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Working Paper 93-2

IDENTIFYING CREDIT CRUNCHES

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Abstract: This article emphasizes the role of nonprice rationing in credit crunches. It proposes a process for identifying credit crunches centered on the political economy of the period under study. The process is applied to the U.S. for the 1960-92 period, and a variable is constructed that indicates when credit crunches occurred. In addition, the article questions the conventional wisdom that Regulation Q was the primary cause of the 1960s credit crunches.

JEL Codes: E44, E51, N20, G1, G21

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I. Introduction

The term "credit crunch" has its origins in the unusually tight credit conditions that prevailed in the U.S. in the late summer of 1966, when reports of borrowers unable to obtain credit at any price were commonplace. Prior to 1966, the postwar U.S. experienced three periods of tight credit: the spring of 1953, the fall of 1957, and the last third of 1959. These periods were called "credit squeezes" or "credit pinches." Sidney Homer and Henry Kaufman, economists at Salomon Brothers in the 1960s, coined the term "crunch" to describe how the 1966 episode differed from those in the 1950s. Although Homer and Kaufman did not formally define a crunch, Homer (1966) offered the following explanation:

> The words "squeeze" or "pinch" have gentle connotations. The prehensile male often 'squeezes,' sometimes 'pinches,' with the most affectionate intentions. No bruises need result and no pain need be inflicted.
>
> A "crunch" is different. It is painful by definition, and it can even break bones.

Since 1966, the U.S. has experienced several periods of tight credit.[1] Some of these events have been labelled "credit crunches," the most recent being 1990-92. Through them all, the term "crunch" has maintained a negative connotation, resulting in complaints about crunch-like credit conditions being accompanied by calls for policy intervention. Before policymakers can decide what, if any, intervention is desirable, they must determine whether a crunch is underway and, if so, what is causing it. This article addresses the question of how economists can identify credit crunches. In so doing, it presents

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1. The term "tight credit" here refers to periods of relatively high or rising interest rates as well as periods of reduced availability because of greater nonprice credit rationing. Thus, "tight credit" is more general than "credit crunch," which is defined in the text below.

new evidence on the U.S.'s experiences with tight credit since 1960 and draws new conclusions about which of those experiences are credit crunches.[2]

Definition, of course, determines the methodology used for identification. We define a "credit crunch" as *a period of sharply increased nonprice credit rationing*. Our view is shared by numerous other economists (e.g. Friedman, 1991, p. 242, and Green and Oh, 1991) and captures what most economists and policymakers, as well as much of the public, think of as a crunch. Note that the word "sharply" in the definition is critical. Our crunches involve a discontinuous increase in the use of credit rationing, beyond the increase typical around recessions, that may (but need not) be independent of any change in borrowers' risk profiles.

Given our definition, identifying a credit crunch must involve searching for periods of sharply increased nonprice credit rationing (i.e. negative shocks to the credit allocation process). Ideally, we would have available time-series data that quantify the degree of nonprice rationing in practice for broad measures of credit. As the Federal Reserve Board (Board of Governors, "Credit Availability," 1992, p. 2) has pointed out, however, such data are not available. What is available is "typically unsystematic, [consisting of] surveys and discussions with borrowers and lenders to draw conclusions about the relative strength of credit demands and the stringency of supplies that generate these flows and prices."

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2. Prominent attempts at identifying the U.S. credit crunches of the postwar period include Eckstein and Sinai (1986), Sinai (1991), and Wojnilower (1980 and 1985). The Eckstein and Sinai paper focuses on the post-World War II period and builds on several papers that Sinai wrote independently; see Sinai (1976, 1978, and 1980). Sinai (1991) extends his earlier analysis through 1990. Wojnilower (1980) studies the period 1950-80, while Wojnilower (1985) covers 1981-84. The most recent period is discussed in Wojnilower (forthcoming).

Consequently, our search for periods of sharply increased nonprice credit rationing involves what Romer and Romer (1989) have termed the "narrative approach": a detailed examination of the historical record from primary sources. For our purposes, this examination first entails identifying periods in which credit conditions reportedly tightened, all periods that might possibly be crunches. We do this by looking at anecdotal reports by borrowers, economic commentaries, and other research on credit crunches. Any period considered a "crunch" by any of these sources is investigated further.

Second, we must determine which of these tight-credit periods qualify as crunches. We do this by looking for a preponderance of anecdotal reports *by lenders* of nonprice credit rationing. This focus on lenders' reports is unique. Traditionally, to the extent that researchers have considered anecdotal evidence, their attention has been on borrowers' reports. Borrowers, however, have an incentive to complain whenever credit conditions tighten, whether credit has become less affordable or less available, and if they are denied credit, they have little information about lenders' reasons for the denials. Lenders, in contrast, know whether they are relying more heavily on nonprice rationing and why. Suppose that lenders increase their use of nonprice rationing because exogenous factors--e.g. usury ceilings or credible threats of more stringent regulation--effectively prevent them from rationing by price. Such restrictions on their ability to ration credit reduce their short-run profitability (otherwise we would observe more nonprice rationing in the absence of the exogenous factors). Consequently, we expect lenders to object vocally to these restrictions on their lending operations. In contrast, increased nonprice rationing may represent optimizing behavior by lenders in the absence of an exogenous shock to the credit allocation process. Lenders would have no incentive to complain under these circumstances. In

fact, we expect to find them defending their lending practices against borrowers' protests. Similarly, tight-credit periods that do not warrant the term "crunch," because they are characterized primarily by increased price rationing, also would not generate protests from lenders. Thus, although we use evidence from borrowers to identify tight credit periods, we rely on reports from lenders to determine which of these periods are crunches. Lenders make such reports through the media and their lobbying groups. For the banking industry, for example, evidence on lenders' use of and attitudes regarding greater nonprice rationing can be found in the position papers, congressional testimony, and speeches by the American Bankers Association and in the banking industry's daily newspaper, the *American Banker*.

Finally, because "actions speak louder than words," the focus in examining political economy forces should be on policymakers' actions, not their intentions.[3] Thus, to complete our identification of credit crunches, we must seek *corroborating evidence, proof that the anecdotal reports from lenders* were consistent with observed behavior. Such evidence can be found in congressional and Federal bank regulatory publications, minutes from Federal Open Market Committee meetings, and other government documents.

To make more clear the approach taken in this article, it is worth describing what we do not do and why. Some obvious alternative approaches involve using substantively different definitions of "credit crunch." For example, we could, but do not, define a crunch as a stage of every business cycle that precedes and triggers recessions.[4] This approach requires searching for periods around recessions during which lending activity is declining. It produces the conclusion that a crunch occurred during each recession from

3. Romer and Romer (1989, p. 143) also make this point. Although they focus on intentions, they note the existence of consistent actions.
4. See Eckstein and Sinai (1986, pp. 40-41) and Sinai (1991).

1960 through 1992.[5] However, this conclusion is inconsistent with the evidence presented in section II. We find some National Bureau of Economic Research (NBER) recessions for which there is anecdotal evidence of heightened nonprice rationing, at least in some sectors; one period of increased nonprice rationing that does not coincide with a recession; and two recessions during which credit was tight but there is essentially no evidence of increased nonprice rationing and there were few complaints of credit crunch conditions.

Another limitation of defining crunches as business cycle phenomena stems from the normal cyclical behavior of credit extensions. Lending activity--as measured by credit outstanding--declines in every recession, partly because loan demand falls as consumers and businesses retrench and repay debt and partly because rational lenders adjust credit standards over the business cycle as credit risk changes. We do not believe that declines in measured lending activity from a decrease in the demand for credit reflect lending restraint. In addition, if the supply of credit decreases but the remaining available credit is rationed by price, we do not label the situation a crunch. Credit is available to--and obtained by--all borrowers willing and able to pay the market interest rate; those unwilling to pay choose not to borrow.

A second alternative approach involves defining "credit crunch" as a significant decrease in the supply of credit or, more narrowly, in the supply of bank loans, regardless of whether or not the available supply is rationed by price.[6] The more narrow definition is problematic because it only considers extensions of credit by banks and thus only finds credit crunches that affect borrowers without access to nonbank sources of credit. However, the broader

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5. Eckstein and Sinai (1986) and Sinai (1991) treat the tight credit conditions during 1966 as a "precrunch" period associated with the 1969-70 recession.

6. For example, see Wojnilower (1980, p. 278) and Bernanke and Lown (1991, p. 207), respectively.

definition also is problematic. Identifying a shift in the supply of credit requires an understanding of what credit is and data on its determinants. An extension of credit represents an agreement by certain borrowers and lenders to a complex contract that states an interest rate and a range of nonprice terms that jointly determine the effective price of credit. Because data on the nonprice terms of credit contracts are limited, identifying shifts in a correctly specified credit supply curve is difficult.

Even if specifying the credit supply curve were not an obstacle, there is a second problem with the broader definition because it does not require that available credit be rationed by nonprice means. Thus, according to the definition, a sizable decrease in credit supply that brings about higher interest rates but no tightening of the nonprice credit terms would be a credit crunch. As explained above, by our definition this would not be a crunch because credit, although expensive, would remain available to anyone willing to pay the now considerably higher interest rates. The evidence presented in section II shows that historically in such circumstances there has been little talk of credit crunch conditions.

A question not addressed in this article is whether credit crunches deserve their bad reputation. Answering it would involve identifying the link--if one exists--between the different types of credit crunches identified and the recessions that often followed them. This perhaps could be done using a credit crunch dummy variable created from Table 1, which summarizes our conclusions regarding the dates and nature of U.S. credit crunches in the 1960-92 period. However, such an exercise is beyond the scope of this article.

Despite credit crunches' bad reputation, we find that they need not require policy intervention. In fact, as shown in section II, policy intervention generated all the credit crunches that we identify in the 1960-82

period. Our historical review further suggests that the intervention at fault in the earliest credit crunches was not the Federal Reserve System's ceiling on deposit interest rates (Regulation Q), as is commonly thought. Rather, the intervention often took the form of extreme jawboning, or policymaking by intimidation.[7] Section III applies our methodology to the 1990-92 period and finds that this period differed noticeably from each earlier credit crunch identified. Section IV concludes.

II. An Examination of 1960-82

Between 1960 and 1982, the U.S. experienced several periods of tight credit conditions. These periods were the second and third quarters of 1966, 1969-70, 1973-74, the first half of 1980, and 1981-82. This section describes and compares the events of each period and determines which ones warrant the title "credit crunch." The focus is on lending by the domestic banking industry, the predominant U.S. lender in the earlier episodes, and thus much of the historical evidence is from the American Bankers Association and the *American Banker*. Corroborating evidence is presented from congressional documents and from the minutes of the Federal Open Market Committee's (FOMC) meetings because that body is the Federal Reserve's policymaking arm.

The Evidence From 1966

The 1966 episode is widely considered to be the classic credit crunch, the one to which analysts compare all subsequent experiences with tight credit.[8] It was preceded by a prolonged period of strong loan demand and easy

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7. Although we do not do so here, the practice of policymaking by intimidation can be formally modelled using a game-theoretic framework, as in Potters and Van Winden (1990).
8. Burger (1969) provides a detailed description of the 1966 experience.

credit conditions. From 1962 through 1965, sales of negotiable *CDs--a financial* innovation of the time--grew rapidly. The sales funded bank lending, which grew at annual rates exceeding 10 percent (in real terms) despite rising interest rates. Whenever interest rates on Treasury bills and other short-term securities approached the Regulation Q ceiling on CDs, the Federal Reserve raised the ceiling, so banks never experienced an outflow of deposits.

In mid-1965, the military buildup for the Vietnam War began. It contributed to a growing Federal government deficit and heightened inflationary expectations that fueled business loan demand. By the fall of 1965, the Johnson Administration and the Federal Reserve were afraid that rapid loan growth would generate accelerating inflation. Federal Reserve Board Chairman William McChesney Martin warned the Administration in early October that the discount rate might have to be raised because it was out of line with market interest rates. Johnson wanted the Fed to postpone any policy actions until the following January so that monetary and fiscal policy could be coordinated given the new government budget. Nevertheless, for the first time in over a year, the Fed--at Martin's urging--raised the discount rate half a percentage point to 4 1/2 percent on December 6; at the same time, it raised the Regulation Q ceiling to 5 1/2 percent (Keetl, 1986, pp. 102-108, and Moore, 1990, pp. 132-134). Banks responded by hiking the prime rate to 5 percent.

Reportedly, President Johnson felt betrayed by Martin's actions, but by year's end, the men appeared to have resolved their differences (Keetl, 1986, pp. 106-107). In making his annual economic report to Congress in February 1966, Johnson stated that he was counting on the Fed to prevent excessive credit flows from generating inflation. The FOMC was conscious of its responsibility as set forth by Johnson when it met that month (*Minutes of the FOMC*,

2/8/66, p. 116). On February 23, 1966, the *American Banker* referred to the Fed's tight-money policy thus far that year as "Operation Screen":

> Today, there is some money available--and the banks have been requested to supervise its rationing. They have been asked to take the responsibility of seeing that their loans go for productive purposes, and that the final use of the funds they lend will not add to inflationary pressures.
>
> This is a remarkable delegation of responsibility to private institutions by the makers of Federal policy. A cynic might observe that the banks are being asked to pull the Fed's chestnuts out of the fire. But the counter argument to that is that the Fed seems to be taking the lead in pulling out the inflationary chestnuts for everybody, and that it is the proper exercise of banking responsibility to help in this endeavor.

Reiterating this theme, Federal Reserve Board Governor Sherman J. Maisel said that "banks might have to fight inflation by refusing credit 'to customers who in other circumstances would be welcomed'" (*American Banker*, 2/25/66).

At its March 1 meeting, the FOMC heard the results of a survey of selected banks in the Federal Reserve's Second District, which includes New York. The survey showed that almost all bankers questioned reported that adequate credit restraint required an increase in the prime rate, but that they had postponed raising the prime because they feared political reprisal (*Minutes of the FOMC*, 3/1/66, p. 229). The FOMC also debated ways of satisfying the Administration's request for reduced credit extensions. Chairman Martin reported discussing in a recent meeting with Treasury Secretary Henry Fowler the possibility of the Federal bank regulatory agencies issuing a joint statement urging lending restraint by banks. Martin disliked the idea because it resembled the voluntary credit restraint programs that the Fed had used during the Korean War. He proposed an alternative: the Federal Reserve Bank Presidents could informally meet with individuals from the banks in their district to discuss the necessity for credit restraint through nonprice rationing. Each banker should be met with individually. No mention should be

made of discount window access being restricted, but the Reserve Banks should make sure that they were applying sufficiently rigorous standards for discount borrowings. Although there were concerns about Martin's alternative, the other FOMC members generally preferred Martin's proposal to the Administration's. They decided to dodge the issue of interest rates to avoid suggesting that the Fed preferred nonprice rationing to interest rate changes as a credit allocation device (*Minutes of the FOMC*, 3/1/66, pp. 265-268).

The FOMC met again on March 22. According to Federal Reserve Board economists, bankers seemed to be examining loan applications more carefully and liquidating U.S. Government securities in response to the Fed's tight monetary policy. The most important event since the last meeting was the increase in the prime rate from 5 percent to 5 1/2 percent on March 10. The Reserve Bank Presidents reported, based on their meetings with the bankers in their districts, that banks were trying to avoid making loans for speculative and nonproductive ventures. Some bankers had imposed quantitative limits on certain types of lending. One Reserve Bank President complained that the discussion at the previous FOMC meeting had left him ill-prepared to answer the questions bankers raised during his meetings with them. Among the questions asked were "'In the present environment, are you trying to tell me in a subtle way to ration credit rather than increase rates, particularly the prime rate?'"; "'What criteria should I follow in rationing credit?'"; "'Is this merely a first step down the road to guidelines?'" Chairman Martin noted that someone had "suggested to him that 'rationing' was the wrong word" for the lending practices that the Fed was encouraging; "what was really needed was intelligent administration. He [Martin] hoped that the system would administer the discount window intelligently and that bankers would be asked to

become bankers again" (*Minutes of the FOMC*, 3/22/66, e.g. pp. 305-308, 317, 356-357).

The following week, Congress, led by the House Banking and Currency Committee, began deliberating measures to deal with rising interest rates and inflation. For example, on March 30 the Committee, chaired by Representative Wright Patman, approved legislation to give the president stand-by authority to impose consumer credit controls like those in effect during World War II and the Korean War (*American Banker*, 3/31/66).[9] Later that spring, the Committee began hearings on H.R. 14026, "a bill to prohibit insured banks from issuing negotiable interest-bearing or discounted notes, certificates of deposit, or other evidences of indebtedness." Also before the House Banking Committee was H.R. 14422, a bill to prohibit insured banks from accepting time deposits of denominations less than $15,000. The American Bankers Association (ABA) strongly opposed both bills (U.S. House, *Hearings to Eliminate Unsound Competition For Savings And Time Deposits*, 1966, pp. 1, 135, 402).

These legislative actions induced the banking industry to show that it could better regulate itself. The ABA published a pamphlet, entitled *The Banker's Role In Reinforcing Monetary Policy*, in which it reprinted a speech by its president, Archie Davis, and presented a statement prepared by a special subcommittee that had been convened to suggest guidelines for making lending decisions (American Bankers Association, 1966). Davis was quoted (p. 11) as saying

> "The period ahead is not going to be an easy one for banks. The warning signals are clear. We are going to have to restrain the expansion of credit. It seems to me that the prudent approach for bankers to follow, if market forces prove inadequate, is to adopt informal screening procedures that will weed out the least productive and the speculative types of loans."

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9. The bill ultimately was defeated.

The subcommittee report delineated the action expected of banks:

> The Administration has urged bankers to use credit rationing as a device to supplement interest rate increases as a means of limiting credit expansion. . . . Secretary of the Treasury Henry H. Fowler [has] . . . strongly expressed a conviction that interest rates "should not and need not be the only means of determining which applicant gets the loans."

The report also explained the motivation for complying with the Administration's wishes:

> Dissatisfaction with the record of governmental control programs which seek to influence loan extensions through rigid formulas has caused many bankers to feel that banks must take positive steps toward establishing self-imposed guidelines. [J.] Howard Laeri [vice chairman of First National City Bank, New York] commented recently that "quite bluntly, we seem to be faced with the choice between responsibility and culpability--responsibility for the custodianship of the country's credit or blame for being a party to inflationary credit excesses which might lead to controls that would hamstring the flexibility of our economy."
>
> . . . . Addison Reese, president of the Association of Reserve City Bankers, spoke for many when he said: "I do not believe that bankers who were involved in the ill-fated Voluntary Credit Restraint Program of 1951-1952 want it resurrected" (American Bankers Association, 1966, pp. 12-13, 28).

The report recommended that banks establish special loan review committees to decide how to allocate available credit. It instructed the committees to direct credit toward "productive" uses by carefully assessing the economic impact of loans for plant and equipment. Discouraged was lending for takeovers or "speculative" inventory purchases, as well as lending outside the bank's local area of operations. In addition, the report encouraged the committees to screen loans affecting the country's international balance of payments; tighten credit standards, especially on loans to new customers; and reduce loan demand by deferring loan requests and encouraging borrowers to find other sources of funds (American Bankers Association, 1966).

During its June meetings, FOMC members debated whether to allow Regulation Q to become binding to squeeze bank lending further. They reported

evidence that banks were dealing with the continuing strong loan demand and rising cost of funds by liquidating U.S. Government securities, making fewer loan commitments, and reducing credit availability through price and nonprice rationing (*Minutes of the FOMC*, 6/7/66 and 6/28/66). On June 29, banks raised the prime rate another quarter point to 5 3/4 percent.

When the secondary-market rate on outstanding CDs rose above the 5 1/2 percent ceiling on newly-issued CDs in the first week of July, Regulation Q became binding (see Figure 1); as a result, banks began experiencing an outflow of funds. Federal Reserve Board Governor Charles Shepardson warned that the Fed would not be relaxing Regulation Q soon. On July 8, the press announced "Credit at Banks Is Tightest Since Expansion's Start" five years earlier (*American Banker*, 7/8/66 and 7/19/66). The Federal Reserve tried to tighten Regulation Q further on July 20 by imposing a lower ceiling on multiple-maturity time deposits than on single-maturity time deposits.[10] This change had little effect, however, because banks simply converted multiple-maturity time deposits to single-date maturities that could pay a higher rate of interest (*Minutes of the FOMC*, 7/26/66, p. 816).

Place Figure 1 Near Here

To protect their liquidity in the face of disintermediation, banks normally would have borrowed from the Federal Reserve's discount window. This time, however, they did not; they apparently had gotten the message from their meetings with Federal Reserve officials during the previous six months that the Reserve Banks were less willing to extend credit. Instead, many banks began selling municipal securities in addition to U.S. government securities. This drastically lowered prices and created a liquidity crisis in the bond

10. Multiple-maturity time deposits are deposits that renew automatically at maturity and those that are payable after written notice of withdrawal.

markets in August as states and municipalities wishing to raise funds through the issue of new bonds faced prohibitively high costs.[11] Bankers also raised the prime rate once again, this time to 6 percent.

At its August 23 meeting, the FOMC heard from staff economists that market interest rates were up sharply since the last meeting and that "uncertainty and apprehension . . . dominate[d] the mood of both lenders and borrowers." The big unknown was the likelihood of a major CD runoff at the large banks. With loan demand continuing to be "very strong," the Fed expected banks to borrow at the discount window if a sizable CD runoff occurred (*Minutes of the FOMC*, 8/23/66, pp. 918-920). Most FOMC members were concerned that monetary policy was not tight enough. One Federal Reserve Board Governor declared, "Beyond question, the current economic situation is so fraught with inflationary pressures that we need to be applying all the restraint upon the availability of credit that we can reasonably bring to bear." Another worried that banks still were extending too much credit. A recent Fed survey of bank senior loan officers had suggested that bankers so valued their relationships with their large customers that they had difficulty denying those customers' loan requests. The Committee decided to leave policy unchanged, although many members would have preferred a directive for further tightening (*Minutes of the FOMC*, 8/23/66, pp. 927, 947-948, 977-978).

A few days later, President Johnson again pleaded with "bankers to be 'very discerning' in granting credit, and not to make loans unless justified by 'demonstrable public interest.'" He also stated his administration's

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11. Some scholars (e.g. Wolfson, 1986) use the term "credit crunch" to refer to this liquidity crisis. We reserve "credit crunch" for periods during which borrowers face sharply increased nonprice credit rationing and "liquidity crisis" for times when securities traders find raising funds in financial markets extremely difficult or costly.

strong support for legislation that would expand the regulatory agencies' powers to set interest rate ceilings (*American Banker*, 8/25/66).

On September 1, 1966, the Fed sent a letter to all member banks, urging again that they adjust to the tighter credit conditions by slowing the growth of their business loan portfolios rather than liquidating securities holdings:

> The [Federal Reserve] System believes that the national economic interest would be better served by a slower rate of expansion of bank loans to business within the context of moderate over-all money and credit growth. Further substantial adjustments through bank liquidation of municipal securities or other investments would add to pressures on financial markets. Hence, the system believes that a greater share of member bank adjustments should take the form of moderation in the rate of expansion of loans, particularly business loans.
>
> Accordingly, this objective will be kept in mind by the Federal Reserve Banks in their extensions of credit to member banks through the discount window. . . . It is recognized that banks adjusting their positions through loan curtailment may at times need a longer period of discount accommodation than would be required for the disposition of securities (Board of Governors, *Federal Reserve Bulletin*, 9/66, pp. 1338-1339).

Bankers' reaction to the letter "ranged from approval to resignation to the inevitable." At the FOMC's meeting on September 13, Federal Reserve Bank Presidents reported that bankers had not been using the discount window since the delivery of the letter and hoped to avoid doing so in the near future. Apparently, the letter allayed fears of a banking crisis, but its effect on bank lending was negligible because bank credit growth had begun slowing in August--business lending had declined--and the bond market crisis was over (*Minutes of the FOMC*, 9/13/66, pp. 1031, 1010, and, e.g., pp. 1013, 1023).

A much-revised version of H.R. 14026, which the Fed endorsed, became law (P.L. 89-597) on September 21, 1966 (*Minutes of the FOMC*, 9/13/66, p. 1054). It required that Treasury, Federal Reserve Board, Federal Deposit Insurance Corporation, and Federal Home Loan Bank Board officials take whatever actions

were available to them to reduce interest rates as much as possible given prevailing economic conditions.

At its October 4 meeting, Federal Reserve Board economists briefed the FOMC that "credit markets during the past two months have moved from a period of severe strain to one during recent weeks of comparative relaxation" (*Minutes of the FOMC*, 10/4/66, pp. 1076-1077).

The 1969-70 Episode

Economic conditions going into 1969 closely resembled those preceding the 1966 credit crunch. During late 1968, fears of inflation mounted as signs emerged that the economy was overheating. Talk of a credit crunch resurfaced when the Fed allowed the Regulation Q ceiling to become binding after rates on large CDs exceeded 6 percent in early November, as shown in Figure 1. Banks prepared for the disintermediation and takedowns of loan commitments that they expected to follow.[12] They raised the prime rate to 6 1/2 percent from 6 1/4 percent on December 2. The Fed, concerned about the public's inflationary psychology, responded by raising the discount rate from 5 1/4 percent to 5 1/2 percent on December 18 (*Minutes of the FOMC*, 1/14/69, p. 75). Banks immediately raised the prime to 6 3/4 percent. With the cost of funds continuing to climb, the prime hit 7 percent just three weeks later, on January 7.

At its January 14 meeting, the FOMC noted that its recent shift toward a tighter monetary policy had renewed fears of a credit crunch. The Committee's staff economists expected a substantial outflow of CDs from banks. Thus, the key question before the Committee was whether maintaining its tight policy

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12. Loan commitments, which were informal agreements in 1966, were generally legally binding contracts in 1969.

stance would result in a crunch if the Regulation Q ceilings were not raised (*Minutes of the FOMC*, 1/14/69, pp. 23, 26).

By February 4, when the FOMC next met, the CD runoff had contributed to greater market uncertainty, although concern about a crunch had subsided. Business loan demand reportedly remained strong. The Federal Reserve Bank presidents reported no complaints from banks about tight credit conditions (*Minutes of the FOMC*, 2/4/69, pp. 100, 138, 163).

The situation was different at the FOMC's next meeting a month later. One staff economist warned that he "smell[ed] 'crunch' in the air." Bankers were buying Eurodollars and selling securities to compensate for the deposit outflow that was in its third month and ultimately would be larger in dollar amount and percentage terms than that in 1966. Concerns about disintermediation led the FOMC to discuss raising the Regulation Q ceilings at its March meeting. The Fed was in a bind: if it maintained the Regulation Q ceilings, the CD runoff would continue, but raising the ceilings would be interpreted as evidence that the Fed had eased policy and thus would fuel inflationary expectations (*Minutes of the FOMC*, 3/4/69, especially pp. 256, 264-267, 289).[13] The Fed decided to leave the Regulation Q ceiling unchanged.

To ration their increasingly scarce loanable funds, banks raised the prime to a record high of 7 1/2 percent on March 17. The Fed, stating its concern that rising interest rates would fuel inflationary pressures, joined the Nixon Administration in publicly calling on banks to reduce credit extensions through nonprice credit allocation methods. Fed Chairman Martin opposed any further increase in the prime and raised the possibility that the Fed might take further steps to limit credit availability (*Wall Street Journal*,

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13. This dilemma plagued the Fed throughout 1969; see *Minutes of the FOMC, 1969*.

3/26/69). On April 4, the Fed raised the discount rate to 6 percent. In response, banking industry leaders, echoing industry spokesmen of 1966, urged bankers to discipline themselves in curtailing credit extensions (*American Banker*, 4/24/69). At an ABA conference that spring, there was even considerable discussion among bankers about the possibility of the Fed's imposing a "voluntary" credit restraint program. Some bankers hoped for such a program, apparently because it would better enforce cooperation among banks in lending restraint (*Minutes of the FOMC*, 4/29/69, p. 503).

In public statements, ABA representatives explained how bankers should allocate credit:

> "Bankers . . . . can, through their investment and loan policies, make a significant contribution [to achieving the objective of slowing inflation]. Speculative and non-productive loans should be discouraged. Customers should be advised to consider how these restrictive measures may affect their decisions to invest in new plants, to accumulate inventories, and to expand operations" (*American Banker*, 5/14/69).

By the end of May, though, there was little evidence of credit growth or loan demand slowing. Bankers nevertheless claimed that there was a credit crunch and that they were nonprice rationing (*American Banker*, 5/28/69 and 5/29/69). For example, for the first six months of 1969, Bank of America made no domestic loans for mergers or acquisitions. As BOA president A. W. Clausen described,

> "Our money committee meets every day . . . and any request for dollars gets a good hearing. We have a list of sort of 'King of the Hill' things, things we try to avoid." Among them are loans for excess inventory positions and unnecessary plant expansion, and arbitrage (*American Banker*, 7/2/69).

However, Fed officials did not take bankers' claims seriously. Encouraging this skepticism was bankers' admission to Fed officials that "large business loans would be made routinely until all funds were exhausted or the Federal

Reserve made a direct request to limit them" (*Minutes of the FOMC*, 5/27/69, pp. 554, 588, 595).

The jawboning accelerated as the summer began. Conveying the Administration's position, Treasury Secretary David Kennedy said that he "'question[ed] whether a further increase in the prime rate would in itself effectively restrain the demand for credit'"; banks had "'available other methods to allocate the limited supplies of funds'" (*Wall Street Journal*, 6/3/69). The political pressure being applied to banks was so extreme that the *American Banker* (6/6/69) commented,

> Rarely, if ever before, has an Administration put the banking industry on notice in public, in such unmistakable language, as to its views towards any such policy move, while that move has been under consideration. True, the prime has not until fairly recent years become a symbol of such great importance, attracting all that much popular attention; but even so, the way the government is making its feelings known before any action is taken, is a remarkable departure from precedent.

Despite banks' attempts at nonprice rationing, business demand for credit remained strong. Banks that did not raise their interest rates in this environment risked experiencing an inflow of business borrowers from the commercial paper market because their loan rates were relatively attractive. Understandably, the requests by the Fed and the Administration largely went unheeded. On June 9, 1969, Bankers Trust raised its prime rate one percentage point to 8 1/2 percent; most other major banks followed suit within hours.

In response to this rate increase--the fourth since December 2, 1968--House Representative Patman urged an antitrust investigation into possible collusion in the setting of the prime rate, and the Fed stated that it would not rule out use of a voluntary credit restraint program (*Wall Street Journal*, 6/10/69 and 6/20/69). Patman's House Banking and Currency Committee held hearings to investigate the rate increase and Patman's charge of a "widespread

conspiracy in the banking industry to fix . . . the prime rate" that had been allowed to continue by the Federal Reserve and the Treasury. At these hearings, the Assistant Attorney General for Antitrust, Richard McLaren, testified that the Justice Department's Antitrust Division was investigating the last four prime rate increases and would prosecute banks on conspiracy charges if warranted. The Division had already interviewed representatives from major banks involved in the rate increases and intended to collect evidence from a much broader set of banks (U.S. House, *Hearings on Investigation Of Increase In Prime Interest Rate*, pp. 3, 203-4, 289).[14]

The hearings also touched on the perceived insufficient use of nonprice rationing methods to allocate credit. Disparaging the banking establishment, Patman said,

> The banks have . . . claimed that they had to have the higher rates to ration credit and discourage borrowers. In other words, the big bankers just can't say no. This is one of the most absurd arguments that the banks have come up with in years.
>
> We are supposed to accept the picture of the kindly and timid banker, too timid to say no [to] his borrowers. He has to have interest rates to discourage the borrower so he won't be faced with the embarrassment of saying no (U.S. House, *Hearings on Investigation Of Increase In Prime Interest Rate*, p. 4).

Treasury Secretary Kennedy shared Patman's view:

> I have previously made clear my serious doubts as to the ability of interest rate increases to effectively ration credit at this time, and I would today urge all lenders to use other methods to make those difficult credit allocation decisions which the present situation clearly demands. We are entitled to expect such responsible behavior from our financial institutions (U.S. House, *Hearings on Investigation Of Increase In Prime Interest Rate*, p. 6).

Reiterating this attitude, Fed Chairman Martin said,

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14. No evidence was found of illegal collusion; the Justice Department attributed the rising prime to economic conditions beyond banks' control. See U.S. House, *Hearings on the Credit Crunch and Reform of Financial Institutions*, 1973, p. 531.

> I hope that banks are learning their lessons, and that they will do what they can to start rationing credit as rapidly as possible, and not rely entirely on rate as the means of helping them ration (U.S. House, *Hearings on Investigation Of Increase In Prime Interest Rate*, p. 310).

Alfred Brittain III, the president of Bankers Trust, defended his bank's actions. He argued that banks like his had responded to the continuing strong demand for loans in the face of Fed tightening by actively borrowing in the Federal Funds and Eurodollar markets at interest rates of 10 percent or higher. They also had liquidated a record amount of their U.S., state, and municipal securities holdings. He explained further that

> Most of our customers rely on bank credit to stay in business. Many have obtained contractual and confirmed lines of credit commitments to make sure the money will be available to them when they need it. But even where there is no legal obligation, the banks have a clear responsibility to meet the ordinary and proper credit requirements of their customers, large and small.
>
> Lending policies had been tightened throughout the banking system in general, and in retrospect should have been tightened sooner, but suddenly to halt all new lending would not be responsible banking. . . .
>
> By raising the prime rate, I believe we have not increased but have in fact helped to moderate some hazards which a tight credit policy inevitably creates for the economy (U.S. House, *Hearings on Investigation Of Increase In Prime Interest Rate*, p. 95).

Calls for passage of legislation to authorize the use of credit controls and to regulate one-bank holding companies also surfaced during these hearings. Congress passed such legislation in December 1969 and December 1970, respectively.[15] Later, Patman would explain,

> The reason we passed this bill [providing the authority to implement credit controls] was because the officials of Banker's [sic] Trust Co. in New York, on June 9 . . . , walked out on the front steps of their bank building and said, 'We are raising the prime rates in the United States . . . .' This increased the burdens on the people at least $15 billion a year.
>
> Now, this law--91-151--gave Mr. Nixon the power to go out on the front porch of the White House if he wanted to and say that

15. P.L. 91-151 established presidential authority to invoke credit controls, and P.L. 91-607 regulated one-bank holding companies.

> hereafter the interest rates on a particular type of law [sic] will not be 8 1/2 percent, but is rolled back to 7 1/2 percent. He could even say 7 percent or 6 percent if he wanted to under this authority (U.S. House, *Hearings on A Call For A Rollback Of High Interest Rates*, 1970, p. 29).

The political pressure continued throughout the summer. Treasury Secretary Kennedy and other top government officials met with chief executives from the nation's major banks, urging that "'there should be action . . . to ration credit other than the use of rates'" (*American Banker*, 7/8/69). Fed Chairman Martin reiterated that a program for rationing bank lending to business might still be necessary; however, he wanted to give banks the opportunity to take action themselves (*Business Week*, 7/5/69).

Bowing to this political pressure, banks refrained from raising the prime rate further during the latter half of 1969, despite continuing strong loan demand and rising market interest rates during most of the period (*American Banker*, 10/1/69, and *Minutes of the FOMC, 1969*). They instead relied more heavily on nonprice credit allocation methods. In commenting on bankers' efforts in this regard, Bank of America president Clausen referred to the Fed's September 1, 1966 letter suggesting that banks restrict certain types of lending. He said that his bank "'is not keying on the 1966 letter' at this time. 'It's just that we don't want another one'" (*American Banker*, 7/2/69).

Bank credit growth began slowing in July. Besides restraining loan growth, banks continued to develop nondeposit sources of funds and sell their municipal bond holdings to cope with their shortage of loanable funds. Federal Reserve Chairman Martin expressed concern about a liquidity crisis in the bond markets like that of August 1966 (*Business Week*, 7/5/69). With little demand for new bond issues, state and municipal governments had to offer higher yields to attract private investors. When yields rose above the usury

ceilings in effect in many areas, these government entities drew on liquid assets or deferred expenditures instead of borrowing.

Loan demand finally slowed when the economy slipped into recession, effectively ending the credit crunch (e.g. *Minutes of the FOMC*, 12/16/69, p. 1355). According to the NBER, the recession began in December 1969. Credit conditions improved markedly throughout 1970 as the result of a series of regulatory changes and an easing of monetary policy. For example, in January the Fed increased the maximum interest rates that commercial banks could pay on time and savings deposits. At that time, it saw few signs of a slowdown in inflation. In May and June, fears of a liquidity squeeze in the money and capital markets arose again in response to increased demand for corporate credit and heightened uncertainty about the economic outlook because of the U.S. involvement in Cambodia. The Penn Central Railroad's default on its commercial paper created even more uncertainty. Throughout these months, the Fed made clear its willingness to serve as a lender of last resort by making its discount window available to banks. On June 24 the Federal Reserve Board suspended ceilings on CD rates with maturities of 30-89 days, although the ceiling on longer-term CDs remained. By January 1971 the prime rate was down to 6 percent.

Events During 1973 and 1974

The 1973-1974 period also began with economic conditions that resembled those observed before the 1966 "crunch": economic growth was strong, business lending was growing rapidly, and severe inflationary pressures had pushed the Fed to tighten monetary policy. The distinguishing feature of the period is the Nixon Administration's wage and price control program, which began in August 1971. Under that program, the Commission on Interest and Dividends

(CID), headed by then-Federal Reserve Board Chairman Arthur Burns, imposed ceilings on the prime rate.[16]

The prime was at 6 percent and the discount rate at 4 1/2 percent at the beginning of 1973. On January 15, the Fed raised the discount rate to 5 percent, the first increase in over a year. Banks wanted to raise the prime, but hesitated because Burns warned them "to let the prime rise passively, with a definite lag." On Friday, February 2, four banks raised their prime rates to 6 1/4 percent. Over the weekend, the CID notified officials of these banks of its disapproval of the interest rate move and asked them to justify the increase publicly; the Administration hoped that this attack on the rate increase would encourage banks to "'play it cool for the next couple of months'" and thus avert congressional action for mandatory interest rate controls. On the following Monday, other banks planning to match the rate increase postponed doing so. Burns announced that the government would continue to respond to premature or unjustified increases in the prime rate, although he warned Congress that the government could not prevent heightened inflationary pressures from pushing rates up further (*Wall Street Journal*, 3/27/73; Board of Governors, *60th Annual Report, 1973*, pp. 39-41; and *American Banker*, 1/22/73, 2/6/73-2/8/73).

Both the prime and the discount rate were below comparable market rates in early 1973. With CID pressures keeping the prime below commercial paper rates, large borrowers found credit from commercial banks to be cheaper than credit obtained from the open market. As a result, the demand for bank loans rose further, and bank lending shifted toward prime borrowers and away from

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16. Burns did not believe that his position on the CID presented a conflict of interest with respect to his role at the Fed because the CID regulated only administered interest rates, whereas the Fed's concern was with market rates (Minutes of the FOMC, 1/16/73, p. 43).

those with few alternative sources of funds. Similarly, with the discount rate below short-term market rates, banks made greater use of the Fed's discount window. At its February 13 meeting, the FOMC discussed whether banks were abusing their window privileges; the regional Reserve Bank Presidents did not feel that the increased borrowing was problematic because banks' use of the window gave the Fed greater opportunities to "counsel" the banks (*Minutes of the FOMC*, 2/13/73, p. 158).

On February 26, the Fed raised the discount rate to 5 1/2 percent. Banks reacted by raising the prime to 6 1/4 percent, and the increase stuck. The ABA responded by warning bankers that they "'cannot take lightly the political implications of high interest rates'" and urging that they must "continue to delay increases in their prime lending rates and document fully the need for such changes or face compulsory rate regulation with all of its disruptions" (*American Banker*, 2/27/73, 3/2/73).

The prime was raised to 6 3/4 percent on March 19, and the CID promptly asked bankers to justify the increase. Burns reiterated the ABA's warning that banks must consider carefully the political consequences of interest rate moves. After Burns' announcement, banks rolled back the prime to 6 1/2 percent (*American Banker*, 3/20/73, 3/26/73, and 3/27/73).

By the FOMC's April 17 meeting, data showed that bank credit growth rose sharply during February and March. Staff economists attributed this increase to structural changes in the financial market as businesses shifted from commercial paper to bank borrowing because of the advantageous interest rate spread. The Fed knew that it soon would have to tighten policy further (*Minutes of the FOMC*, 4/17/73, especially p. 414). To ensure against another credit crunch, Burns announced in mid-April that banks should immediately move to a two-tier prime: the loan rate to large, very-creditworthy borrowers

would be tied to market rates, while smaller, less-creditworthy borrowers would face a higher prime rate that was administered and thus more stable (*American Banker*, 4/17/73). The prime rate for large borrowers rose to 6 3/4 percent immediately after the two-tier rules went into effect. A week later, the Fed raised the discount rate to 5 3/4 percent. On May 7, the prime hit 7 percent, and on the 11th, the Fed increased the discount rate to 6 percent.

The Fed announced on May 16 that it was suspending Regulation Q ceilings on large CDs and raising the ceilings on all other deposit categories to prevent disintermediation. However, it imposed other regulations to restrain credit growth further. The most important was a marginal reserve requirement applied to increases beyond a base amount of large, single-maturity CDs and bank-related commercial paper issued by a member bank (Board of Governors, *Federal Reserve Bulletin*, May 1973, pp. 375-376). This marginal reserve requirement raised banks' marginal cost of obtaining funds from the money markets. By suspending Regulation Q and implementing this reserve requirement, the Fed shifted from a policy of slowing credit growth through restraint on credit availability to one of restraint through the price mechanism.

Nevertheless, Burns wrote bankers on May 22, asking them to allocate credit through nonprice rationing instead of further rate increases. Bankers in turn blamed Burns' maintenance of a below-market prime for the rapid credit growth that year and argued that they extended most of their credit through loan commitments, leaving them little discretion in their credit extensions. Bankers responded by raising the top-tier prime to 7 1/4 percent on May 24 and 7 1/2 percent on June 7. The Fed then raised the discount rate again to 6 1/2 percent, which pushed the prime rate up to 7 3/4 percent two weeks later (*American Banker*, 5/23/73-5/25/73, 6/8/73, 6/11/73).

At the FOMC's June meeting, questions were raised about whether the two-tier prime program could be modified to provide greater flexibility in the interest rates charged by small and medium-sized banks that lent to relatively smaller businesses. Burns answered that the prime for large businesses was essentially free to vary with market conditions. He insisted that there was no basis to reports that the CID had been upset with the recent prime rate increase. Moreover, he viewed the two-tier system as affecting only the largest banks with a substantial share of their loan portfolio in business loans; there was no effect on the small or midsized banks. Overall, he said that the system's economic impact was "negligible"; "however, it had been of incalculable value in depoliticizing interest rates rather effectively" (*Minutes of the FOMC*, 6/19/73, pp. 647-648).

Credit became increasingly costly as the summer progressed. July began with the Fed announcing a discount rate increase to 7 percent to slow a "serious explosion" of credit creation and with bankers raising the top-tier prime to 8 percent. By month's end, the prime was at 8 3/4 percent, exceeding its maximum level during 1969 (*American Banker*, 7/3/73 and 7/30/73). The CID was noticeably silent about these rate increases, and the Nixon Administration's announcement of Phase Four of its wage and price control program did not mention interest rate ceilings. Treasury Secretary George Shultz explained, "'We're doing everything we can on interest rates'" (*American Banker*, 7/19/73 and 7/20/73). In August, the Fed raised the discount rate to 7 1/2 percent; the prime rate continued climbing. Meanwhile, Burns said that the Fed was trying to maintain credit availability despite its tightening, and that he was somewhat confident of its ability to do so, although he could not guarantee that rates would decline soon. On August 27, the prime hit 9 3/4

percent after the thirteenth 1/4 percentage point increase under the two-tier prime program (*American Banker*, 8/6/73 and 8/28/73).

In mid-September, Patman's House Banking Committee held hearings on credit conditions. According to Patman, the high interest rates had caused a credit crunch by preventing some individuals and businesses from getting affordable credit. Much of the hearings focused on the impact high interest rates were having on the housing industry, which was particularly strained. Burns argued that the slowdown in housing production in 1973 seemed attributable more to an oversupply of housing than to tight credit. In fact, the oversupply resulted from excessively easy credit from 1970 through 1972. ABA president Eugene H. Adams also testified, explaining that bankers had to increase interest rates over the previous months in response to the Fed's steady tightening of monetary policy. In addition, he argued against the arbitrary allocation of credit. Banks postponed raising the prime to a record 10 percent until after the hearings were over to avoid confrontation with Patman's committee and the CID. When banks raised the prime on September 18, the CID asked them to justify the increase, but none were called before Patman's committee (U.S. House, *Hearings on the Credit Crunch and Reform of Financial Institutions*, 1973, pp. 44-57, 313-322, 772-777; *American Banker*, 9/17/73).

About the same time that Patman's committee was meeting, banks began seeing evidence of weakening business loan demand. They lowered the top-tier prime on October 23 for the first time in almost two years (*Minutes of the FOMC*, 10/16/73, pp. 1096-1098). According to the NBER, a recession started in November.

The Fed continued to tighten aggressively, primarily by repeated discount rate increases, throughout 1974, but it did not pressure banks to use nonprice allocation techniques. Thus, credit remained available to those willing to

pay for it, although it became increasingly expensive, with the prime reaching a record high of 12 percent in July 1974 and less-creditworthy borrowers paying as much as 16 percent on business loans (Board of Governors, *61st Annual Report, 1974*, p. 41). Total real bank loans grew at an annual rate of 8.3 percent in 1973 (December-to-December) and 0.79 percent in 1974; real business loans grew 10.47 percent and 6.33 percent, respectively (December-to-December).

The tightest credit conditions occurred in the securities markets in the spring of 1974 and were associated with the publicized difficulties of the Franklin National Bank and a few other prominent firms. These difficulties created fears of widespread weakness in the financial sector, which led to a temporary liquidity crisis. Securities market lenders became more conservative, forcing less creditworthy borrowers to draw more heavily on their bank credit lines. To satisfy this sharp increase in the demand for their funds, banks raised their loan rates considerably, pricing some smaller and less-creditworthy borrowers out of the credit market. By late summer, the credit crisis had largely ended as the recession deepened and loan demand slowed (Board of Governors, *61st Annual Report, 1974*, p. 41).

1980

Despite analysts' predictions that a recession was imminent and a 15 1/4 percent prime rate, 1980 began with credit extensions growing rapidly.[17] Strong demand fueled credit growth as inflationary expectations induced consumer and business borrowing to finance expenditures before prices rose further. To slow what was considered to be an overheating economy, the Federal Reserve imposed selective credit controls in mid-March of 1980 at the Carter

17. This section is based on Schreft (1990).

Administration's request, under the authority of P.L. 91-151 (the Credit Control Act of 1969). With the presidential election looming, the Administration felt a need to signal the public that it was committed to fighting inflation. Credit controls that focused on consumer credit but were largely symbolic and without teeth seemed ideal; they would capture the attention of every voter. Only later did the Administration discover that the economy had entered a recession in January and that the controls were unnecessary and ill-conceived.

President Carter announced the credit control program on Friday, March 14, after the eastern financial markets closed. The announcement came suddenly and without public debate beforehand, although there had been rumors that credit controls might be imposed. At a special press conference held on Saturday, Fed Chairman Paul Volcker and other Federal Reserve officials presented the details of the program, which were set forth in a handout of approximately 50 pages. The controls took the form of direct restrictions on bank loan growth rates and marginal reserve requirements on additional credit extensions by affected lenders, raising the cost of extending consumer and business credit. Lenders were free to pass these costs onto borrowers as much as possible and to allocate credit as they chose. The Fed provided only broad guidelines for credit allocation, suggesting that banks avoid making unsecured consumer loans, financing mergers and acquisitions, and lending for speculative purposes. It made clear, however, that it was not going to interfere in credit allocation decisions.

On Monday, May 17, Fed officials--including many Reserve Bank presidents whose presence was requested for a show of force--met with 65 leading bankers whom they had summoned to Washington for a briefing on the program. Those attending described Volcker as taking a "hard line, telling the banks that they would be primarily responsible for allocating credit throughout the econ-

omy." They said "they had no doubts that 'this time the Fed means business'" and claimed that Volcker "warned them to abide by the spirit of the program as well as its specific instructions." The Fed threatened that other, unspecified government agencies would be involved in guaranteeing compliance with the program (*New York Times*, 3/18/80; *Wall Street Journal*, 4/15/80).

The banking establishment opposed the control program. Although the public did not have the opportunity to comment on the program before its enactment, Congress had held hearings in May 1979 on the repeal of P.L. 91-151. At those hearings, the ABA supported repeal of the Credit Control Act, stating that

> credit controls are a form of allocating credit and the result is invariably a less efficient, i.e. less productive, allocation than would be determined by market forces. It can be argued that credit is more productively allocated in financial markets by interest rates than by rules established by regulators (U.S. Senate, *Hearings on Amending the Credit Control Act*, 1979, p. 71).

"Dramatic" is the best word to describe the controls' impact on credit markets. The prime was at 18 1/2 percent when the program was announced; within two weeks, it was 20 percent. Other market rates followed suit. Although loan rates were high, credit was available to businesses willing to pay the price because banks did not resort to increased use of nonprice allocation techniques. Consumers were not as fortunate as businesses. Usury ceilings, which limited the interest rates that could be charged on certain consumer loans, became binding, making such loans unprofitable. The Fed considered waiving the state usury ceilings, but chose otherwise (Board of Governors, Press Release, 4/2/80). As a result, consumers found credit unusually difficult to obtain (*New York Times*, 3/17/80).[18]

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18. Green and Oh (1991, p. 16) take a different view of the 1980 credit control experience. They suggest that the Fed's refusal to lift usury ceilings may have been "an attempt to approximate an ex ante efficient contract." How-

By May 5, rumors were circulating that the Fed would soon lift the control program because the economy was slowing so rapidly. The program was having a surprising adverse effect on credit demand, primarily by creating increased uncertainty regarding employment and earnings prospects and credit availability. Consumer loan demand was hardest hit, plummeting during the second quarter of 1980. During that time, credit extensions fell sharply, as did interest rates. The prime rate, for example, fell five percentage points in May alone, from 19 percent to 14 percent. As Fed Vice Chairman Frederick Schultz later explained,

> We learned in 1980 that it is exceedingly difficult to assess in advance the impact of controls on economic activity. When the Board enacted its program, we did not anticipate, and we had no reason to anticipate, the market impact it would have. Given the limited coverage of the program, it would have been expected to have had a moderate effect on aggregate demand; however, we did not reckon correctly the dimensions of the psychological impact of the program on borrowers and lenders. To be sure, some of this impact owed in part to a misunderstanding, especially at the beginning, about the scope and intent of the program, but beyond this, there was [a] remarkable shift in attitudes that led to a sudden contraction of credit flows. This contraction involved even those sectors that were explicitly exempted from the controls, and . . . contributed to a sharp economic recession (U.S. House, *Hearings to Extend the Credit Control Act*, 1982, pp 228-229).

Thus, although the program was intended to be primarily cosmetic, its complexity and the manner in which it was announced contributed to its having considerable credibility with bankers and consumers. An analysis of the 1980 recession indicated that the decline in personal consumption accounted for almost 80 percent of the shortfall in real GNP, twice the average of 35 percent for all post-World War II recessions.

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ever, their view is not supported by primary evidence on the Fed's intentions regarding the control program; see Schreft (1990).

The rumors proved to be accurate; the controls were lifted on July 3. Pent-up demand for credit and an easing of monetary policy that rekindled inflationary expectations pushed interest rates up through the end of 1980.

1981-1982

At the beginning of 1981, the economy was at the height of its rebound from the 1980 recession. Credit demand reportedly remained strong through the first quarter.

During 1981, the Federal Reserve maintained a tight monetary policy to combat inflation. Interest rates remained high and volatile though aggregate demand growth was slowing over most of the year; the prime rate, for example, fluctuated between 20 percent and 15.75 percent. With interest rates remaining high, consumer and business borrowing increased only moderately. By year's end, the unemployment rate had risen to a near-record level for the postwar period as the economy slipped into recession.

The weakness in the economy continued throughout much of 1982. As the Federal Reserve made progress in its fight against inflation, the prime rate fell from 15 3/4 percent in January to 11 1/2 percent in December. Business demand for credit was down from 1981 as firms could rely more on internal financing. Consumer credit demand also was down because consumers were trying to reduce their debt levels.

Few reports can be found of a tightening of nonprice lending terms during the 1981-82 period, although additional price rationing did occur. Apparently, borrowers willing to pay the higher interest rates could obtain credit. (See Board of Governors, *68th Annual Report, 1981*, and *69th Annual Report, 1982*.)

Assessing the Evidence from 1960-82

Two broad conclusions can be drawn from this historical analysis. First, there are some striking similarities among the episodes of tight credit from 1960-82. A period of strong credit demand, relatively rapid growth in credit extensions and rising inflationary expectations preceded each episode. The Federal Reserve, fearing higher inflation, responded by tightening monetary policy. Second, despite these similarities, no two episodes of tight credit are identical in that the political and regulatory pressures on banks to use nonprice rationing differed.

During the so-called "credit crunches" of 1966 and 1969, the Fed used Regulation Q as a monetary tool to squeeze banks' lending capabilities (Monhollon, 1970). We maintain that the periods were crunches, although we dispute the generally accepted conclusion (see e.g. Burns, 1988, p. 13, and Samuelson and Nordhaus, 1985, p. 394) that a binding Regulation Q triggered them. The timing and nature of the anecdotal evidence presented here regarding nonprice rationing, along with the corroborating evidence from policymakers, do not support that standard explanation. Rather, our analysis suggests that the sharp increases in nonprice rationing in 1966 and 1969 were caused by political pressures and credible threats of more stringent regulation of banks.

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19. Much discussion about Regulation Q's role in the early credit crunches focused on the impact deposit disintermediation had on the mortgage market. We believe, however, that although Regulation Q made funds scarce, a sharp increase in nonprice rationing of mortgage credit would not have occurred without ceilings on mortgage rates. In fact, evidence exists that the extent of nonprice rationing varied by state, depending on when and to what extent such ceilings were binding. Lenders faced with binding usury ceilings on mortgage rates appear to have both restricted lending activity and raised the effective price of mortgage credit by requiring higher loan fees, larger downpayments, and shorter loan maturities. Such efforts to ration by price except as prohibited by usury ceilings support our conclusions. See, for example, Brimmer (1968) and Ostas (1976).

From the beginning of 1966, Congress, the Fed, and the Administration strong-armed banks to use nonprice rationing through public statements, one-on-one meetings between Fed officials and bankers, and threatened enactment of bank regulatory legislation. The ABA encouraged its members to comply. Banks relied heavily on nonprice credit allocation methods, although a modicum of price rationing occurred; the prime rose 0.5 percentage points from March through September. More importantly, the ABA did not attribute the nonprice rationing to Regulation Q. In fact, the evidence shows that a shift toward nonprice rationing began in March, at which point bankers did not believe the Fed would allow Regulation Q to bind because it had never done so in the past. They were surprised in July when it did become binding. The immediate response to the ensuing CD runoff was an increase in the prime rate and a massive liquidation of tax-free securities by banks. The Fed's September 1 letter confirms this by offering leniency at the discount window to banks that reduced their extensions of business credit rather than selling securities to cope with their deposit outflow.

The situation in 1969 was similar. Regulation Q became binding in November 1968, and interest rates immediately began rising. A noticeable outflow of CDs from banks did not occur until January, but even then bankers were not complaining about tight credit conditions. Finally in March, after seeing that its policies were not inducing the intended reduction in credit extensions, the Fed and the Nixon Administration publicly pressured banks to rely more heavily on nonprice rationing. Interest rates rose steadily during the first half of the year, despite the extreme jawboning. To compensate for the disintermediation generated by a binding Regulation Q, banks sought nondeposit sources of funds and liquidated tax-free securities, rekindling fears of a 1966-style liquidity crisis. Only after Congress threatened anti-trust action

against the banking establishment did the prime rate hold steady and nonprice rationing intensify, despite further increases in the cost of funds.

This evidence from the historical record is consistent with data showing that the annual growth of real total lending by commercial banks slowed markedly during 1966 and 1969. We conclude that both 1966 and 1969 were credit crunches because extreme nonprice rationing occurred, brought about by political pressures on lenders that amounted to *policymaking by intimidation*.[20] The binding Regulation Q ceilings immediately resulted in banks raising loan rates to ration credit and selling securities to improve their liquidity.

Our historical analysis also suggests that credit-crunch conditions affected consumer lending during the spring of 1980, when the Fed's selective credit control program was in place. The program only required that lenders restrict total loan growth and face higher costs on additional credit extensions; the Fed stressed that lenders could allocate credit as they saw fit. In practice, bankers chose to ration credit by price wherever possible. Thus, businesses for the most part found credit available, but only at an unusually high price. Consumers, though, found credit less available because binding usury ceilings during the period resulted in nonprice rationing of consumer credit. To the extent that such direct regulatory restrictions forced banks to use nonprice rationing, the 1980 episode was a crunch.

The 1973-74 period differed from those in 1966, 1969, and 1980 because political and regulatory pressures were less of a hindrance. The Fed suspended Regulation Q in 1973 and relied more heavily on discount rate increases

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20. The political pressure applied to banks during 1966 and 1969 appears to be dramatically similar to that which occurred during 1928-29, when the Fed advocated applying "direct pressure" to banks (see Friedman and Schwartz, 1963, pp. 254-266).

and marginal reserve requirements to curtail credit extensions. The major regulatory constraint facing banks was the CID's ceiling on the prime rate, but it proved to be little more than an annoyance. Although the CID often warned banks of possible political retaliation if they raised interest rates further, any actual retribution took the form of demands for justifications of rate increases. Banks dealt with the political pressure by postponing rate increases a week or so. After the CID introduced a two-tier prime to depoliticize interest rates, it did not challenge subsequent rate increases. Even when Congress debated tight credit conditions, its hearings focused on the high interest rates that were making credit too costly for some classes of borrowers. The unusually rapid growth of real total bank lending during 1973 and the arresting slowdown in lending activity that occurred in 1974 and 1975 are consistent with this descriptive evidence. We conclude then that 1973-74 was not a credit crunch because lenders allocated credit predominantly by price. Whatever nonprice rationing occurred appears typical for an economy entering or in a recession.

Even less evidence exists to support identifying 1981-82 as a credit crunch. Interest rates were relatively high and variable, fluctuating in response to market conditions, but there is no evidence of pronounced nonprice credit rationing; borrowers could obtain credit if they were willing to pay the prevailing interest rates. Real total lending rose during the period, and talk of a credit crunch is absent from press reports from the time.

Thus, we conclude from the analysis of this section that the periods of tight credit experienced during 1966 and 1969 were general, broad-based credit crunches. The 1980 episode was a sector-specific crunch, affecting only consumers and caused by a binding regulatory constraint. The other periods examined are lacking some features necessary to be classified as crunches.

III. Credit Conditions from 1990 through 1992

In late 1989, rumblings of dramatically tightening credit conditions began coming from New England; by the spring of 1990, complaints of intense nonprice credit rationing were emanating from other regions of the U.S. as well. A debate began over whether the nation was in a credit crunch.

What were credit conditions from 1990 through 1992? How do they compare to the earlier episodes of tight credit? Does the 1990-92 period warrant the label "credit crunch"? This section proposes answers to these questions using the methodology detailed in section I and the analysis of section II.

Regulatory and Political Factors

Regulatory excesses that allegedly contributed to the tight credit conditions from 1990 through 1992 received much media attention during the period. The so-called excesses began in February 1990, when Robert Clarke, head of the Office of the Comptroller of the Currency (OCC), sent an advisory to the chief executive officers and directors of all national banks, warning them against making unprudent real estate loans:

> Over the last year, OCC examination activity has revealed a significant number of fundamental deficiencies and negative trends in national bank real estate lending which require the immediate attention of bank managements and Boards of Directors. . . .
> Directors should instruct bank management to review carefully real estate lending activities and to initiate corrective action promptly. The OCC has been and will continue to be aggressive in requiring the correction of such weaknesses. Examiners have been instructed to recommend formal enforcement actions as appropriate.
> . . . . Nothing in this advisory or in OCC examination policy is intended to discourage *sound* real estate (project and development) lending. Our supervisory activity confirms that the vast majority of national banks have *not* deviated from traditional high lending standards (OCC Advisory, "Real Estate Project and Development Lending by National Banks," 2/90).

After the OCC released this advisory, some bankers claimed that examiners were unreasonably scrutinizing their real estate portfolios, making it impossible for them to make real estate loans (*New York Times*, 3/27/90).[21] Such claims were widespread in regions where real estate values were declining and from depository institutions with large real estate portfolios. New England institutions reportedly faced the toughest examinations (*American Banker*, 4/25/90).

Responding to these complaints, federal banking regulators met privately with the ABA's board of directors to express their agreement regarding appropriate supervisory practices and to encourage bankers to make sound loans. A few weeks later, the Office of Thrift Supervision (OTS) eased some of its restrictions on thrifts' real estate lending. This action did not quell the outcries of regulatory abuses from New England (*American Banker*, 5/14/90, 6/5/90, and 6/22/90). Neither did Federal Reserve Board Chairman Alan Greenspan's congressional testimony that

> To date, . . . whatever overreaction [by examiners] that may have occurred does not appear to have been widespread, and access to credit has not been reduced to an extent that has had a significant damping influence on the American economy overall (U.S. House, *Hearings on Credit Availability*, 1990).

Nevertheless, a few weeks later, Greenspan suggested that the Fed might ease to avoid a crunch:

> As I indicated to this Committee several weeks ago, we [the Fed] have been closely watching various interest rate spreads and other indicators to determine if the pulling back of commercial banks to less lax lending standards is moving over the line and, in effect, creating a tightening in credit markets, independent of actions by the Federal Reserve.
>
> I must say to you today that the accumulating evidence indicates commercial bank loan rates and collateral requirements are firming in the context of an unchanged federal funds rate. This

21. A real estate loan is any loan secured with real estate. Loans that are unsecured or secured by something other than real estate are classified by the purpose of the loan.

> suggests a market tightening of modest dimensions may be occurring. And if that was in fact the case, that could have undesirable effects on the economy that the Federal Reserve would have to consider offsetting with an ease in monetary policy in a general way. And I must say to you we are monitoring this issue on a day-by-day basis because it doesn't necessarily follow that if the Federal Reserve takes a fixed position that the markets will stay that way. . . .
>
> We cannot have a monetary policy which is independent of our regulatory policy or vice-versa; they are related (U.S. Senate, *Hearing on Deposit Insurance Reform and Financial Modernization*, 1990).

Greenspan cited data from a Fed survey as support for a possible easing of monetary policy to prevent a credit crunch. Knight-Ridder Financial News obtained, in response to a request for the cited survey results, an internal Fed memorandum prepared for the Board of Governors that presented only weak evidence of tightening credit conditions (Knight-Ridder MoneyCenter News #8239, 7/13/90).

The following day, the Fed eased monetary policy in response to the perceived tight credit conditions. (See Knight-Ridder MoneyCenter News #3822, 7/18/90, for confirmation of the ease.) In elaborating on the credit situation in prepared remarks for the Senate Banking Committee, Greenspan explained,

> The [recent] change in credit supply conditions may have significant implications for borrowing, spending, and policy. I would not call this change a "credit crunch," as those words connote a contraction of lending on a major scale, with many borrowers effectively shut out of credit markets, regardless of their qualifications. . . .
>
> . . . . Nevertheless, in the here and now, the tightening is beginning to have very real, unwelcome effects. . . . It is difficult to discern the dividing line between lending standards that are still healthy and those that are so restrictive as to be inconsistent with the borrower's status and the best interests of the lender in the long run. In recent weeks, however, we may have slipped over that line. Such developments can, and do, occur independently of central bank actions, and can have important influences on spending and output. Thus the Federal Reserve must remain alert to the possibility that an adjustment to its posture in reserve markets might be needed to maintain stable overall financial conditions.

> As best we can judge, the change in credit conditions currently is exerting a slight additional degree of restraint on the economy. The process of credit restraint may not have reached completion and some of its effects may not yet have been felt; hence it will require continued scrutiny (Board of Governors, *1990 Monetary Policy Objectives*, 7/18/90, pp. 4, 6).

During other congressional testimony, Greenspan defended the Fed's easing, arguing that the Fed must anticipate future credit conditions, rather than simply rely on past data, to successfully fight inflation (Knight-Ridder MoneyCenter News #64 and #5942, 7/24/90; *Business Week*, 7/30/90). In retrospect, the ease may have been appropriate for other reasons; the NBER later determined that the economy entered a recession in July 1990.

During the fall, President Bush began what would be a series of White House meetings with regulators and bankers over the next year to discuss credit conditions. Bush reportedly called his first such meeting--attended by top officials from the federal bank regulatory agencies and several cabinet members--because of concern that tight real estate credit, resulting from a regulatory crackdown, would lead to a more generalized weakening of the economy. The next day, Bush summoned ten top lenders and borrowers to the White House for a similar meeting. Bankers were quoted as telling Bush that reduced demand, not a refusal of banks to lend, was behind the slowing of credit growth (*American Banker*, 11/15/90 and 11/16/90).

Over the following weeks, policymakers prodded banks to lend. On December 4, the Fed eliminated reserve requirements on nonpersonal time deposits and net Eurocurrency liabilities to improve banks' earnings and liquidity (Knight-Ridder MoneyCenter News #2788, 12/4/90). In addition, Administration and federal bank regulatory officials tried to pressure banks by making repeated public announcements encouraging lending to good customers (*Business Week*, 12/10/90). For example, Federal Reserve Board Governor John LaWare publicly urged banks to undertake what he called "'gutsy lending'" (*American*

Banker, 1/29/91). This jawboning had little impact. With each month, data became available suggesting a more pronounced contraction in lending activity. By early February, the "credit crunch" was declared Public Enemy No. 1, and the Administration had met with top banking regulators, encouraging that they not employ stringent examination standards (*Wall Street Journal*, 2/4/91, and *ABA Bankers Weekly*, 2/5/91).

In congressional testimony, Fed Chairman Greenspan acknowledged that "'What we've seen is a tightening of [bank examination] standards that goes beyond what we see necessary for long-term safety and soundness'" (*American Banker*, 2/21/91). Assuming the blame for the lending slowdown, the Federal bank and thrift supervisors issued a joint statement on March 1, 1991 to "reduce impediments to lending." The statement explained,

> The Federal banking and thrift regulators do not want the availability of credit to sound borrowers to be adversely affected by supervisory policies or depository institutions' misunderstandings about them. As a result, the agencies today are issuing a series of guidelines and statements that are intended to clarify regulatory policies in a number of areas and reduce concerns depository institutions may have about extensions of credit to sound borrowers. Specifically, the guidelines and statements released today: (1) encourage enhanced disclosure to the public, (2) facilitate extensions of credit to sound borrowers and the workout of problem loans, and (3) better assure sound assessments of the value of real estate by depository institutions and Federal examiners (Board of Governors, *Press Release and Attachment*, 3/1/91).[22]

Bush Administration officials encouraged regulators "to get out of their offices and 'into the trenches' to communicate [the] new guidelines" (*American Banker*, 3/4/91). During the latter half of 1991, the Federal bank and thrift regulators complied by holding a series of regional town meetings with bankers and borrowers to discuss the guidelines (Memo from Richard Spillenkothen, Fed-

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22. See also *ABA Bankers Weekly*, 4/16/91, for a synopsis of the guidelines.

eral Reserve Board, to the Officer in Charge of Supervision at Each Federal Reserve Bank, 10/2/91).

The banking establishment generally attributed the tighter credit conditions to rational behavior by bankers facing deteriorating economic conditions. According to the ABA, the situation was more of a "credit caution" than a "credit crunch":

> In the face of a recession, it is only reasonable and prudent that all businesses--including banks--exercise caution in taking on new financial obligations.
>
> Banks are looking very carefully at the types of loans that have gone bad, and will naturally think very carefully about risking additional bank capital and resources by making the same type of loan. This has meant that some higher-risk projects have not been funded, though they might have been a few years ago when the economy was still going strong. While some might call this a "credit crunch," it is perhaps more appropriate to call it "learning from experience." But . . . the banking industry has *not* decided to *indiscriminately* shut off the spigot of credit (Testimony of Stuart Hoffman, U.S. House, *Hearing on The Credit Crunch*, 1991).

The ABA's Chief Economist, Robert Dugger, later elaborated:

> Across the country bankers are now scaling back lending and attempting to reduce overall risk. For less credit-worthy borrowers there is a tangible decrease in credit availability. The semantics of "credit caution" versus "credit crunch" are lost on them. If you have just been turned down for a loan, it is a "credit crunch." For a banker concerned about his or her future, it is a "credit caution." Credit crunch or credit caution, it adds up to credit contraction (Testimony before the U.S. House, *Hearings on The Credit Shortage: Is It Stifling Economic Recovery?*, 1992).

Despite the new regulatory guidelines, credit volumes remained weak throughout the year. In June, White House Chief Economist Michael Boskin declared "that the credit crunch 'remains a problem,'" noting that bank examination practices were not reflecting the Administration's efforts to ease credit conditions (Knight-Ridder MoneyCenter News #8386, 6/13/91). The federal bank regulators responded by issuing statements to examiners clarifying various supervisory procedures. These statements included a memo

to examiners suggesting "a more flexible approach to bank exams" so that depository institutions would not be criticized for refinancing medium-term real estate loans. An estimated $300 million in such loans was thought to be nearing maturity (*American Banker*, 6/21/91).

In September, the regulators again explained their practices regarding the classification of partially charged-off loans (Memo from Richard Spillenkothen, Federal Reserve Board, to the Officer in Charge of Supervision at Each Federal Reserve Bank, 9/23/91). Later, they issued a joint statement detailing the procedure for valuing underlying collateral and determining loan and lease loss allowances, among other things (Interagency Policy Statement on the Review and Classification of Commercial Real Estate Loans, 11/7/91). In assessing the value of the joint policy statement, William Seidman of the Federal Deposit Insurance Corporation (FDIC) said,

> In many areas real estate markets, and particularly commercial real estate markets, have declined in value. If bankers are more circumspect in their attitude toward real estate related lending, I would first congratulate them, and second, suggest that their circumspection is due more to the economic realities of the marketplace than to a fear of bank examiners.
>
> Having said that, I would agree that bank examiners may have discouraged bankers from making prudent and profitable loans in certain cases. But since this happens on an individual, case by case basis, it is difficult to generalize a solution to the problem, except to suggest that each situation be addressed on it[s] merits. In this regard, I believe the new Interagency Statement by the FDIC, OCC, OTS and the Federal Reserve could be helpful.
>
> But it certainly will not "cure" the credit crunch (Testimony of L. William Seidman, U.S. House, *Hearings on The Credit Shortage: Is It Stifling Economic Recovery?*, 1992).

Meanwhile, the Bush administration frequently expressed concern that bank "regulatory excesses" would slow the economy's recovery (see e.g. Knight-Ridder 10/4/91). In the face of such concern, the ABA sent a letter to the White House disputing the argument for a regulatory-based credit crunch. The letter cited weak loan demand as the major cause of the prevailing credit con-

ditions (*American Banker*, 10/8/91), a theme that bankers emphasized when they went to the White House for another meeting with Bush a week and a half later (*ABA Bankers Weekly*, 10/22/91).[23] The *American Banker* (10/18/91 and 10/21/91) quoted John Medlin, chairman of Wachovia Corporation, as saying, after meeting with President Bush to discuss credit conditions,

> "Banks are eager to extend credit to anyone who is halfway creditworthy. That is not the problem. There simply is not the demand. I encourage the President to abolish 'credit crunch' from the vocabulary of administration officials. There is no credit crunch."

Nevertheless, the Administration persisted, shifting its jawboning efforts toward Congress and bank examiners and away from bankers. As Deputy Treasury Secretary John Robson told Congress,

> Nearly every day, an examiner can turn on CSPAN or read in the local newspaper about a Congressional Committee attacking a regulator for being too lax--rarely, if ever, for being too strict. Thus, the nearly 7,000 examiners in the field are subjected to a "mixed message." This mixed message makes the job of achieving our goal--balanced, common sense regulation--especially difficult. This hearing is an important step in examining how to achieve a more direct and balanced message from both the legislative and executive branches of government (Testimony of John Robson, U.S. Senate, *Hearing on The Credit Crunch*, 1992).

The Administration's efforts were most intense in mid-December when it delivered its message to about 500 senior field examiners at a meeting in Baltimore that the Administration had requested (*ABA Bankers Weekly*, 10/22/91 and 12/24/91). Treasury Secretary Brady exhorted the examiners by saying, "By making your examination standards clear to bankers and using professional judgment, you can inspire confidence among those who now shy away from providing credit" (*Wall Street Journal*, 12/17/91).[24]

23. See *ABA Bankers Weekly*, 10/22/91, for President Bush's response to the ABA's letter.

24. One banker told us that his bank was shrinking its real estate holdings because stock analysts were advising against buying the stock of banks with large real estate portfolios, not because of examiner pressure. In some sense, the stock analysts served as a market-based regulator.

The crunch received considerably less media attention throughout 1992, reflecting fewer complaints from borrowers of tight credit conditions. In fact, the crunch remained a news item primarily because the Administration officials continued to press for greater leniency in bank exams and congressional action to increase lending activity (e.g. *American Banker*, 5/11/92, 6/9/92, 6/16/92, 12/16/92). The ABA took advantage of the favorable political climate by campaigning for legislation to reduce the regulatory burden on banks (e.g. *ABA Bankers Weekly*, 10/27/92). This campaign intensified as the year progressed. It led the Federal bank regulatory agencies to ease some regulations and to study the extent of banks' regulatory burden (e.g. *American Banker*, 10/14/92; Knight-Ridder MoneyCenter News #11261, 12/17/92). At the year's end, Congress was promising to craft legislation designed to repeal some regulatory requirements.

Was There a Credit Crunch in 1990-92?

The evidence presented above clearly suggests that some increased non-price rationing occurred, especially in New England. Surprisingly, though, the banking industry repeatedly argued against the existence of a crunch. Bankers attributed the decline in lending activity not to an unwillingness to lend, but rather to a reduction in loan demand and a shortage of creditworthy borrowers. They admitted, however, to having considerably reduced real estate lending, especially for commercial purposes, because of the increased credit risk associated with such loans.[25] Anecdotal reports from borrowers were con-

25. The *Barron's*/John B. Levy & Co. National Mortgage Survey of over 30 institutional lenders of commercial mortgages found that a number of survey participants were tightening their loan underwriting standards during 1990 and 1991. Some of the tightening of collateral requirements was attributed to the difficulty lenders were having in determining the value of property pledged as collateral. The survey also found that institutional lenders consistently limited loans to 60 to 75 percent of a project's value, compared to the 75 to

sistent with this; most reports of severe nonprice rationing came from commercial real estate developers or businesses wanting loans collateralized by real estate. Similar reports regarding consumer and commercial and industrial loans (i.e. business loans not collateralized with real estate) were noticeably absent.

Evidence from the Federal Reserve Board's Senior Loan Officer Opinion Survey of Changes in Bank Lending Practices supports this conclusion. The survey results indicate that the demand for consumer credit was down in 1990-91 and essentially unchanged in 1992. In addition, results for 1990-91 showed that banks on net were steadily tightening their credit standards for commercial and industrial loans during the period. During 1992, banks reported that their credit standards remained virtually unchanged. However, a historical analysis of these survey results indicates that the net share of banks reporting a tightening of standards in 1990 and 1991 was *not* unusual when compared to reports from earlier recessions; the reports of unchanged standards in 1992 were typical of those for an economy in recovery and may have reflected an actual easing of credit policies (Schreft and Owens, 1991). The results also showed that the deteriorating economic outlook was the predominant reason for banks' tighter credit standards; relatively few survey respondents cited regulatory pressures.

Other surveys (Dunkelberg, 1991, and Dunkelberg and Dennis, 1992) focused on small business borrowers. They showed that small business borrowers, who typically are hardest hit by tight credit conditions, did not report significantly increased difficulty in obtaining credit. In fact, most of those that were denied credit at one bank reported obtaining credit elsewhere. Reports

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80 percent that was the norm in earlier periods. (See, for example, *Barron's*, 4/8/91, 6/10/91, 7/8/91, 8/5/91.)

of small business borrowers having difficulty getting credit came mostly from New England. These reports indicated that credit tightness peaked in mid-1990, however, and declined steadily through 1992.[26]

Bankers' explanation that their sharp reduction in commercial mortgage lending was a rational response to a glut of commercial property also has legitimacy (e.g. *Fortune*, 6/4/90; *American Banker*, 11/16/90). Commercial banks--the largest suppliers of commercial mortgages--increased their real holdings of commercial mortgages by 157 percent from 1980 to 1990.[27] Insurance companies and pension funds increased their commercial mortgage holdings at similar rates. As commercial construction began to outpace space demands during the 1980s, office vacancy rates rose, and real estate prices fell.[28] Falling property prices reduced the value of the collateral backing real estate loans. In response, lenders called loans and raised collateral requirements and other nonprice loan terms. By early 1991, the share of real estate loans made for construction and land development was one-third of its mid-1986 peak.

Some researchers have argued that credit availability was restricted because banks reduced lending to increase their capital-to-asset ratios to meet the standards of the Basle Accord (e.g. Syron, 1991, Board of Governors, Press Release, 1/19/89). For example, Johnson (1991) found that banks with weak balance sheets accounted for the slowdown in commercial (nonmortgage)

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26. It is interesting to note that small business borrowers in New England reported a net easing of credit standards from 1985 through mid-1987 and reported less tightening of standards on net than for the U.S. as a whole from mid-1987 through early 1989. See Dunkelberg and Dennis, 1992.
27. This increase was most extreme in New England. See Moscovitch (1990) and Peek and Rosengen (1992).
28. The overbuilding during the 1980s was so great that some analysts expect that the demand for new commercial office space during the 1990s may amount to only 10 percent of all the office space constructed during the 1980s. See *Wall Street Journal*, 11/11/90.

lending at U.S. banks. However, Bernanke and Lown (1991) established that bank capital only has a small, although statistically significant, effect on bank loans outstanding in the aggregate. In addition, in a Fed survey few bankers reported capital concerns as causing their tighter credit standards (e.g. Board of Governors, Survey of Senior Loan Officers, 2/5/93). Consistent with these results are the conclusions of Peek and Rosengren (1993) for New England banks. They find that the capital-to-asset ratio did not have a significant effect on new lending by banks that were not operating under formal regulatory actions.[29] In contrast, for the banks that had signed formal actions, an increase in capital induced a large and statistically significant reduction in new lending.[30] They conclude (p. 26) that "a threat of civil and criminal penalties, rather than vague regulations on bank capital requirements, is necessary to induce banks to quickly increase their capital-to-asset ratios so as to meet minimum capital requirements." Of course, whether the reduction in bank lending in response to such threats results in a credit crunch depends, according to our definition, on whether the reduction occurred through price or nonprice rationing.

Comparing the 1990-92 period to the 1966, 1969, and 1980 credit crunches reveals striking differences. For example, economic conditions before 1990 differed considerably from those preceding the earlier crunches. During the earlier episodes, money growth and inflationary expectations were rising, and loan demand was reported strong. In contrast, 1987-1992 was the longest

29. Formal actions by regulators specify financial conditions that banks must meet. These conditions generally concern capital ratios or loan loss reserves.

30. However, some borrowers affected by the reduction in new bank lending that Peek and Rosengren find had access to other sources of funds; Peek and Rosengren were not able to correct for this (see their footnote 15). If, for example, large borrowers typically accounted for a majority of new funds lent at the sample banks, then the identified reduction in new bank lending would not imply a substantial reduction in credit availability.

consecutive period of below average real M2 growth since 1960. Inflation expectations, as measured by the Livingston Survey, peaked at over 10 percent in mid-1980, then fell during the latter half of the 1980s to levels not seen since the early 1970s.

In addition, political and regulatory interference, which was critical to the early crunches, played a lessened role in the 1990-92 episode. In 1966 and 1969, policymakers implored bankers to restrict credit extensions and credibly threatened retribution if they did not comply. During 1980, direct regulatory restraint, in the form of binding usury ceilings, induced a sector-specific credit crunch. Most notable about 1990-92 was the nature of the jaw-boning that did occur. Specifically, in contrast to the earlier crunches, policymakers entreated bankers to no avail to resume their usual lending practices. Bankers meanwhile advocated a more cautious and restrictive lending policy. Some policymaking by intimidation did occur to the extent that regulatory restraint in the form of credible threats of legal action reduced new lending activity. However, this reduction in lending occurred primarily in New England, where such threats were most common, and there is little evidence of intensified nonprice rationing.[31]

We conclude that the 1990-92 period was not a *generalized* credit crunch in the sense of the classic crunches of 1966 and 1969, during which borrowing activity was affected generally and severe nonprice rationing arose in response to policymakers' efforts to directly restrict bank lending. The period instead seems to have been a *sector-specific* credit crunch that prevented commercial real estate developers and business borrowers using real estate as collateral from getting credit at any price. Because the commercial

31. See Dunkelberg (1991) and Dunkelberg and Dennis (1992) for evidence suggesting that most small business borrowers in New England did not experience severe nonprice rationing for much of 1990-92.

real estate market collapsed from an excess supply of commercial property, few trades occurred and property prices plummeted. Under these circumstances, lenders had difficulty pricing risk and thus relied more on nonprice rationing.[32] In contrast to the early credit crunches identified, this rationing, like the market conditions that caused it, continued beyond the recession, which ended in March 1991.

However, because the origins of the 1990-92 "crunch" were so different from those of the earlier episodes, some analysts consider "crunch" an inappropriate label for the period. For this reason they devised a variety of alternative terms to describe the period. Among them were "credit crumble," which captures the role of declining property values, and "credit correction" or "market rationalization," which conveys the market origins of the lending slowdown.[33] We view these distinctions as purely semantic. Whatever the label, the events in commercial real estate markets during the period satisfy our definition of a crunch.

IV. Conclusion

This article begins by defining a credit crunch, as must any article that attempts to identify crunches. Our definition focuses on shocks to the credit

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32. Berger and Udell (1989, p. 25) present empirical evidence that makes it "difficult to argue that [credit] rationing in the commercial loan market is an important macroeconomic phenomenon," although they cannot rule out such rationing based on their findings. Their results are not inconsistent with our identification of crunch episodes because they use only data on commercial loans made from 1977 to 1988; we conclude that no credit crunches occurred in the business sector during that period. Further, although Berger and Udell do not define the term "credit rationing," they state that they study the type of rationing associated with high market interest rates. This is not the type of rationing that we examine.

33. "Credit crumble" first appeared in Johnson (1991). Federal Reserve Board Chairman Alan Greenspan (U.S. House, *Hearings on the Conduct of Monetary Policy*, 1992) is responsible for "credit correction" and Federal Reserve Bank of Atlanta President Robert Forrestal (1991) for "market rationalization."

allocation process in the form of sharp increases in nonprice credit rationing. This definition leads us to a method for identifying credit crunches centered on the political economy of the periods under study and, thus, requires a historical narrative analysis. The remainder of the article has two parts, each using the identification process that we propose. In the first part we consider the 1960-82 period, and in the second, we spotlight 1990-92.

Place Table 1 Near Here

Table 1 summarizes the conclusions from our analysis by presenting a quarterly credit crunch dummy variable--a listing of the quarters during which a credit crunch ensued--and the cause of the nonprice rationing that generated the crunch conditions. For the 1960-82 period, we identify only 1966, 1969, and 1980 as years with credit crunches, although the 1980 crunch was limited to the consumer sector. The periods 1973-74 and 1981-82 saw credit unusually expensive but available to those willing to pay; thus, they are not crunches by our definition. Furthermore, our analysis suggests that political and regulatory interference with the credit allocation process, rather than standard monetary policy actions, caused all of the crunches from 1960-82. In some cases, policymakers, concerned about inflation caused by "excessive" credit creation, pressured banks to reduce credit extensions through nonprice rationing. This pressure was made credible by legislative action to intensify or expand bank regulation or by the Fed's restricting access to the discount window; policymakers made clear that such action was punishment for banks' noncompliance with earlier requests for credit restraint. In other cases, binding legal restrictions on loan interest rates prevented banks from rationing credit through interest rate increases when loanable funds were scarce.

We also identify crunch-like conditions affecting borrowing collateralized by commercial real estate in 1990-92. Extreme nonprice rationing limited such borrowing and constituted a market-induced correction to the severe excess supply of commercial property that prevailed during the period. Consequently, the sector-specific "credit crunch" of 1990-92 is the only one identified that likely was desirable in that a more efficient allocation of credit resulted. Because of the difference in its scope and origins from the earlier credit crunches identified, some may choose not to label it a crunch. We view this as a purely semantic distinction.

Finally, our most surprising finding is that our analysis overturns the conventional wisdom that Regulation Q was the culprit in the 1960s crunches. Certainly, when the Federal Reserve allowed Regulation Q to become binding, banks faced an outflow of funds. The historical record clearly shows, however, that banks responded to this outflow by liquidating government securities and raising loan interest rates. That is, to the extent that banks were free to allocate available credit as they saw fit in response to changing credit conditions, they predominantly rationed by price. The nonprice rationing that ensued during 1966 and 1969 occurred because of a practice of policymaking by intimidation that pressured banks into greater reliance on nonprice rationing.

Figure 1

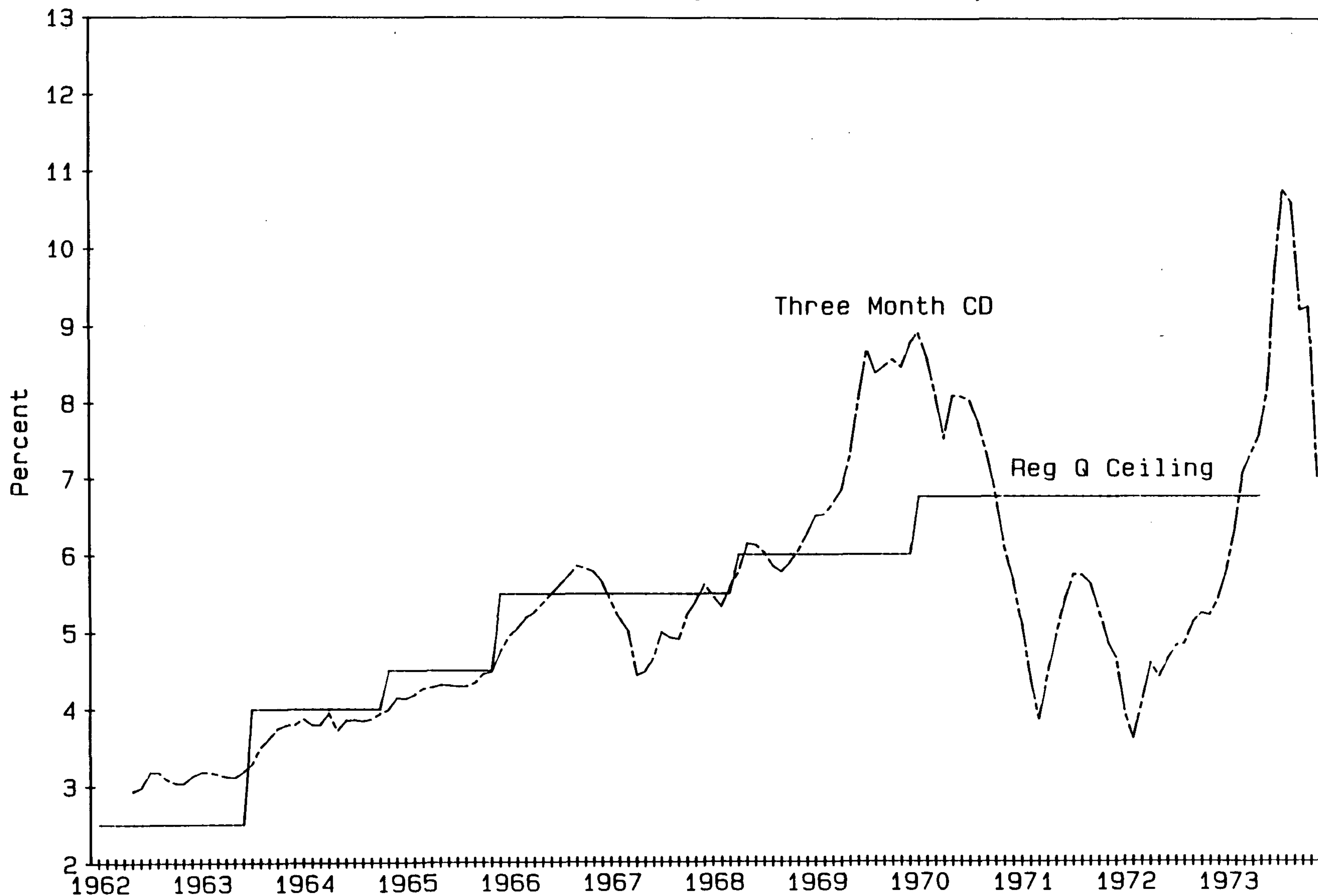

Table 1 -- U.S. Credit Crunch Periods: 1960-1992

Period	Credit Crunch?	NBER Recession?	Causes of Credit Crunch[a]
1960:II - 1961:I	No	Yes	-----
1961:II - 1966:I	No	No	-----
1966:II - 1966:III	Yes	No	presidential support for and congressional threats of credit control and interest rate ceiling legislation
1966:IV - 1969:I	No	No	-----
1969:II - 1969:III	Yes	No	presidential and Federal Reserve threats of "voluntary" credit restraint program; antitrust investigation of the banking industry's setting of the prime rate; passage of legislation providing presidential authority to impose credit controls; proposal for regulation of one-bank holding companies
1969:IV	Yes	Yes	
1970:I - 1970:IV	No	Yes	-----
1971:I - 1973:III	No	No	-----
1973:IV - 1975:I	No[b]	Yes	-----
1975:II - 1979:IV	No	No	-----
1980:I - 1980:II	Yes[c]	Yes	tight monetary policy and selective credit controls push interest rates up, making usury ceilings binding
1980:III	No	Yes	-----
1980:IV - 1981:II	No	No	-----
1981:III - 1982:IV	No[d]	Yes	-----
1983:I - 1990:I	No	No	-----
1990:II	Yes	No	sharply deteriorating property values and increasing economic uncertainty made pricing risk on real estate-collateralized loans extremely difficult
1990:III - 1991:I	Yes[e]	Yes	
1991:II - 1992:IV	Yes	No	

Notes:

[a]No cause is given for periods that were not crunches.

[b]During 1973 and 1974, interest rate ceilings were in place under Nixon's wage and price control program, but they effectively were not binding. Although banks were threatened with retribution if they violated the ceilings, no action was taken to make the threats credible.

[c]This was a sector-specific crunch, affecting only consumer credit.

[d]There is no evidence of extreme nonprice rationing during the 1981-82 recession.

[e]This was a sector-specific crunch, affecting only lending to commercial real estate developers and to business borrowers using real estate as collateral.

References

ABA Bankers Weekly. Various issues.

American Banker. Various issues.

American Bankers Association. *The Banker's Role in Reinforcing Monetary Policy*. New York: American Bankers Association, est. 1966.

Barron's. Various issues.

Berger, Allen N. and Gregory F. Udell. "Some Evidence on the Empirical Significance of Credit Rationing," Mimeo, December 1989.

Bernanke, Ben S. and Cara S. Lown. "The Credit Crunch," *Brookings Papers on Economic Activity, 2:1991*, pp. 205-239.

Board of Governors of the Federal Reserve System. *Annual Report*. Various years.

Board of Governors of the Federal Reserve System. "Credit Availability for Small Businesses and Small Farms," Report submitted to U.S. Congress, House of Representatives, December 31, 1992.

Board of Governors of the Federal Reserve System. *Federal Reserve Bulletin*. Various issues.

Board of Governors of the Federal Reserve System. *Minutes of the Federal Open Market Committee*. Various years.

Board of Governors of the Federal Reserve System. *1990 Monetary Policy Objectives*, July 18, 1990.

Board of Governors of the Federal Reserve System. Press Releases, April 2, 1980; January 19, 1989; March 1, 1991.

Board of Governors of the Federal Reserve System. Senior Loan Officer Opinion Survey on Bank Lending Practices, February 5, 1993.

Brimmer, Andrew F. "Statutory Interest Rate Ceilings and the Availability of Mortgage Funds," in *The Budget, Regulation Q, and Gold: Three Issues for Today and Tomorrow*, Supplement to Federal Reserve Bank of Philadelphia *Business Review* (June 1968), pp. 3-9.

Burger, Albert E. "A Historical Analysis of the Credit Crunch of 1966," *Federal Reserve Bank of St. Louis Review*, vol. 51, no. 9 (September 1969), pp. 13-30.

Burns, Arthur F. *The Ongoing Revolution in American Banking*. Washington: American Enterprise Institute, 1988.

Business Week. Various issues.

Dunkelberg, William C. "The Credit Crunch--Myth Or Mistaken Monetary Policy?" National Federation of Independent Business, April 1991.

Dunkelberg, William C., and William J. Dennis, Jr. "The Small Business 'Credit Crunch,'" National Federation of Independent Business, December 1992.

Eckstein, Otto and Allen Sinai. "The Mechanisms of the Business Cycle in the Postwar Era," in Robert J. Gordon, ed., *The American Business Cycle: Continuity and Change*, National Bureau of Economic Research Studies in Business Cycles, vol. 25. Chicago: University of Chicago Press, 1986, pp. 39-105.

Forrestal, Robert P. "Policy Implications of a Credit Crunch," Remarks for the Conference on "Credit Crunches--Causes and Cures," Wellington, New Zealand, August 16, 1991.

Fortune. Various issues.

Friedman, Benjamin M. "Comment on 'The Credit Crunch,'" *Brookings Papers on Economic Activity, 2:1991*, pp. 240-44.

Friedman, Milton and Anna Jacobson Schwartz. *A Monetary History of the United States, 1867-1960*. Princeton: Princeton University Press, 1963.

Green, Edward J. and Soo Nam Oh. "Can a 'Credit Crunch' Be Efficient?" Federal Reserve Bank of Minneapolis, *Quarterly Review*, vol. 15 (Fall 1991), pp. 3-17.

Homer, Sidney. "Does '66 Add Up to a Credit Squeeze or Credit Crunch?" *The Commercial and Financial Chronicle*, September 29, 1966.

Interagency Policy Statement on the Review and Classification of Commercial Real Estate Loans, November 7, 1991.

Johnson, Ronald. "The Bank Credit Crumble," Federal Reserve Bank of New York, *Quarterly Review*, vol. 16, no. 2 (Summer 1991), pp. 40-51.

Kettl, Donald F. *Leadership at the Fed*. New Haven: Yale University Press, 1986.

Knight-Ridder MoneyCenter News. Various reports.

Monhollon, Jimmie R. "Regulation Q: An Instrument of Monetary Policy," Federal Reserve Bank of Richmond, *Monthly Review* (July 1970), pp. 2-8.

Moore, Carl H. *The Federal Reserve System, A History of the First 75 Years*. Jefferson, NC: McFarland & Company, 1990.

Moscovitch, Edward. "The Downturn in the New England Economy: What Lies Behind It?" Federal Reserve Bank of Boston, *New England Economic Review* (July/August 1990), pp. 53-65.

New York Times. Various issues.

Office of the Comptroller of the Currency. "Real Estate Project and Development Lending by National Banks," Advisory, February 1990.

Ostas, James R. "Effects of Usury Ceilings in the Mortgage Market," *Journal of Finance*, vol. 31, no. 3 (June 1976), pp. 821-834.

Peek, Joe and Eric S. Rosengren. "Bank Regulation and the Credit Crunch," Unpublished manuscript, February 1993.

Peek, Joe and Eric S. Rosengren. "The Capital Crunch in New England," Federal Reserve Bank of Boston, *New England Economic Review* (May/June 1992), pp. 21-31.

Potters, Jan and Frans Van Winden. "Modelling Political Pressure as Transmission of Information," *European Journal of Political Economy*, vol. 6 (August 1990), pp. 61-88.

Romer, Christina D. and David H. Romer. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," in Olivier Blanchard and Stanley Fischer, eds., *NBER Macroeconomics Annual 1989*. Cambridge: MIT Press, 1989.

Samuelson, Paul A. and William D. Nordhaus. *Economics*, 12th ed. New York: McGraw-Hill, 1985.

Schreft, Stacey L. "Credit Controls: 1980." Federal Reserve Bank of Richmond, *Economic Review*, vol. 76, no. 6 (November/December 1990), pp. 25-55.

Schreft, Stacey L. and Raymond E. Owens. "Survey Evidence of Tighter Credit Conditions: What Does It Mean?" Federal Reserve Bank of Richmond, *Economic Review*, vol. 77, no. 2 (March/April 1991), pp. 29-34.

Sinai, Allen. "Credit Crunches--An Analysis of the Postwar Experience," in Otto Eckstein, ed., *Parameters and Policies in the U.S. Economy*. Amsterdam: North Holland, 1976, pp. 244-274.

Sinai, Allen. "Credit Crunch Possibilities and the Crunch Barometer," *Data Resources Review* (June 1978), pp. 9-18.

Sinai, Allen. "Crunch Impacts and the Aftermath," *Data Resources Review* (June 1980), pp. 37-60.

Sinai, Allen. "Financial and Real Business Cycles," Mimeo, August 1991.

Spillenkothen, Richard. Memo to Officer in Charge of Supervision at Each Federal Reserve Bank, September 23, 1991 and October 2, 1991.

Syron, Richard F. "Are We Experiencing a Credit Crunch?" Federal Reserve Bank of Boston, *New England Economic Review* (July/August 1991), pp. 3-10.

U.S. Congress, House of Representatives, Committee on Banking and Currency. *A Call For A Rollback Of High Interest Rates*. Hearings, 91 Cong. 2 Sess. Washington: Government Printing Office, 1970.

U.S. Congress, House of Representatives, Committee on Banking and Currency. *The Credit Crunch and Reform of Financial Institutions*. Hearings, 93 Cong. 1 Sess. Washington: Government Printing Office, 1973.

U.S. Congress, House of Representatives, Committee on Banking and Currency. *To Eliminate Unsound Competition For Savings And Time Deposits*. Hearings, 89 Cong. 2 Sess. Washington: Government Printing Office, 1966.

U.S. Congress, House of Representatives, Committee on Banking and Currency. *Investigation Of Increase In Prime Interest Rate. Hearings, 91 Cong. 1 Sess. Washington: Government Printing Office, 1969.*

U.S. Congress, House of Representatives, Committee on Banking, Finance and Urban Affairs. *Credit Availability*. Hearings, 101 Cong. 2 Sess. Washington: Government Printing Office, 1990.

U.S. Congress, House of Representatives, Committee on Banking, Finance and Urban Affairs, Subcommittee on Consumer Affairs and Coinage. *To Extend the Credit Control Act*. Hearings, 97 Cong. 2 Sess. Washington: Government Printing Office, 1982.

U.S. Congress, House of Representatives, Committee on Banking, Finance and Urban Affairs, Subcommittee on Domestic Monetary Policy. *Conduct of Monetary Policy*. Hearings, 102 Cong. 1 Sess. Washington: Government Printing Office, 1992.

U.S. Congress, House of Representatives, Committee on Small Business. *The Credit Crunch.* Hearing, 102 Cong. 1 Sess. Washington: Government Printing Office, 1991.

U.S. Congress, House of Representatives, Committee on the Budget, Task Force on Urgent Fiscal Issues. *The Credit Shortage: Is It Stifling Economic Recovery?* Hearings, 102 Cong. 1 Sess. Washington: Government Printing Office, 1992.

U.S. Congress, Senate, Committee on Banking, Housing, and Urban Affairs. *Amending the Credit Control Act*. Hearings, 96 Cong. 1 Sess. Washington: Government Printing Office, 1979.

U.S. Congress, Senate, Committee on Banking, Housing, and Urban Affairs. *Deposit Insurance Reform and Financial Modernization*. Hearing, 101 Cong. 2 Sess. Washington: Government Printing Office, 1990.

U.S. Congress, Senate, Committee on Banking and Currency. *The Impact of High Interest Rates on the Economy*. Hearings, 91 Cong. 1 Sess. Washington: Government Printing Office, 1969.

U.S. Congress, Senate, Committee on Small Business. *The Credit Crunch*. Hearing, 102 Cong. 1 Sess. Washington: Government Printing Office, 1992.

Wall Street Journal. Various issues.

Wojnilower, Albert M. "The Central Role of Credit Crunches in Recent Financial History," *Brookings Papers on Economic Activity, 2:1980*, pp. 277-326.

Wojnilower, Albert M. "Credit Crunch," in *The New Palgrave Dictionary of Money and Finance*. London: Macmillan, forthcoming.

Wojnilower, Albert M. "Private Credit Demand, Supply, and Crunches--How Different are the 1980's?" *American Economic Review*, vol. 75, no. 2 (May 1985), pp. 351-356.

Wolfson, Martin H. *Financial Crises: Understanding the Postwar U.S. Experience*. Armonk, N.Y.: M.E. Sharpe, 1986.