bernanke's explanation of the Great Depression based on credit rationing departs from Friedman and Schwartz's explanation based on the decline in the nominal

quantity of money. All of this would be enough to conclude on a consensus. Nonetheless, as underlined in our introduction, the puzzle appeared when Bernanke (2002c) came to the conclusion that "[his] argument for nonmonetary influences of bank failures is simply an embellishment of the Friedman-Schwartz story." The present section contributes to solve the puzzle in three ways.

At first, in a review of the book edited by Glenn Hubbard (1991) in which New Keynesians (notably Bernanke, and Mishkin) produced chapters on financial crises, Kindleberger (1992) stressed the financial cause of the Great Depression and precisely recalled the functioning of the New York call loan market, which was prone to the spiral of liquidity and grew significantly in the late nineteenth century. One of the purposes of the Federal Reserve System was to reduce the influence of call loans in the interbank market and credit intermediation especially in New York.[7] In any event, the New York call loan market continued to grow to unprecedented level and was one of the factors explaining the 1929 financial crisis. Given the deflationary spiral in motion in the New York call loan market, Kindleberger (1992, p. 128) regretted that "Bernanke's frequently-cited 1983 paper explaining how bank troubles could produce depression through credit rationing did not investigate the connection between call-loan difficulties in October 1929." In other words, the lack of analysis in terms of the spiral of liquidity on the one hand, and the approach in terms of asymmetric information, agency problem, and sequential-service constraint on the other hand, might explain why little attention is given to "the change in expectations."[8]

Secondly, in the third edition of *Manias*, Kindleberger (1996a, pp. 60-1) analyzed Bernanke's 1983a paper and acknowledged that it "claimed that the stock market crash led banks to ration credit to other borrowers" (ibid, p. 60). The rest of his comment (ibid, p. 61) might appear obscure at first sight. To provide some enlightenment, it is important to recall formerly that Bernanke (1983a, p. 257) controverted an explanation according to which the financial system would respond to the declines in aggregate output. This being stated, Bernanke (1983a, p. 271) stressed that his interpretation requires "the assumption, that failures of banks and commercial firms are not caused by anticipations of (future) changes in output"—in

[7] The episode of the Federal Reserve policy in the 1920s is tricky. Bernanke (1983a, p. 257) noted that "Milton Friedman and Anna Schwartz (1963) have stressed the importance of the Federal Reserve's 'anti-speculative' monetary tightening" during 1928 and 1929 (see also Bernanke, 2002b). Kindleberger (1995, p. 17) also noticed that Friedman and Schwartz (1963, pp. 261-2]) "wrote that the monetary authorities should have ignored the rise in the New York stock market, and focused attention on other goals such as the general price level." All these interpretations, however, did not consider how, since the Federal Reserve, officials such as Benjamin Strong worried about the critical growing of the call loan market (Warburg, 1930).

[8] Ibid. Kindleberger (1992, pp. 127-8) then expounded skeptical insights about the growing the literature of the banking firm and financial markets, that is, "new theoretical insights, some of which are familiar if put into plain English from the new jargon, e.g., asymmetric information, adverse selection, moral hazard, agency problems, heterogeneously-informed depositors, sequential-service constraint." Regarding sequential-service constraint, Kindleberger (1996b, p. 127) found it curious that the theory of bank runs could suggest that "the depositors who lead such a movement—called 'sequentially-served depositors'—are helpful insofar as they monitor the performance of banks."

other words, there is no displacement of expectations. To support such an assumption, he gave two references. The first is Cagan (1965), who made the point that "banking crises had never previous to this time been a necessary result of declines in output" (Bernanke, 1983a, p. 271). The second reference is Friedman and Schwartz (1963), who had identified "specific events" such as the revelation of scandal at the Bank of the United States or the collapse of the Kreditanstalt in Austria, "that were important sources of bank runs in 1930-33" and were "all connected very indirectly (if at all) with the path of industrial production in the United States" (Bernanke, 1983a, p. 272). It is then concluded (ibid): "If it is further accepted that the financial crisis contained large exogenous components (there is evidence for this in the case of the banking panics), then there are elements of causality in the story as well." Thus, the story is that the causality runs from banking panic (the exogenous component) to production decline—and not from economic downturn (the endogenous component) to financial turmoil.

Bernanke's causality being outlined, we can see now that Kindleberger (1996a, p. 61) precisely responded to it. Empirically, he observed the opposite causality: "the collapse of production took place […] before the stock market crash [of October 1929]" (ibid) and *a fortiori* before the collapse of the credit system. Analytically, he considered the business and financial cycle in all its sequence. The credit supply (the "call money") previously grew in the 1920s with the movement of the stock market "toward its apex" (ibid). Therefore, the credit supply did not only play a role once the specific events adversely occurred, but bank credit played a role alongside with the real as well as the financial cycle. The critical point occurred when bank credits or funds were "diverted from consumption and production" to feed the stock market: in the upward phase, the "call money" grew with stock price and, in the downward phase, "banks held back in lending to the stock market" and "when the crash came, the credit system suddenly froze" (ibid). So, for Kindleberger, "an old-fashioned theory of the instability of the credit system" is required.

Thirdly, if Kindleberger and Bernanke rested on the debt-deflation theory, it is worth examining how they referred to Fisher (1933). Kindleberger (1989, p. 17; 1997a, p. 22) applied the debt-deflation process to all actors (respectively, indebtedness of firms, household, and banks) and all prices (respectively, price of commodity, real estate, and financial assets) as an extension of the spiral phenomenon. On the other hand, Bernanke and Gertler (1989, p. 15) referred to Fisher (1933) to underline that an unanticipated fall in the price level leads to a rise in firms' liabilities and a decline in firms' net worth so that agency costs associated with lending to them becomes high. More precisely, Bernanke (1993, p. 62) pondered two ways to consider Fisher's debt-deflation. First, the debt-deflation was initially related to the effect of dynamic process: indeed, "Fisher had in mind a dynamic process in which falling asset prices […] bankrupted debtors, forcing them to make distress sales of their remaining assets." Second, Fisher's contribution might be related to the role of balance sheets: hence, "the adverse effects of debt-deflation can be better rationalized in terms of the modern literature on the role of balance sheets (Bernanke and Gertler, 1990)." Bernanke and Gertler (1999, p. 20) finally concluded that the "debt-deflation mechanism, first described by Irving

Fisher, has been modeled formally by Bernanke and Gertler (1989)." Therefore, Fisher's debt-deflation was finally associated to the balance-sheet channel and not to the deflationary spiral. Retrospectively, one can see why Kindleberger (1986, p. 167) considered that Bernanke (1983a) "does not deal explicitly with the prices of commodities and financial assets as they may affect debt deflation […] but it states that a useful way to think of the 1930-33 debt crisis is as the progressive erosion of borrowers' collateral relative to debt burdens."

In definitive, both authors do not share the same timing explanation. For Kindleberger, an unstable price dynamics is previously in motion when an exogenous shock occurs. Thus, an adverse event then reveals to market participants that upward spiral is not sustainable and triggered a displacement of expectations so that the downward spiral and the ensuing banking run take place. The work of Bernanke does not rest on the spiral of liquidity but on agent's balance sheet and intermediary costs. The exogenous run on banking institutions or exogenous shock on financial markets deteriorates the quality of collaterals and balance sheets of firms, increases the costs of credit intermediation, and amplifies economic difficulties. The latter is the financial accelerator that Bernanke and Gertler formalized from the mid 1980s to the late 1990s.

5. Bernanke-Gertler models

Bernanke embraced the New Classical as well as the New Keynesian paradigm.[9] As we shall examine, in line with the New Classical side, Bernanke embraced the real business cycle framework with rational expectations and efficient market hypotheses. In line with the New Keynesian side, he added some credit market imperfections, or financial frictions, which were presented as the source of the endogenous propagation-amplification to the real economy of an exogenous shock. From 1985 onwards, Ben Bernanke co-authored papers with Mark Gertler and Simon Gilchrist. They provided a spectrum of financial-accelerator models with several versions of shocks concerning either banking sector (credit-supply side), or agent indebtedness (credit-demand side).[10] So Bernanke and Gertler (1995, p. 35)

[9] Such a combination contributed to the New Neo-classical Synthesis in the late 1990s (Goodfriend, 2002, p. 186). Bernanke (2002a, p. 214) claimed that "most of my work has been orthogonal to the new Keynesian/new Classical debate even though I was graduate school during the height of their warfare. I largely avoided that conflict and focused on the application of asymmetric information theory to credit markets and more generally the role of credit markets in the economy. Those kinds of interest can feed off both the new Keynesian and new Classical ideas. So I would say that I played fairly neutral for a long time and I didn't take a strong stand either way."

[10] On the credit-supply side, one can find adverse shock related to deterioration of banks' balance sheet, reduction of credit due to banks failures (Bernanke and Gertler, 1985, p. 33; Bernanke and Gertler, 1987a, p. 107). On the credit-demand side, one can find adverse shock related to borrowers' balance sheet (Bernanke and Gertler, 1989, p. 28), slowdown of an economic expansion (Bernanke, Gertler and Gilchrist, 1996, p. 1), redistribution between creditors and debtors (Bernanke, Gertler, and Gilchrist, 1999, p. 1372), adverse shock on assets price (Bernanke and Gertler, 1999, p. 93). Regarding the origin of the accelerator in the business cycle analysis, Bernanke

observed: "An extensive theoretical literature has exploited this idea to argue that endogenous pro-cyclical movements in borrower balance sheets can amplify and propagate business cycles, a phenomenon that has been referred to as the 'financial accelerator'."

Bernanke and Gertler (1985; 1987a) proposed at first a model with banks collecting liquid and short-term deposits for granting illiquid and long-term loans and consumers facing liquidity risks. Thus, the system is prone to bank runs (Diamond and Dybvig, 1983). Banks provide credit for project, which cannot be funded in the securities markets because of high evaluation and monitoring costs (Diamond, 1984). A twofold feature may be here underlined. First, Bernanke and Gertler (1985, p. 34; 1987a, p. 108) distinguish the "fundamental" factors explaining runs from the contraction in banking due to "market psychology" or "sunspots". Second, Bernanke and Gertler (1985; 1987a) as well as Bernanke and Blinder (1988) made the assumption of the traditional bank credit channel through which commercial banks' liabilities are only deposits, and not market funds such as short-term securities. Later, Bernanke and Gertler (1995, pp. 40-2) recognized that, despite that this assumption has prevailed in the United States prior to the 1980s, it appeared afterwards as "a poorer description of reality": they concluded that, "because of financial deregulation and innovation, the importance of the traditional bank lending channel has most likely diminished over time. […] Additionally, it may well be the case that the balance sheet channel—described earlier in reference to non-financial borrowers—has become increasingly relevant to banks as well." This may explain why Bernanke and Gertler shift from a model with banks and credit in the mid-1980s to a model with firms and financial markets since the late 1980s. Despite that Bernanke and Gertler (1985, p. 37) announced in its first version that their paper constituted "the beginning of what may be an extend research program" on the understanding of the role of "banks" in aggregate economic activity, such an announcement did not appear anymore in its published version (Bernanke and Gertler, 1987a).

Actually, Bernanke and Gertler (1986, 1989) provided in the meantime a different model without banks—using the word "bank loan" only once. According to Bernanke and Gertler (1989, pp. 14-5), their model is a modified real business cycle model, "that is, a stochastic neo-classical growth model" with "an asymmetry of information between the entrepreneurs who organize and manage physical investment and the savers from whom they borrow." So it departs both from the Modigliani-Miller theorem (as was already the case) and from the Kydland-Prescott real business cycle model (even if the methodology remained the same). The focus was made on the borrower's financial position measured by the "collateralizable" net worth or balance sheet defined as the sum of liquid assets and marketable collateral held in the balance sheet. Then, the agency costs may create a critical

(1983c, p. 85) notably quoted Frisch (1933) and Samuelson (1939). Fischer, Bernanke's PhD supervisor, previously handled the notion of "accelerator" (Fischer and Cooper, 1973, pp. 848-9), and Mishkin (1977, p. 19) referred to a "flexible accelerator model." The term of accelerator may not be found in Bernanke (1979) but in Bernanke (1980, p. 811) for one of the first time.

discrepancy between the cost of "external" and "internal" funds. Bernanke and Gertler (1990, p. 98; 1995, p. 28) then defined the "external finance premium" as the difference between the cost of funds raised externally (by issuing equity or bonds) and the opportunity cost of internal funds (by retaining earnings) so that deterioration of borrower's net worth and issuance of imperfectly collateralized debt provoke an increase in external finance premium. Frictions are reinforced by borrower's incentives to retain information about its investment and collateral and lender's expected cost of evaluation and monitoring. Through the determination of the external finance premium, the quality of borrowers' balance sheet endogenously determines investment and spending decisions and hence creates propagation and amplification of the business cycle. The borrower's net worth is procyclical in that solvency increases during good times, which in turn reduces agency costs—and conversely. Thus, "a kind of accelerator effect emerges" (Bernanke and Gertler, 1989, p. 15).

In line with Bernanke and Gertler (1986, 1989), Bernanke and Gertler (1987b, p. 10; 1990, p. 94) propose a model with "entrepreneurs" and "lenders" in which financial intermediaries are "convenient fictions." The turning point is finally achieved when Bernanke and Gertler (1990, pp. 107-8) come to place on the same footing "banks" and "entrepreneurs" so that the financial-accelerator model apply to all kinds of firm (financial and non-financial): "Like the entrepreneurs in our model, financial institutions need net worth (capital) to be able to borrow and to perform their functions with manageable levels of agency costs."[11] There is no narrow channel through bank lending but a large channel through the balance sheet—an enlargement of the transmission of the economic fluctuations that leads to a sort of dilution of the credit view. In this respect, after having made a distinction between the bank lending channel (whereby the supply of bank credit relative to other forms of credit determines the external finance premium) and the balance sheet channel (through which the borrowers' net worth also determines the external finance premium), Bernanke and Gertler (1995, p. 42) explicitly retained the latter. They did acknowledge that the bank credit channel and the balance sheet channel walk hand in hand inasmuch as a reduction in the supply of bank credit increases the external finance premium and, in reverse, the deterioration of borrowers' balance sheet reduces their ability to obtain credit from banks. They asked the question of the respective importance of this or that channel. Their conclusion was that financial deregulation and innovation has lessened the importance of the bank lending channel in comparison with the balance sheet channel, which has even become relevant to banks as financial intermediaries participating to asset market activities.

Bernanke and Gertler's financial accelerator model coupled (*i*) the propagation (the transmission of a shock) and (*ii*) the amplification mechanism (the feedback effect of a shock). The propagation mechanism is based on agents' balance sheet or

[11] Bernanke, Gertler and Gilchrist (1996, p. 6) stated that "a complete description of the financial accelerator mechanism will likely include significant roles for non-firm borrowers such as banks and households." Bernanke and Gertler (1999, p. 21) finally specified that the agents' financial positions correspond to firms' rather than households' balance sheet.

net worth and, as previously seen, it is claimed to be found in Fisher (1933). The amplification mechanism rests on informational frictions and agency costs and it is supposed to be found in Akerlof (1970) regarding imperfect information and in Jensen and Meckling (1976) concerning agency relationship between lenders and borrowers (Bernanke, 1993, pp. 52-4). As defined by Bernanke and Gertler (1990, p. 88), "a financially fragile situation to be one in which potential borrowers (those with the greatest access to productive investment projects, or with the greatest entrepreneurial skills) have low wealth relative to the sizes of their projects", which "leads to high agency costs and thus to poor performance in the investment sector and the economy overall." All in all, the financial accelerator formalized the *effects* of financial factors on the real economy once the financial crisis is exogenously determined. According to Bordo and Jeanne (2002, p. 162), "the financial friction" *à la* Bernanke and Gertler (2000), "introduces a financial accelerator but there are no financial crises." In other words, the financial friction delays the return of the economy to its steady state by increasing the persistence of the exogenous shock, but it does not generate the financial crisis. Actually, insofar as Mishkin and Bernanke did not strictly provide a theory of financial crisis but a theory of aggregate demand (respectively through households' and entrepreneurs' expenditures), the assumption that any change in stock prices is exogenous appears, from the households' and entrepreneurs' viewpoint, relevant. As Mishkin (1977, p. 13) early pointed out (and his analysis also applies to firm's balance sheet), "many changes in the consumer's balance sheet are exogenous, in that the consumer does not have control over certain surprise events (movements in common stock prices, changes in the price level, etc.)"

6. Bubbles and exogenous shock

As Bernanke-Gertler approach shifted from a model with banks' credit in the mid-1980s to a model with agents' collateralizable net worth in the late 1980s, the respective exogenous shock shifted from "runs" to "bubbles." So Bernanke (1983a, p. 259) and Bernanke and Gertler (1985, p. 4; 1987a, p. 93) referred to bank runs *à la* Diamond-Dybvig, when Bernanke and Gertler (1999, p. 48; 2001, p. 254) rediscovered asset-price bubbles *à la* Blanchard-Watson. According to Blanchard and Watson (1982), the market-fundamentals component of assets price is determined by the discounted expected payments of future dividends, while the rational-bubble component is determined by *random* variables which are extrinsic from the market fundamentals and reflects self-confirming agents' belief about potential gain from future increase in the asset price. The deviation of the market price from their fundamental value "can embody the popular notion of a bubble, namely movements in the price, apparently unjustified by information available at the time" (Blanchard and Watson, 1982, p. 297) and takes place without violating the arbitrage condition and the rational-expectations hypothesis. In turn, there are two components of the bubble. First, the fundamental component starts with a stochastic process and agents' behavior is rational in that are aware that the bubble

remains a deviation vis-à-vis the fundamental value. This is the pure notion of "rational bubble". Second, concerning the non-fundamental component of the bubble, nothing can be said about the rational agents' behavior and knowledge about the fundamental value. This is the loose notion of "psychology", "herding", or "irrationality".

Blanchard and Watson (1982, pp. 295-6) then created a longstanding *quid pro quo* in associating the name of Kindleberger to the irrationality hypothesis: "There is little question that most large historical bubbles have elements of irrationality; Kindleberger (1978) gives a fascinating description of many historical bubbles. Our justification is the standard one: it is hard to analyze rational bubbles. It would be much harder to deal with irrational bubbles." Thus, Blanchard and Watson call "irrationality" the part of the asset-price bubble which is not explained by their own model with rational expectations. In the first edition and second edition of *Manias*, no explicit definition of a bubble can be found and Kindleberger (1989, p. 33) only mention two times to the notion of "fundamentals" to link it to rational expectation hypothesis. In the third edition of *Manias*, Kindleberger (1996a, p. 13) defined a bubble as "an upward price movement over an extended range that then implodes" without drawing a strict dichotomy between fundamental and non-fundamental components of the bubble. By contrast, according to the efficient market hypothesis, "there can be no bubbles because market prices reflect fundamentals, and that sharp falls in prices frequently reflect 'policy switching' by government or central banks. Where there are no fundamentals to claim attention, and an alleged bubble appears to be the result of herd behavior, positive feedback or bandwagon effects—credulous suckers following smart insiders—econometricians who believe in the efficient market hypothesis tend to suggest that the model is 'misspecified,' i.e. that something was going on not taken into account by the theory, and that more research is called for. Some of the research ignored by those with this belief is offered in this book" (ibid, pp. 16-7)—without departing from the assumption that "each participant in the market is acting rationally" (Kindleberger, 1978a, , p. 41). Thus, the identification of Kindleberger's description of bubbles with elements of "irrationality"—an identification that Blanchard and Watson (1982, p. 295) and Bernanke (1982 p. 159) made in concert—is to be nuanced. Kindleberger's purpose simply was to go beyond exogenous-shock hypothesis.

With the aim to building their financial-accelerator model in an economy without bank loans but with financial assets, Bernanke and Gertler (1999, p. 48; 2001, p. 254) use the "bubble specification […] arbitrarily close to a rational bubble." More precisely, they distinguish two components of bubbles. First, the fundamental component used by Blanchard and Watson (1982) is a rational deviation from the fundamental value defined as the present value of the expected dividends. Second, the non-fundamental component used by Bernanke and Gertler (1999, p. 24) is technically handled as an exogenous shock: "We use the term 'bubble' here loosely to denote temporary deviations of asset prices from fundamental values, due, for example, to liquidity trading or waves of optimism or pessimism." As far as they "loosely" define bubbles as the result of "waves of optimism or pessimism" and

"market psychology", they consider the non-fundamental component of bubbles—the fundamental component remaining intact elsewhere—as an exogenous shock.

Bernanke and Gertler (1999, p. 19) suggested two sources related to the non-fundamental component of fluctuations of asset prices: "poor regulatory practice and imperfect rationality on the part of investors." The first source, "poor regulatory practice", corresponds to the argument of moral hazard: "problems arise when financial liberalizations are not well coordinated with the regulatory safety (for example, deposit insurance and lender-of-last-resort commitment). If liberalization gives additional powers to private lenders and borrowers while retaining government guarantees of liabilities, excessive risk-taking and speculation will follow, leading, in many cases, to asset price booms."[12] The second source of non-fundamental fluctuations in asset prices, according to Bernanke and Gertler (1999, p. 19), is "irrational behaviour by investors, for instance, herd behaviour, excessive optimism, or short-termism. […] Nevertheless, episodes of 'irrational exuberance' in financial markets are certainly a logical possibility." Such an argument finally departs from Bernanke's (1983a, p. 258) research strategy.

Once the two sources of non-fundamental component of fluctuations of asset prices are associated to exogenous shocks such as government's failure and traders' irrationality, it is specified that asset-price bubbles do not enter in the borrowing decisions of firms given that financial as well as non-financial "firms make investments based on fundamental considerations, such as net present value, rather than on valuations of capital including the bubble" (Bernanke and Gertler 1999, p. 25). Firms are rational, but traders are not.[13] In any event, the solution to solve the problem of the existence of bubbles in financial markets is to assume "an exogenous one percentage point increase in stock prices (above the fundamental)" (ibid, p. 26): "We do not attempt to rationalize why investors do not arbitrage the difference between the market and fundamental returns. To our knowledge, any theory of bubbles based on market psychology relies on some arbitrary assumption along these lines" (ibid, p. 48). Finally, Bernanke and Gertler (2001, p. 257) recognized that a "deficiency of the literature to date is that the nonfundamental component of stock prices has generally been treated as exogenous."

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[12] It may be noted here that Kindleberger (1975, [1981, p. 268)]; 1978a, p. 173; 1980 [2000, p. 432]) repeatedly addressed the moral-hazard problem and the rule of conduct of the central bank during financial panics. Kindleberger did not ignore that inappropriate central bank policy can worsens financial disruption, but he did not go as far as to claim that it is crucially an important source of bubbles and financial crises. Another research program is about the rule of the lender of last resort and how both authors regard Bagehot's dictum. In addition, we do not investigate the so-called Jackson Hole consensus as built by Bernanke and Gertler (1999, 2001) with inflation targeting and the question of asset prices in the conduct of the monetary policy.

[13] Bernanke (2002b) however noticed: "Some may believe that stock prices are set largely by uninformed and unsophisticated traders and thus have little connection to fundamentals. I find that belief hard to reconcile with the general level of American prosperity, in which I believe the efficient allocation of capital by financial markets has played a central role. Moreover, even if bubbles arise from the behavior of uninformed traders, they should have no substantial effect on capital allocation unless those who make capital expenditures believe the market's valuations."

These two sources of exogenous shock echo in a large extent to the explanations of the Great Depression given Friedman and Schwartz (1963)—namely, the policy and institutional arguments. Firstly, for Friedman and Schwartz, the Federal Reserve was conducted by misguided doctrines and aimed at combating the "speculative" uses of credit notably by increasing its interest rate in early 1928 (Bernanke, 1983a, p. 257; Bernanke, 2002c). Secondly, before the establishment of the Federal Reserve, bank panics were handled by banks themselves through the suspension of payment and the leadership of largest banks. Hence, "because the decline in money induced by bank panics would not have occurred under previous regimes, Friedman and Schwartz argued, it can be treated as partially exogenous" in the Great Depression (Bernanke, 2002c). Lastly, the United States was the dominant economy under the gold bullion standard during the interwar period and the Federal Reserve constrained other central banks to follow its deflationary monetary policy. All in all, these policy and institutional features (anti-speculative policy, federal banking system, gold bullion standard) were the exogenous forces of the Great Depression. If Kindleberger (1973) also pointed out the institutional features of the interwar period, notably the deflationary pressure resulting from the maintenance of the gold standard and the absence of an international lender of last resort, he specified that these features were not simply the causes of the Great Depression but explained its worsening and deepness. Furthermore, for Kindleberger (1978a), systemic risk and financial fragility due to the spiral of liquidity was the main source of banking panics—which, hence, were not exogenous.

Such was the ultimate question and Bernanke (2002c) came to the following conclusion: "One logical possibility is that the extraordinary rate of bank failure of the 1930s, rather than causing the subsequent declines in output and prices, occurred because depositors and others *anticipated* the collapse of the economy—that is, that the banking panics were endogenous to the expected state of the economy. Friedman and Schwartz's institutional arguments persuade me that this is unlikely" (original italics)—that is, the banking panics are exogenous, while the "logical possibility" here evoked by Bernanke and endorsed by Kindleberger is that banking panics are endogenous. Mishkin (2014, p. 291) echoed with Bernanke's view in stating that, according to Friedman and Schwartz's book, "there were episodes of monetary contractions that look pretty exogenous because there were caused by bank panics or arbitrary decisions to raise reserve requirement and these were then followed by declines in economic activity."

7. Conclusion

The departure of Kindelberger's and Bernanke's view does not significantly lie in different assumptions of rational behavior but rather in the dichotomy between exogenous and endogenous cause of financial. Bernanke aimed at completing Friedman and Schwartz's demonstration in using the cost of credit intermediation in his argument according to which a contraction of the banking system cannot take

place in a world with complete and perfect market, but only if there is a significant increase in the cost of credit intermediation due to critical information asymmetry. Then, Bernanke provided a formalized framework on the effects of the exogenous shock of the banking panics on the real economy, when Kindleberger remained attached to analytical description of the causes of financial crisis and banking panics. Bernanke proposed a sequence whereby the intermediary system appears at the end of the business cycle as follows: 1) exogenous shock, 2) change in firms' balance sheet, 3) worsening of asymmetrical information, 4) increase in agency cost and external finance premium, and 5) endogenous credit rationing and decline in investment spending. By contrast, according to Kindleberger, the financial and banking system appears throughout the cycle as follows: 1) the spiral of liquidity as an endogenous process, 2) expansion of credit intermediation, 3) vulnerability to shocks of the credit system, 4) displacement of agents' expectation in financial asset and real estate markets, and 5) financial crisis, banking panics, and adverse consequence on the rest of the economy. Banking panics are therefore an endogenous process arisen from the price dynamics, which is the result of "rational behavior on the part of each participant" of specific markets where capital gain is significant. In the burst, it is rational on the part of each individual to flight for quality even when such a behavior worsens each participant's cash flow.

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- Kindleberger provided an analysis of the interbank market (especially the call loan market). Minsky (1977) and Bernanke and Gertler (1989) did not provide a model of the interbank market but a model with consumers or entrepreneurs.

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