

Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

June 1986

The World Financial Scene:
Balancing Risks and Rewards

Union COLA's on the Decline

Deposit Deregulation, Credit
Availability, and Monetary Policy

June 1986, Volume 71, No. 6

The *Economic Review* (ISSN0161-2387) is published monthly by the Federal Reserve Bank of Kansas City, except in July/August and September/October, when it is published bi-monthly. Subscriptions and additional copies are available without charge. Send requests to the Research Division, Federal Reserve Bank of Kansas City, 925 Grand Avenue, Kansas City, Missouri, 64198. If any material is reproduced from this publication, please credit the source. Second class postage paid at Kansas City, Missouri. Postmaster: send address changes to *Economic Review*, Research Division, Federal Reserve Bank of Kansas City, 925 Grand, Kansas City, Missouri, 64198.

Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

June 1986

The World Financial Scene: Balancing Risks and Rewards 3

By Preston Martin and Bryon Higgins

Financial markets are becoming increasingly internationalized, posing new challenges for central banks. Increased cooperation and coordination among central banks are needed to meet these challenges.

Union COLA's on the Decline 10

By Stuart E. Weiner

Cost of living adjustments have become less prevalent in union contracts in recent years. While the reduction in COLA's may significantly affect some industries, the general economy will not be much affected because the union sector is small.

Deposit Deregulation, Credit Availability, and Monetary Policy 26

By William R. Keeton

Deregulation of deposit rates may weaken monetary policy by reducing credit availability effects. But availability effects will not be reduced enough to weaken monetary policy significantly.

The World Financial Scene: Balancing Risks and Rewards

By Preston Martin and Bryon Higgins

Monetary authorities throughout the world are bedeviled by new challenges posed by the changing financial system. The problems confronted by the Federal Reserve are similar in many ways to the problems confronted by the Bundesbank, Bank of Japan, the Bank of England, the Bank of Canada, and the Bank of Italy. Monetary policy used to be a rather staid profession in which the rules of the game were fixed and understood. Outsiders might not like the rules; policymakers themselves might not always play by the rules; but at least everyone knew the rules.

In contrast, today's central banker must navigate in uncharted waters. The global financial system is changing so rapidly that the old rules of the game no longer universally apply. New financial instruments are developed almost monthly, the thrust toward deregulation of

domestic financial systems proceed apace, and financial markets are becoming increasingly internationalized in their scope. The rewards from financial change are potentially large: increased equity and efficiency.

This change in the financial system also poses important risks, however. These risks will be intensified unless central bankers can successfully adapt to financial change. They must adapt both the implementation of monetary policy and the regulation of financial institutions to the new environment. One danger in such a fluid financial situation is that central banks will be guilty of "fighting the last war." Therefore, in the United States and other major developed countries, the focus must shift from domestic financial innovation and deregulation to the global integration of financial markets and to the new financial instruments developed in those markets.

Fortunately, many of the changes in international markets are similar to those that we have experienced in domestic markets. There are parallels in today's global financial system to our experience with the U.S. financial system. The Federal Reserve's response, therefore, need not

Preston Martin was vice chairman of the Board of Governors of the Federal Reserve System from March 1982 to April 1986. This article was prepared while Bryon Higgins, a vice president and economist at the Federal Reserve Bank of Kansas City, was on leave from the bank to serve as assistant to Vice Chairman Martin.

be entirely novel, but it must be an adaption, even a metamorphosis. The causes and consequences of financial change are much the same now as they were a decade ago, but its scope has expanded substantially. Thus, the range of factors that must be taken into account by central banks must expand commensurately.

Domestic financial change

Changes in U.S. financial markets have reflected in large part the accelerating inflation in the 1970s. Initially, market interest rates pushed above regulatory ceilings on deposits and certain types of loans. Powerful incentives were created for the development of new unregulated financial instruments and channels of intermediation. The most dramatic: money market mutual funds offered by brokerage firms and other nondepository institutions. In just a few years, these funds attracted nearly \$250 billion. High and variable market interest rates also increased the internal rates of return from the application of electronic management of money balances. Electronic funds transfer systems enabled one to economize on regulated accounts by reducing the cost of transferring to deregulated instruments.

To restore competitive balance and remove distortions in credit flows, regulators and legislators have progressively removed interest rate ceilings in recent years. The phaseout of interest rate ceilings on virtually all U.S. deposits was completed earlier this year. By placing greater reliance on market forces, deregulation has produced a more efficient financial system and improved the allocation of credit. Without regulatory and legal constraints on interest rates, credit now flows to the uses that are most productive.

Interest rate deregulation has changed the channels of monetary policy. In the 1960s and early 1970s, monetary restraint had its effect primarily by reducing the availability of credit from finan-

cial intermediaries. The sectors most affected by monetary constraint were those that had limited access to the open market. The boom-bust cycle in housing, for example, was largely a result of the drying up of mortgage credit during periods of monetary restraint, followed by a burst of pent-up demand when monetary conditions eased.

Financial innovation and deregulation have also altered the relationship of monetary growth to ultimate policy objectives. Traditional monetary aggregates rely on a sharp demarcation between financial assets. Such a sharp demarcation was appropriate when regulatory barriers imposed sharp breaks in the characteristics of financial assets. With those barriers now largely eliminated, both the supply of and demand for financial assets are continuums, without any obvious place to draw the line between monetary

Interest rate deregulation has changed the channels of monetary policy and altered the relationship of monetary growth to ultimate policy objectives.

assets and nonmonetary financial assets. The blurring of distinctions between financial assets has been manifested in much less predictable changes in the growth rates of the monetary aggregates. The most pronounced change has been in the velocity of M1, which behaved erratically in 1982-83 and again over the last several quarters. Consequently, the interpretation of M1 growth has been more difficult, and the weight placed on this aggregate in policy implementation has been reduced. The Federal Reserve has been forced to look at a wider range of economic developments in determining the direction of monetary policy.

Deregulation has also heightened depository institutions' exposure to interest rate risk. Fortunately, financial innovation redressing this problem has continued. New instruments and

markets that allow interest rate risk to be transferred to third parties have proliferated. The secondary markets for mortgage-backed securities, for example, have allowed depository institutions to continue to meet their customers' demands for fixed rate mortgage credit by funding such assets from pension funds, life insurance companies, and other institutions that have a better access to long-term funds. The burgeoning financial futures markets offer additional opportunities for transferring interest rate risks. Futures markets have also facilitated the development of a variety of new risk management products such as interest rate swaps, which smaller banks and thrifts may find easier to use than futures markets themselves.

Another effect of deregulation has been a blurring of distinctions between financial institutions. Thrift institutions have gained increased asset powers and have been authorized to offer consumer checking accounts. In recognition of the increased similarities among financial institutions, the Federal Reserve now counts one-half of thrift deposits along with commercial bank deposits in determining market shares. Securities firms have also offered bank-like assets in the form of money market mutual fund shares, and commercial banking organizations have pressed the limits of the traditional separation between commercial banking and investment banking by acquiring firms that offer mutual funds and other security services. The Board of Governors has urged that Congress reexamine U.S. banking laws to ensure that financial institutions that perform similar functions are subject to similar regulations.

Deregulation in the United States has occurred in the context of a general orientation toward the principles of open competition, freedom of action, and minimum government intervention in the marketplace. Even so, there are always vested interests that resist change. Much of the argument over banking powers has revolved around whether banks have been gaining or losing market

share to nonbank institutions. There is no obvious economic reason why this should be the criterion by which the appropriateness of financial liberalization is judged. But one cannot ignore the fact that existing resource allocations reflect responses to the past legal and regulatory frameworks and that there will always be cries of foul when the rules of the game are circumvented or changed. We have also faced transitional problems associated with the existing portfolio positions of financial institutions and have encountered conflicts in objectives in the process of deregulation. The goals of efficiency and stability are both served best in the long run by financial reform. In the short run, however, the dislocations caused by deregulation have led to questions about the safety and soundness of the banking system and even about the overall stability of the financial system.

The combination of regulatory liberalization and market innovation has enabled financial institutions in the United States to engage in a variety of activities where risks are high or not easily assessed. Although this may tend to have favorable effects on competitiveness of markets and on the efficiency of capital allocation, it may also have negative consequences for the safety and soundness of institutions. Moreover, the U.S. deposit insurance system encourages institutions to take on greater risks without incurring a commensurately higher funding cost. In responding to the increased risks—as we did by imposing minimum capital guidelines for commercial banks—there is always a danger of intensifying pressures for banks to engage in novel activities outside the scope of our regulations. One reason banks have increased their off-balance sheet lending is to avoid the minimum capital guidelines that we earlier established. In response, the Board of Governors recently proposed a new supplemental capital standard that takes account of the off-balance sheet risk exposure as well as the risk inherent in more traditional bank portfolios.

The institutional strains—and indeed even failures—of the past few years have led to some greater caution in our approach to financial deregulation of late. It would be an exaggeration to refer to this as reregulation, however. There is no thought that we are going to retrace the ground that we have traversed along the road of deregulation. We believe that our economy benefits greatly from having highly competitive, flexible, and innovative financial markets. What is needed is a realistic approach to reform that preserves the elements essential to stability.

The developments outlined above have dominated Federal Reserve monetary policy and regulatory policy over the past decade or so. In the past few years, however, a number of new developments increasingly required our attention. These developments are the international counterparts to the domestic innovation and deregulation of earlier years. Foreign central banks have also been required to turn their attention to the consequences of the globalization of financial markets. In such a rapidly changing international financial environment, there is a danger that central banks will lag behind the markets. Continued preoccupation with domestic innovation and deregulation without regard to the international aspects of financial change would lead ultimately to inadequate methods of monetary policy implementation and outmoded regulatory frameworks for ensuring the safety and soundness of the global financial system.

International financial change

Stimulus for international financial change has come from the confluence of several related developments. Deregulation of domestic markets both in the United States and elsewhere has been a catalyst for international financial change. Volatility of interest rates and exchange rates has also increased the incentive to find new ways for both lenders and borrowers throughout the world to

limit their risk exposure. The unprecedented size of international capital flows accompanying global imbalances in international trade has spurred development of new financial techniques and instruments for channeling funds across national boundaries. At the same time, the move to a floating exchange rates system expedited the elimination of exchange controls that had previously hindered the international flow of funds. As in the case of domestic financial change, the technological revolution has provided increasingly sophisticated methods of transferring funds from lenders to borrowers at a low cost.

The manifestations of international financial change are everywhere apparent. The securitization of debt, which has led in the domestic U.S. market to mortgage-backed securities and increased use of commercial paper in lieu of directly negotiated loans, is also increasingly important in international markets. As recently as five years ago, syndicated bank credit accounted for more than half of the total borrowing on international capital markets. Last year it accounted for only about 15 percent. Traditional bank credit has thus been supplanted by issuance of bonds and notes in the international markets. The most rapidly growing instrument has been floating rate notes, which have more than tripled their market share in the past five years and now account for one-fourth of the total borrowing on international capital markets. Futures, options, and swap transactions have also grown very rapidly.

Moreover, the currency denomination of international borrowing has changed substantially in recent years. The share of international borrowing denominated in U.S. dollars has declined from over 80 percent in the early 1980s to just over 60 percent last year. The share denominated in yen, sterling, and the ECU has more than doubled over this same period, and dual currency issues have grown substantially.

The competition for a share of the international financial market has expedited the liberalization

of domestic financial markets. Deregulation of the London Stock Exchange scheduled for later this year and consideration of establishing an off-shore banking facility in Tokyo are examples of what might well be called competitive deregulation. Governments recognize that unnecessary restrictions on financial transactions put their markets at a competitive disadvantage in attracting international financial business. The blurring of distinctions among U.S. financial intermediaries therefore has its counterpart in the blurring distinction among the currency denomination and the geographical location for international financial transactions. In both cases, the segmentation of financial markets that once existed is quickly disappearing. Borrowers seek the cheapest source of funds and lenders seek the highest return on funds without regard to the classification of the financial intermediary, the country in which that intermediary does business, or the currency in which the transaction is denominated.

Interest rate and exchange rate swaps are used to convert loans initiated in international markets to the currency denomination and maturity favored by the borrower. These swaps allow the interest rate and exchange rate risk to be shifted to the parties most willing—and, one hopes, most able—to bear such risk. Banks that arrange swaps are also subject to increases in credit risk, but that risk is often not apparent because swaps are an off-balance sheet form of financing.

Increased off-balance sheet financing is one example in which international financial change poses new challenges for financial regulation. The risk incurred by banks in their off-balance sheet lending should be offset by increased capital in order to maintain the safety and soundness of the system. Accordingly, the Federal Reserve recently published for public comment a supplemental capital standard that would take account of such off-balance sheet risk exposure in determining the appropriate level of capital for U.S.

banks. The Board of Governor's proposal is intended to be consistent with the guidelines used in other developed countries.

New challenge for central banks

This proposal is an example of the need to take account of the regulatory structure in foreign countries in developing U.S. financial regulations, which is essential to maintaining competitive equity and efficiency. When U.S. banks and other financial firms compete in a world financial market, regulation of U.S. firms cannot ignore comparable regulation of foreign competitors. The Monetary Control Act and the Garn-St Germain Act aimed to provide a level playing field among U.S. financial institutions; the same principle applies in international markets. Arthur Burns once warned of the danger of a "competition in laxity" among regulators of U.S. financial institutions. Without international cooperation among financial regulators, a similar competition in laxity could threaten the stability of the international financial system. The Federal Reserve, the Federal Deposit Insurance Corporation, the Federal Home Loan Bank Board, the

Increased cooperation and consultation among central banks are necessary to meet the challenges posed by the internationalization of the financial services industry.

Securities and Exchange Commission, and other U.S. regulators could take a parochial view by liberalizing U.S. financial regulations relative to those abroad to provide a competitive advantage for U.S. banks and securities firms. But it would be myopic to believe that such an advantage would not lead to comparable relaxation of foreign regulations. For the same reason that trade barriers invite retaliation and a trade war, competitive relaxation of financial regulations could invite an

unhealthy battle among nations to gain market share in the global financial markets. Both regulators and international financial institutions must devise ways to ensure the safety of the international financial system while retaining a system that is open for innovation.

Self regulation is one avenue for ensuring equitable and efficient monitoring of international financial markets. Self regulation is a well-established means of monitoring the actions of securities firms in the United States. The National Association of Securities Dealers establishes rules and oversees the performance of member firms. In addition, the U.S. banking and the thrift industries have recently taken tentative steps toward establishing the mechanisms for self-regulatory bodies. Self regulation will also be an integral part of the oversight of the deregulated securities industry in the United Kingdom. Under the Financial Services Bill currently before Parliament, membership in a self-regulatory organization is one way to obtain authorization for a firm to conduct securities business. As the competition among financial firms turns increasingly from internal domestic markets to world markets, it seems natural to expect that international self-regulatory bodies will evolve. A meeting of the top financial institutions that operate in the world's major financial centers would be a useful first step for developing ways in which existing self-regulatory organizations can be melded into an international organization for the oversight of global financial markets and of firms that participate in those markets.

Government regulatory authorities cannot rely entirely on private, self-regulatory organizations to ensure the safety of the international financial system, however. Central banks have a unique role to play in maintaining the integrity of the world payments and credit systems. Because of this unique role, central banks also have a unique responsibility to ensure consistency of financial regulations across national boundaries. Con-

sultations already take place under the auspices of the Bank for International Settlement. Such consultations are crucial because achieving consistency in regulation of international financial markets can be exceedingly complex.

The desirability of more uniform capital standards among countries, for example, is complicated by the diversity of laws and customs that govern each nation's financial institutions. European banks, for example, rely heavily on provisioning rather than accounting capital as a cushion against risk. This difference makes it difficult to agree on what capital levels are in fact comparable. Despite such difficulties—indeed, because of such difficulties—discussions among central banks are essential for understanding the effect of foreign financial regulations and for achieving greater uniformity over time.

The rapid pace of financial innovation presents additional problems for the regulation of international financial markets. A large and growing proportion of international financial transactions employ instruments and methods that have only been developed within the last few years. As an example of the intricacy of international financial lending agreements, a U.S. bank recently led a syndicate that offered in the Eurogilder market a floating rate note issue that involved sale of an interest rate cap in addition to currency and interest rate swaps. Such complicated financial deals would have been unthinkable only a few years ago. Many of the instruments that were used to put together this offering have only become important in the past two or three years. There is some question about how well regulators—and indeed the involved financial institutions—understand the risk implications of these instruments, especially during periods when interest rates are rising.

Many of the more complicated types of financial arrangements in international financial markets entail contingent risk of a kind with which we have little experience. The subtle and com-

plicated credit risks banks incur in off-balance sheet financing could come to the fore if interest rates, exchange rates, or other factors change substantially. What are the potential implications for the liquidity of the bank in such a circumstance? What are the ramifications for the other parties involved in the transaction if the bank could not meet its contingent obligation? These are the types of questions with which central banks must increasingly concern themselves in the years ahead.

As central banks strive to solve the many regulatory and prudential challenges posed by the globalization of financial markets, they must also be concerned about the implications for monetary policy implementation. The deregulation of domestic financial markets in the United States and elsewhere led to increased importance of interest rates rather than credit availability as the primary channel for monetary policy in the late 1970s. Elimination or relaxation of exchange controls and other aspects of financial liberalization that increased the international mobility of capital have increased the importance of exchange rates as a channel of monetary policy in the 1980s. World financial markets increasingly conform to the economist's paradigm of instantaneous arbitrage among financial markets. Differences in the expected rate of return among assets denominated in different currencies are quickly eliminated by international financial transactions, not only those of the conventional type but also unconventional transactions that are not recorded in capital flows. The resulting change in exchange rates alters the international competitiveness of producers in various countries. The burden of monetary restraint thus falls increasingly on tradeable goods sectors rather than interest-sensitive sectors. The timing and magnitude of changes in output, employment, and prices that result from exchange rate changes can be very different from those that were obtained when monetary policy worked through the level of in-

terest rates or availability of credit. Central banks have too little experience with the new and more complicated channels of monetary policy to confidently predict the timing and magnitude of the effects of monetary policy actions.

Central banks must thus contend with these complications to monetary policy implementation while at the same time devising improved methods for regulatory and supervisory policies. In all of these areas, increased cooperation and consultation among central banks and among financial institutions operating in world markets are necessary if we are to meet the challenges posed by the internationalization of the financial services industry.

The decade ahead thus promises to be a most challenging period for the Federal Reserve and for central banks throughout the world. They no longer have the luxury of familiarity with extant financial institutions and markets. Yet the stakes are too high to rely on trial and error. It is, therefore, imperative that central banks throughout the world share information, consult with each other about the possible consequences of monetary policies among countries, and devise innovative approaches to the supervision and regulation of financial institutions.

The "last war" both in the United States and in most other industrial countries was deregulation and innovation in domestic financial markets. The challenges of the next war are more difficult, however, because they entail deregulation and innovation in international financial markets. The complexity of the problems grows geometrically as the number of currencies, the number of financial instruments, the diversity of financial institutions, and the geographic location of major financial centers increases. By adopting forward-looking policies, central banks can ensure a world financial system that is more efficient, more equitable, and more sound. The rewards of financial change can be realized without suffering unduly from the attendant risks.

Union COLA's on the Decline

By Stuart E. Weiner

Rising prices reduce the purchasing power of a given wage or salary. To protect against such losses, workers and firms often incorporate cost-of-living-allowance (COLA) clauses in their labor agreements. COLA's provide automatic wage adjustments whenever prices rise, that is, COLA's index wages to prices. Not surprisingly, the prevalence of COLA's rose during the 1970s as inflation accelerated. But since peaking in the late 1970s, COLA prevalence in the union sector has been declining, both in the number of workers covered and in the proportion of workers covered. Last year saw a particularly sharp decline in the prevalence of COLA's. And some industries have been more affected than others.

This article examines the decline in union COLA's and assesses its possible effects on the U.S. economy. The article argues that, though in theory a reduction in COLA's could have a large impact on an economy, in this case the impact is

likely to be small given the small and dwindling size of the union sector in the United States. The decline in union COLA's could have a significant impact at the industry and firm level, however, allowing businesses to meet head-on cost pressures associated with heightened domestic and foreign competition.

The first section of the article provides an overview of wage indexation in the United States. The second section documents the recent decline in union COLA's. The third section examines its possible causes. The fourth section explores the possible consequences of the decline.

An overview of COLA's

COLA's protect workers from unexpected price changes. Depending on the exact form of the COLA, the protection may be complete or incomplete, that is, a 1 percent increase in prices may lead to a 1 percent increase in wages or something less than 1 percent. Even in the latter case, however, COLA's remove some of the uncertainty facing a worker about his or her real (after inflation) earnings.

Stuart E. Weiner is a senior economist with the Federal Reserve Bank of Kansas City. David Zen, a research associate at the bank, assisted in the preparation of this article.

COLA's have the opposite effect on employers. Precisely because wage payments can vary according to what happens to prices, firms with COLA's in their labor agreements face added uncertainty over their labor costs. This uncertainty increases as the COLA protection becomes more complete. One possible advantage of COLA's to firms is that COLA's might entice workers to enter longer-term agreements than they would otherwise, reducing, in the case of union workers, the opportunity and perhaps the incentive to strike.

Coverage

COLA's have long been common in the union sector. As early as 1920, COLA's appeared in the printing industry. But COLA's have never been common in the nonunion sector.¹ Consequently, for the economy as a whole, COLA's are relatively rare. Estimates suggest that only about 10 percent of the total U.S. work force is covered by a COLA.

Even within the union sector, COLA coverage has varied from year to year. Table 1 shows the prevalence of COLA's among union workers in major contracts (those covering 1,000 workers or more) in private industry since 1957. As indicated, the number of workers covered by a COLA has ranged from under 2 million to as high as 6 million, and the proportion of workers covered has ranged from 22 percent to over 60 percent. At the beginning of this year, 3.5 million workers had COLA coverage, or 50 percent.²

¹ COLA's are rare among nonunion workers for two primary reasons. First, unlike union workers, nonunion workers typically have annual wage adjustments and thus face less real earnings uncertainty than union workers in multiyear contracts. Second, nonunion workers are without a strike threat, removing much of the incentive for firms to seek longer term agreements by offering COLA protection in those agreements. For further discussion of this point, as well as a survey of COLA's through U.S. history, see Wallace E. Hendricks and Lawrence M. Kahn, *Wage Indexation in the United States—Cola or Uncola?*, Ballinger Publishing Company, Cambridge, Mass., 1985, pp. 7, 13-76.

COLA's are not distributed uniformly across industries. Some industries are heavily indexed. Others are not. Table 2 presents COLA coverage among major contract workers by broad industry group for 1986. As indicated, COLA's are somewhat more common in goods-producing industries than in service-producing industries and much more common in manufacturing industries than in nonmanufacturing industries. And, postal workers aside, COLA's are virtually nonexistent among government workers. The near-absence of COLA's among government workers lowers coverage among all major contract workers—private plus government—to under 40 percent.³

This unevenness in COLA coverage is just as striking at narrower industry levels. Among manufacturing industries, for example, the tobacco, primary metals, transportation equipment, and stone, clay, glass, and concrete products industries all had 90 percent or more of their union work force covered by COLA's at the beginning of this year, while the lumber, paper, leather, and petroleum refining industries had less than 10 per-

² Coverage data for the years prior to 1957 are generally unavailable. Note that these data refer to major contract private workers only; data for nonmajor contract private workers (i.e., contracts covering less than 1,000 workers) and government workers are much more limited. Regarding nonmajor contract private workers, a comprehensive data base created by Hendricks and Kahn for the years 1966 to 1981 indicates that COLA coverage among these workers has roughly tracked that of major workers, albeit at somewhat lower levels (page 80). Regarding government workers, data for major contract state and local workers have been published for the past two years, with coverage at the beginning of this year at 1.8 percent. Data for nonmajor contract state and local workers and major and nonmajor contract federal workers have generally not been published. It is known, however, that at present all postal workers (655,000 major contract, 4,000 nonmajor contract) are covered by COLA's, while all nonpostal federal workers (major and nonmajor contract breakdown not available) are without COLA's.

³ As explained in the note to Table 2, this figure is derived from Bureau of Labor Statistics (BLS) data that exclude 655,000 major contract postal workers, all of whom have COLA coverage, and an unspecified number of major contract nonpostal federal workers, none of whom have COLA coverage. See also note 2.

TABLE 1

Prevalence of COLA's in private industry, major union contracts, 1957-86
(millions of workers)

<u>Year</u>	<u>Number Under Contract*</u>	<u>Number Covered by COLA</u>	<u>Percent Covered by COLA</u>	<u>Inflation Rate†</u>
	(1)	(2)	(3)	(4)
1957	7.8	3.5	45	3.0%
1958	7.8	4.0	51	1.8
1959	8.0	4.0	50	1.5
1960	8.0	4.0	50	1.5
1961	8.1	2.7	33	0.7
1962	8.1	2.5	31	1.2
1963	8.0	1.9	24	1.6
1964	7.8	2.0	26	1.2
1965	7.8	2.0	26	1.9
1966	7.9	2.0	25	3.4
1967	10.0	2.2	22	3.0
1968	10.6	2.5	24	4.7
1969	10.6	2.7	25	6.1
1970	10.8	2.8	26	5.5
1971	10.8	3.0	28	3.4
1972	10.6	4.3	41	3.4
1973	10.4	4.1	39	8.8
1974	10.2	4.0	39	12.2
1975	10.3	5.3	51	7.0
1976	10.1	6.0	59	4.8
1977	9.8	6.0	61	6.8
1978	9.6	5.8	60	9.0
1979	9.5	5.6	59	13.3
1980	9.3	5.4	58	12.4
1981	9.1	5.3	58	8.9
1982	9.0	5.1	57	3.9
1983	8.5	4.9	58	3.8
1984	7.9	4.5	57	4.0
1985	7.5	4.2	57	3.8
1986	7.0	3.5	50	—

*Contracts covering 1,000 workers or more. Data relate to information available late the preceding year. The construction, services, finance, and real estate industries were not included until 1967.

†As measured by CPI, December to December. Data beginning 1978 are for all urban consumers. Earlier data are for urban wage earners and clerical workers.

Sources: George Ruben, "Major Collective Bargaining Developments—A Quarter-Century Review," *Current Wage Developments*, U.S. Department of Labor, Bureau of Labor Statistics, February 1974, Table 1, p. 45; David J. Schlein, Phyllis I. Brown, and Fehmida Sleemi, "Collective Bargaining During 1986: Pressures to Curb Costs Remain," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1986, Table 8, p. 32; *Economic Report of the President*, U.S. Government Printing Office, February 1986, Table B-58, p. 319; *Economic Report of the President*, U.S. Government Printing Office, February 1983, Table B-55, p. 225.

TABLE 2

Prevalence of COLA's by broad industry group, major union contracts, 1986
(thousand of workers)

<u>Industry Group</u>	<u>Number Under Contract*</u>	<u>Number Covered by COLA</u>	<u>Percent Covered by COLA</u>
Private nonagricultural	6,981	3,458	49.5
Goods-producing	3,926	2,108	53.7
Mining	130	22	16.9
Construction	1,064	116	10.9
Manufacturing	2,732	1,970	72.1
Service-producing	3,058	1,378	45.1
Transportation and public utilities	1,880	1,198	63.7
Wholesale and retail trade	648	78	12.0
Finance, insurance, and real estate	119	55	46.2
Other services	411	47	11.4
State and local government	2,149	39	1.8
Total	9,130	3,524	38.6
Addenda:			
Manufacturing	2,732	1,970	72.1
Nonagricultural nonmanufacturing	6,398	1,554	24.3
Private nonagricultural nonmanufacturing	4,249	1,515	35.7

*Contracts covering 1,000 workers or more. Data relate to information available in late 1985. Excluded are 655,000 major contract postal workers, all of whom have COLA coverage, and an unspecified number of major contract nonpostal federal workers, none of whom have COLA coverage. Due to rounding, sums of individual items may not equal totals.

Source: Derived from David J. Schlein, Phyllis I. Brown, and Fehmida Sleemi, "Collective Bargaining During 1986: Pressures to Curb Costs Remain," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1986, Table 7, p. 31.

cent coverage. Among nonmanufacturing industries, the anthracite mining and railroad transportation industries had more than 90 percent coverage, while the bituminous coal industry and several wholesale and retail trade industries had less than 10 percent coverage.⁴ Not only does coverage vary among industries at any one time but also within industries over time. Several industries have seen sharp declines in recent years, the subject of the next section.

While 50 percent of all major contract private workers were covered by a COLA last year, COLA's appeared in only 30 percent of the contracts. The explanation for this is that large groups

⁴ Prevalence of COLA's among major contract private workers by two-digit SIC industry code has been published by the BLS since 1974. A complete table is available from the author upon request.

of workers are covered under national contracts with large companies.⁵ A related point is the concentration of COLA's in certain unions. In 1982, for example, five unions accounted for 57 percent of the major contract workers with COLA's. These were the United Autoworkers, the United Steelworkers, the Communication Workers, the Teamsters, and the Machinists.

Features

COLA's vary considerably from contract to contract. Formulas differ, limitations differ, the number of reviews differ, and price indexes differ, with the result that a typical COLA does not exist.

With regard to the adjustment formula, the most common type last year granted a 1 cent hourly wage increase for each 0.3 point increase in the Consumer Price Index (CPI). Other common formulas granted a 1 cent wage increase for each 0.26 point increase in the CPI or a 1 cent increase for each 0.175 percent increase in the CPI. Some formulas also permitted wages to be adjusted downward in the event the price level fell, an occurrence not uncommon in the past year or so.⁶

Many COLA's imposed limitations on these formulas. "Caps," which prevent COLA increases from exceeding a certain maximum level, are common. So are "triggers" and "corridors," the former specifying minimum CPI changes necessary before COLA's are activated, the latter specifying limited CPI ranges in which COLA's are allowed to operate.

Frequency of review and the reference price index also vary from contract to contract. At the

beginning of this year, roughly 40 percent of workers had COLA's calling for annual reviews, another 40 percent called for quarterly reviews, and the remainder called principally for semi-annual reviews. Regarding the price index used, over 90 percent of workers had COLA's tied to the national CPI. Most of the remainder had COLA's tied to the CPI for an individual city.

This variation in the design of individual COLA's generates a wide divergence in inflation protection. Some COLA's offer full protection against price increases, while others offer virtually none at all. The majority fall somewhere in between.

At the aggregate level, since 1968, the Bureau of Labor Statistics has published data on average COLA wage adjustments for all major contract private workers receiving such adjustments. By comparing these adjustments with the rise in prices, it is possible to calculate the overall inflation protection offered by COLA's to these workers. This protection, in percentage terms, has varied from a low of 28 percent in 1969 to a high of 89 percent in 1971. At no time has it equaled 100 percent. Thus, on an average aggregate basis, indexation has only been partial over the last 18 years.⁷

Although COLA protection has not been complete, real earnings of union workers have not plummeted. Wages can increase not only through the operation of COLA's but also through negotiated guaranteed adjustments. Such adjustments, in combination with COLA adjustments, have allowed workers to roughly keep pace with inflation since 1968. Workers have lost purchasing power in some years (for example, in 1973-74 and 1979-80 following large increases in oil prices)

⁵ For example, the Autoworkers' contract with GM covers 350,000 workers and the Communications Workers contract with the "old" AT&T covers 500,000 workers.

⁶ Such formulas typically permit wages to be lowered only to the original base, however, effectively prohibiting first-year adjustments. Lawrence Kahn and David Schlein provided useful discussion on this point.

⁷ Average COLA wage adjustment data are drawn from H.M. Douty, *Cost-of-Living Escalator Clauses and Inflation*, Council on Wage and Price Stability, Washington, D.C., 1975 and various issues of *Current Wage Developments*, BLS. Inflation data refer to fourth-quarter to fourth-quarter changes in the CPI.

but have gained purchasing power in other years. So incomplete COLA protection need not imply declining real earnings.⁸

The decline in union COLA's

COLA coverage among union workers in private industry major contracts has declined since 1977. As indicated in Table 1, the decline has come in terms of both the number of workers covered and the proportion of workers covered. In 1977, 6.0 million workers were covered by a COLA, but by 1986 only 3.5 million were covered. Similarly, in 1977, 61 percent of workers had COLA coverage, but by 1986 only 50 percent had coverage.

Table 1 also reveals that much of the decline in COLA coverage came last year. Seven hundred thousand major contract private workers lost their COLA's in 1985, reducing overall COLA prevalence by a full seven percentage points. COLA coverage is now at its lowest level since the early 1970s.

This decline in union COLA coverage has two fundamental sources: a decline in the number of union employees and an outright elimination of COLA's in contracts covering those employees. As indicated in column (1) of Table 1, the number of union workers in private industry major contracts peaked in 1970, at 10.8 million, and has been declining ever since. The figure is down to 7.0 million this year, representing a decline of 3.8 million workers, or a 35 percent decline in 15 years. The second fundamental source, the elimination of actual COLA's, is reflected in the percentage declines in column (3).

⁸ The average wage data underlying these calculations are for all major contract private workers, not just those receiving COLA adjustments. Data are drawn from H.M. Douthy, *Cost-of-Living...*, and various issues of *Current Wage Developments*. Inflation data refer to fourth-quarter to fourth-quarter changes in the CPI.

Table 3 documents the decline in COLA coverage by industry, showing the change in the number of major contract workers covered from 1977 to 1986 and from 1985 to 1986. Note that available data permit the latter comparison to be extended to state and local government workers. The total change for a given industry is broken down into its two fundamental components: the change due to shifting employment patterns and the change due to COLA eliminations or originations. The first change is the change one would expect given the overall increase or decrease in union employment in that industry. The second change is the actual change over and above the expected change, that is, the "pure" change reflecting COLA eliminations and originations.⁹ For example, of the 118,000 food and kindred product workers who lost their COLA's between 1977 and 1986 (see first row), 76,000 represented declines due to falling union employment in that industry while 42,000 represented declines due to COLA eliminations.

Over the 1977 to 1986 period, 34 industries lost some COLA coverage. Two saw no change and 5 registered gains. On net, 2.5 million workers lost their COLA's. Sixty-nine percent of this decline was attributable to employment shifts while 31 percent was attributable to COLA eliminations.

Thirteen industries lost 50,000 or more COLA workers over the nine year period. Ranked in descending order, they were as follows: (1) motor freight, (2) food stores, (3) transportation equipment, (4) primary metals, (5) nonelectrical machinery, (6) electrical machinery, (7) railroad

⁹ The change attributable to shifting employment patterns is calculated by applying the base year's (1977 or 1985) coverage proportion to the current year's (1986) employment level and then subtracting the resulting "expected" coverage level from the base year's coverage level. The pure change attributable to COLA eliminations and/or originations, in turn, is calculated by subtracting this employment-based change from the actual change.

TABLE 3

Change in COLA coverage by industry, major union contracts, 1977-86 and 1985-86*
(thousands of workers)

Manufacturing Industry	1977-86			1985-86		
	Total	Due to Shifting Employment Patterns	Due to COLA Eliminations/Originations	Total	Due to Shifting Employment Patterns	Due to COLA Eliminations/Originations
	(1)	(2)	(3)	(4)	(5)	(6)
Food and kindred products	-118	-76	-42	-71	-23	-48
Tobacco manufacturing	-9	-10	1	-1	-1	0
Textile mill products	-5	-4	-1	0	0	0
Apparel and other finished products	8	-75	83	-81	8	-89
Lumber and wood products	2	0	2	0	0	0
Furniture and fixtures	-8	-6	-2	-1	0	-1
Paper and allied products	0	0	0	0	0	0
Printing and publishing	-25	-18	-7	-7	-5	-2
Chemicals	-26	-18	-8	-1	-1	0
Petroleum refining	0	0	0	0	0	0
Rubber and plastics	-52	-50	-2	-20	-17	-3
Leather and leather products	-8	-5	-3	0	0	0
Stone, clay, glass, and concrete products	-16	-24	8	-2	-2	0
Primary metals	-236	-219	-17	-22	3	-25
Fabricated metal products	-20	-26	6	-1	-5	4
Nonelectrical machinery	-166	-158	-8	-17	-10	-7
Electrical machinery	-153	-151	-2	-59	-51	-8
Transportation equipment	-276	-258	-18	-59	-58	-1
Instruments and related products	-12	-8	-4	-1	-1	0
Miscellaneous manufacturing industries	-2	-2	0	-1	0	-1

Sources: Author's calculations (see footnote 9) derived from Douglas LeRoy, "Schedule Wage Increases and Escalator Provisions in 1977," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1977, Table 4, p. 24; Joan D. Borum and David J. Schlein, "Bargaining Activity Light in Private Industry in 1985," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1985, Table 7, p. 24; and David J. Schlein, Phyllis I. Brown, and Fehmida Sleemi, "Collective Bargaining During 1986: Pressures to Curb Costs Remain," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1986, Table 7, p. 31.

Nonmanufacturing Industry	1977-86			1985-86		
	Total (1)	Due to Shifting Employment Patterns (2)	Due to COLA Eliminations/ Originations (3)	Total (4)	Due to Shifting Employment Patterns (5)	Due to to COLA Eliminations/ Originations (6)
Metal mining	-28	-25	-3	0	-1	1
Anthracite mining	-1	-1	0	0	0	0
Bituminous coal and lignite mining	-120	-15	-105	0	0	0
Building construction	10	-12	22	-1	-1	0
Nonbuilding construction	-23	-25	2	-9	-2	-7
Special construction	-45	-25	-20	-2	-1	-1
Railroad transportation	-123	-94	-29	-45	-16	-29
Local and urban transit	-99	-92	-7	-4	1	-5
Motor freight	-411	-251	-160	-315	-149	-166
Water transportation	-4	-6	2	2	-3	5
Transportation by air	-85	6	-91	-3	0	-3
Communications	-76	-44	-32	-1	-4	3
Electric, gas, and sanitation	8	1	7	-3	-1	-2
Wholesale trade—durables	—	—	—	0	0	0
Wholesale trade— nondurables	—	—	—	-1	-1	0
Retail trade—general	-9	-8	-1	2	0	2
Food stores	-363	-59	-304	1	2	-1
Automotive dealers and service stations	-6	-4	-2	0	0	0
Apparel and accessory stores	-2	-1	-1	0	0	0
Eating and drinking places	-3	-2	-1	0	0	0
Miscellaneous retail stores	-2	-2	0	0	-1	1
Finance, insurance, real estate	1	25	-24	9	10	-1
Services	-13	11	-24	1	1	0
State and Local Government	—	—	—	-8	2	-10
TOTAL	-2,516	-1,731	-785	-721	-327	-394

* Contracts covering 1,000 workers or more.

Note: Dashes represent unavailable data.

transportation, (8) bituminous coal, (9) food and kindred products, (10) local and urban transport, (11) transportation by air, (12) communications, and (13) rubber and plastics. For five of these industries (transportation equipment, primary metals, nonelectrical machinery, electrical machinery, local and urban transport) the decline was overwhelmingly employment-based, for another five (motor freight, railroad transportation, food and kindred products, communications, rubber and plastics) it was primarily employment-based, for two (food stores, bituminous coal) it was primarily a pure COLA loss, and for one (transportation by air) it was overwhelmingly a pure loss.

As already noted, a significant portion of the 1977-86 decline in COLA coverage occurred last year. Overall, 26 industries lost some COLA coverage in 1985 while 13 saw no change and five registered gains. Of the 20 manufacturing industries, 15 lost some coverage, five saw no change, and none gained. The total net loss in COLA coverage last year was 721,000 workers, with 55 percent of that attributable to pure COLA eliminations. So while a majority of the COLA decline over the entire 1977-86 period has been employment-based, a majority last year was due to pure COLA givebacks. The large seven percentage point decline in column (3) of Table 1 tells the same story.

The industries hardest hit last year, again ranked in descending order, were as follows: (1) motor freight, (2) apparel, (3) food and kindred products, (4) electrical machinery equipment and transportation equipment (tie), (5) railroad transportation, (6) primary metals, and (7) rubber and plastics. The decline in the transportation equipment industry was overwhelmingly employment-based, the declines in the electrical machinery and rubber and plastics industries were primarily employment-based, the declines in the motor freight, railroad transportation, and food and kindred products industries were primarily

pure COLA losses, and the declines in the primary metals and apparel industries were overwhelmingly pure COLA losses.

Possible explanations for the decline

Why the decline in COLA coverage? Or more to the point, given the two fundamental sources, why the decline in the number of union employees and why the decline in COLA's among those employees?

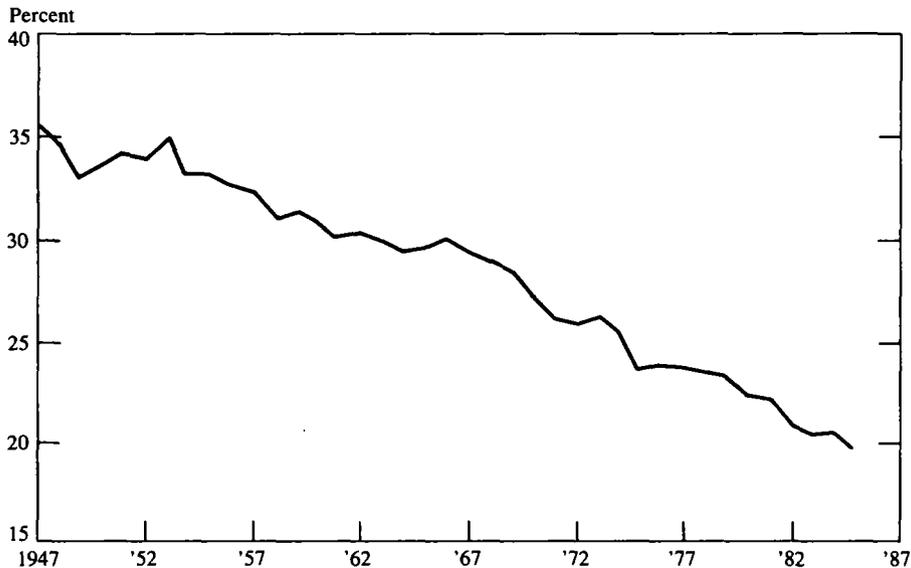
The answer to the first part of the question is at least partially clear. Union employment has declined in part because employment has shifted out of manufacturing industries into nonmanufacturing industries. As shown in Chart 1, manufacturing's share of total employment in the United States has declined steadily over the postwar period, from roughly 34 percent in the late 1940s and early 1950s to under 20 percent in 1985. Since union presence is greater in manufacturing than in nonmanufacturing—a point made in Table 4—a reduction in manufacturing's importance would be expected to depress union employment growth. Such sectoral shifts have apparently played a major role in the COLA declines in the transportation equipment, primary metals, nonelectrical machinery, electrical machinery, and rubber and plastics industries, manufacturing industries that, as noted above, have had predominantly employment-based COLA losses.¹⁰

But the move out of manufacturing is not the entire explanation for unions' dwindling size. Even within manufacturing, unions have lost ground. As shown in Table 4, unions' share of employment in manufacturing has declined three percentage points over the past two years alone. And vir-

¹⁰ This shift out of manufacturing has by no means been completely exogenous—several of these industries have suffered employment losses in part because of cost pressures associated with increased foreign competition. A question that arises is whether more pure COLA losses in some of these industries might not have resulted in fewer employment-based losses.

CHART 1

Manufacturing employment as a percentage of total nonagricultural employment



Source: Nonagricultural payroll employment, establishment survey, U.S. Department of Labor, Bureau of Labor Statistics.

tually every other industry group has seen declines as well. Union membership as a percentage of total nonagricultural employment has fallen below 20 percent, its lowest level in 50 years (see Chart 2).

The second part of the question, why the outright elimination of COLA's in union contracts, has many possible answers. These include the disinflation of the 1980s, the recessions of the 1980s, and heightened domestic and foreign competition.

The sharp inflation decline of the past few years is undoubtedly one contributing factor to the elimination of COLA's. As documented in Table 1, inflation accelerated through the 1970s, reaching over 13 percent at decade's close. Since then, however, inflation has declined dramatically, dropping to under 4 percent. And just as important as the low level itself is the fact that this level has been sustained for four years now. Theoretical

models suggest that it is not the inflation level per se that influences the desire to have COLA protection but rather uncertainty over that inflation level. The more predictable inflation is, the more comfortable workers are in abandoning their COLA's, confident that they can protect their real earnings with negotiated first year and deferred wage increases. Lower, more stable inflation has led to COLA eliminations before, for example, after the Korean War, and probably has been a factor this time as well.¹¹

¹¹ Inflation's role in promoting COLA's is modeled by Jo Anna Gray in her influential article, "On Indexation and Contract Length," *Journal of Political Economy*, February 1978, pp. 1-18. Empirical studies examining the issue include Hendricks and Kahn, *Wage Indexation...*, pp. 159-170, and Stephen G. Cecchetti, "Indexation and Incomes Policy: A Study of Wage Adjustment in Unionized Manufacturing," *Journal of Labor Economics*, forthcoming.

TABLE 4
Union presence by broad industry group, 1983-85
 (percent of employees belonging to unions)*

<u>Industry Group</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Private nonagricultural	16.8	15.5	14.6
Goods-producing	27.5	25.3	24.1
Mining	20.7	17.7	17.3
Construction	27.5	23.5	22.3
Manufacturing	27.8	26.0	24.8
Service-producing	11.3	10.5	9.8
Transportation and public utilities	42.4	38.7	37.0
Wholesale and retail trade	8.7	7.9	7.2
Finance, insurance, and real estate	2.9	2.7	2.9
Other services	7.7	7.3	6.6
Agricultural	3.4	2.6	2.1
Government	36.7	35.8	35.8
Total	20.1	18.8	18.0
Addenda:			
Manufacturing	27.8	26.0	24.8
Nonmanufacturing	17.9	16.8	16.1
Nonagricultural nonmanufacturing	18.2	17.1	16.4
Private nonagricultural nonmanufacturing	12.7	11.7	10.9

*Or employee associations similar to unions.

Sources: Derived from *Employment and Earnings*, U.S. Department of Labor, Bureau of Labor Statistics, January 1985, Table 53, p. 209; and *Employment and Earnings*, U.S. Department of Labor, Bureau of Labor Statistics, January 1986, Table 58, p. 214.

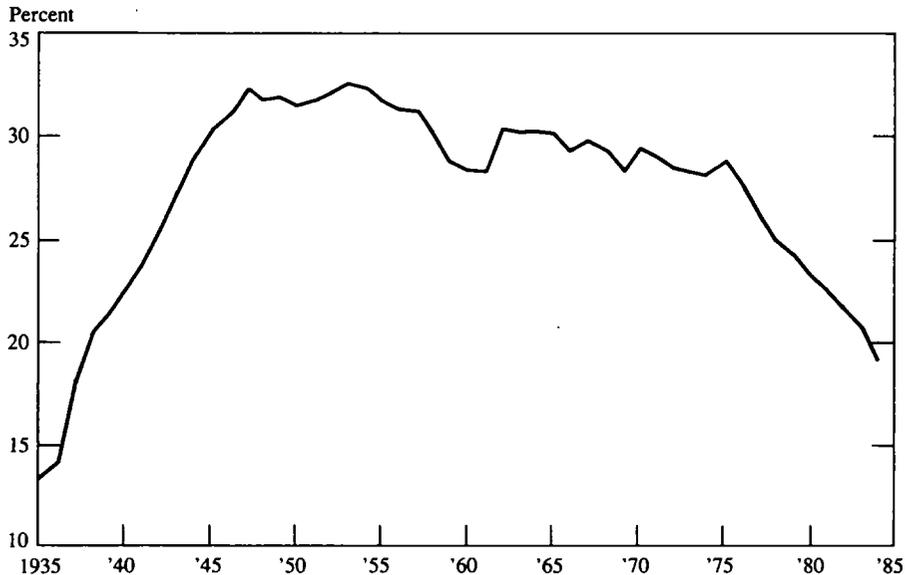
A second possible explanation for the pure decline in COLA's relates to the dual recessions of the early 1980s. The U.S. economy experienced a brief recession in 1980 and a much more serious recession in 1981 and 1982. Sales fell, production fell, and workers were laid off, putting considerable pressure on workers to lower their wage demands. Although it is possible some COLA's were dropped in response to this recessionary environment, it must be remembered that the largest pure decline in COLA's came last year, when the economy was in its third year of expansion. Rather

than reflecting general business cycle developments, the pure decline in COLA's can more often be traced to developments in individual industries.

Increased cost pressures stemming from heightened domestic and foreign competition in a multitude of industries is the third principal explanation for the pure decline in union COLA's. Deregulation and inroads by nonunion firms have forced unions in several industries to take a hard look at their compensation packages, including COLA's. Increased foreign competition, fueled by

CHART 2

Union membership as a percentage of total nonagricultural employment



Source: Leo Troy and Neil Sheflin, *Union Sourcebook*, Industrial Relations Data and Information Services, West Orange, N.J., Appendix A. Union membership includes members of employee associations.

a strong dollar, has forced unions in other industries to do the same. Job security has emerged as a key union goal, and COLA's have increasingly been seen as expendable in negotiating that security.

Several of the industries noted earlier that have experienced the largest pure COLA declines fall into these categories. Retail food stores and the meat packing industry (the latter included in the food and kindred products industry) have had to face serious inroads from nonunion firms in recent years; both have had large pure COLA declines. Similarly, the airline industry (transportation by air) and the trucking industry (motor freight) have had to contend with deregulation, and they, too, have had significant pure COLA declines. Among those industries facing stiffening foreign competition, the apparel industry has recently seen substantial pure COLA declines.¹²

This is not to say that workers have not been reluctant to eliminate their COLA's. On the contrary, outright elimination of COLA's has been one of the last chips on the bargaining table. Various concessions have been made in pressured industries for several years now, including concessions making COLA's less lucrative and concessions deferring or even suspending COLA

¹² The pure COLA losses experienced in these industries are consistent with the predictions of theoretical models that link diminished COLA prevalence to increased relative price variability. Nonunion inroads, deregulation, and foreign competition might all be expected to lead to more volatile product prices. For a theoretical discussion of the effects of relative price variability (or more generally, of industry-specific shock variability), see Jo Anna Gray, "On Indexation...", and Alan S. Blinder, "Indexing the Economy Through Financial Intermediation," in *Stabilization of the Domestic and International Economy*, Carnegie-Rochester Conference Series on Public Policy, vol. 5, 1977, pp. 69-106.

payments entirely.¹³ But the outright elimination of COLA's from contracts has only accelerated in the last year or so. Continued progress against inflation has no doubt made such a concession more palatable.

Consequences of the decline

Economywide effects

In theory, a COLA reduction could have a major impact on aggregate wages and aggregate employment. Whether that impact would be beneficial or detrimental depends on the primary source of general price movements.¹⁴

To the extent that general price movements emanate from the demand side, reflecting increased or decreased aggregate spending, wage indexation is desirable and so any reduction in COLA's is regrettable. Indexation is desirable in the sense that it insulates the economy from these

purely nominal disturbances, preventing unwanted deviations in employment.

To see this point, consider first an increase in aggregate spending that causes prices to rise throughout the economy (i.e., inflation). With indexation, wages will rise as well. Assuming this indexation is complete, workers will be no better or no worse off than before because their real wages—after accounting for the increase in general prices—will be unchanged. Similarly, firms will be no better or no worse off because, although they are now paying their workers higher wages, their product prices will have presumably risen as well, leaving their real wage—after accounting for the increase in product prices—unchanged. Firms will demand the same amount of labor and workers will willingly supply that amount.

In the absence of indexation, though, the situation is much different. Real wages as perceived by workers will decline as general prices rise but their wages do not. Similarly, real wages as perceived by firms will decline as their product prices increase but their wage payments to workers do not. Workers will become cheaper to firms, and firms will consequently demand more labor. Assuming workers are contractually bound to provide that labor, workers will be supplying more labor than they really want to at their prevailing real wage, causing an undesired increase in employment.¹⁵

A comparable situation will hold when aggregate spending decreases, causing prices throughout the economy to rise less rapidly (i.e., disinflation) or even to fall (i.e., deflation). If wages are indexed, the economy will again be insulated, with no undesired employment fluctuations. But if wages are not indexed, real wages (as perceived by both workers and firms) will rise, labor demand will fall, and employment will fall.

¹³ For a discussion of earlier concessions, see Robert S. Gay, "Union Settlements and Aggregate Wage Behavior in the 1980's," *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, December 1984, pp. 843-856, and Daniel J.B. Mitchell, "Shifting Norms in Wage Determination," *Brookings Papers on Economic Activity*, 1985:2, pp. 575-608. For a discussion of settlements in 1985, see George Ruben, "Labor and Management Continue to Combat Mutual Problems in 1985," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, January 1986, pp. 3-15; and Joan Borum and James Conley, "Wage Restraints Continue in 1985 Major Contracts," *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics, April 1986, pp. 22-28.

¹⁴ A rich literature exists on this issue, including Milton Friedman, "Monetary Correction," in *Essays on Inflation and Indexation*, edited by H. Giersch, American Enterprise Institute, Washington, D.C., 1974, pp. 25-61; Jo Anna Gray, "Wage Indexation: A Macroeconomic Approach," *Journal of Monetary Economics*, April 1976, pp. 221-235; Stanley Fischer, "Wage Indexation and Macroeconomic Stability," in *Stabilization of the Domestic and International Economy*, Carnegie-Rochester Conference Series on Public Policy, vol. 5, 1977, pp. 107-147; and Robert J. Gordon, "Alternative Responses of Policy to External Supply Shocks," *Brookings Papers on Economic Activity*, 1975:1, pp. 183-205.

¹⁵ Following Gray, "Wage Indexation..." it is assumed here that employment is demand-determined, a reasonable assumption for unionized U.S. labor markets.

Unlike the indexed case, price declines will not be automatically transmitted into wage declines and, as a result, unemployment will increase.

Wage indexation is thus beneficial when the economy is subjected to demand disturbances. But exactly the opposite is true when the economy is subjected to supply disturbances. To the extent that general price movements emanate from the supply side—for example, from oil price shocks, crop failures, or productivity shifts—wage indexation is not desirable and so any COLA reduction is to be welcomed.

To see this, consider a hypothetical oil embargo that forces the price of oil much higher. General price indexes like the CPI will register gains and, with indexation, wages will rise accordingly. As a result, real wages as perceived by workers will be unchanged. But real wages as perceived by firms will be higher because firms will be paying higher wages to their workers even though their product prices will not have risen. Labor will thus become more expensive, and firms will respond by reducing their demand for that labor, causing a decrease in employment and an increase in unemployment. Similarly, a positive supply shock, that is, one that lowers the price level, will lead to an undesired increase in employment. So while wage indexation insulates an economy from demand disturbance, it leaves it more vulnerable to supply disturbances, making judgments on the desirability of COLA reductions theoretically ambiguous.

With regard to the decline in union COLA's, however, this is really a moot point. Any economywide impact this decline has is likely to be small given the small size of the union sector. As noted earlier, less than 20 percent of the total U.S. work force is unionized and less than 40 percent of the unionized work force—private plus government—have COLA coverage.¹⁶ And among the 40 percent or so that have coverage, protection is incomplete. Studies suggest that COLA's have had only a limited effect on U.S. aggregate

wage movements, so any decline in these COLA's can be expected to have a similar limited effect.

A recent study based on 1980 data, for example, estimates that only 10 percent of general price movements are passed on to aggregate wages through COLA's, that is, the overall impact of COLA's is quite limited.¹⁷ Similarly, an earlier study for 1957 to 1973 estimates that, even after allowing for possible spillover effects into non-COLA sectors, the response of COLA-related wage movements to overall price movements is no more than 31 percent and may be as small as 5 percent.¹⁸ In an economy such as Israel's, where COLA's are nearly universal and COLA responsiveness is perhaps near 100 percent, a reduction in COLA's could have a major impact.¹⁹ But in the United States it will not.

The reduction in union COLA's could also in theory lead to more strike activity. There are two channels through which more strikes might occur. First, contracts could become shorter as COLA's

¹⁶ Strictly speaking, this 40 percent figure applies to a subset of major contract workers only, as explained in note 3. When postal workers and estimates for major and nonmajor contract nonpostal federal workers and nonmajor contract state and local workers are included as well, true COLA coverage in the total union sector is probably even lower.

¹⁷ Wayne Vroman, "Cost-of-Living Escalators and Price-Wage Linkages in the U.S. Economy, 1968-80," *Industrial and Labor Relations Review*, January 1985, pp. 225-235.

¹⁸ Lawrence M. Kahn, "Wage Indexation and Wage Inflation in the U.S.," unpublished manuscript, University of Illinois, reported in Hendricks and Kahn, *Wage Indexation...*, p. 125. In fact, consideration of possible spillover effects imparts an upward bias since the focus of attention conceptually is the effect of automatic wage adjustments, not discretionary adjustments that might result from automatic adjustments.

¹⁹ Assaf Razin and Judith Lusky, in "Partial Wage Indexation: An Empirical Test," *International Economic Review*, June 1979, pp. 485-494, estimate that Israeli COLA responsiveness over the years 1956 to 1975 was between 86 and 112 percent. For further discussion of wage indexation in Israel, see Alex Cukierman, "General Wage Escalator Clauses and the Inflation Unemployment Trade Off," *Economic Inquiry*, January 1977, pp. 67-84.

were eliminated, resulting in more frequent negotiations and therefore more frequent opportunities for strikes. There is ample evidence that non-COLA contracts do tend to be of shorter duration.²⁰ Second, COLA-less workers could be expected to be less conciliatory at bargaining time to the extent that unanticipated inflation occurred, lowering their real earnings.

But there are theoretical counterarguments as well. It can be argued that the longer contracts made possible by COLA's actually increase the probability of strike because worker grievances build up over a longer time. And in a disinflationary environment, workers with COLA's could become less conciliatory at bargaining time to the extent that they experienced lower real earnings gains than their COLA-less counterparts.²¹

Little empirical work has been done on the relationship between COLA's and strike activity. One study that was recently completed found that COLA's with caps tend to be associated with more strike activity while COLA's without caps tend to be associated with less strike activity.²² This suggests that the recent decline in union COLA's could conceivably alter strike activity, with the direction of impact depending on whether the lost COLA's were predominantly capped or not. Of course, with both types of losses occurring, any net impact would be dampened.

²⁰ According to a BLS study of 1,550 major contracts in force on January 1, 1980, 12.0 percent of contracts of duration two years or less had COLA's while 55.8 percent of contracts of duration greater than two years had COLA's. Similarly, Hendricks and Kahn, examining 1966-81 data covering both major and non-major contracts (see note 2), report that contracts with COLA's were on average four to five months longer than contracts without COLA's, in *Wage Indexation...*, Table 3-6, p. 90.

²¹ For further discussion of the possible effects of COLA's on strike activity, see Hendricks and Kahn, *Wage Indexation...*, pp. 126-127, 221-237, as well as Bruce Kaufman, "Bargaining Theory, Inflation, and Cyclical Strike Activity," *Industrial and Labor Relations Review*, April 1981, pp. 333-335, and Martin Mauro, "Strikes as a Result of Imperfect Information," *Industrial and Labor Relations Review*, July 1982, pp. 522-538.

Industry effects

Although the reduction in union COLA's will likely have only a limited effect on the overall economy, it could have a significant effect at the industry level. COLA eliminations potentially reduce labor costs and certainly reduce labor cost uncertainty, permitting industries and firms to more effectively meet domestic and foreign competition. As previously noted, such a response is evident in several industries.

Last year, for example, 101,000 workers in the cotton garment industry gave back their COLA's, reversing a decade-long rise in COLA coverage in the apparel industry. Why the giveback? Presumably to help management counter massive foreign inflows. Similarly, last year 150,000 workers in the trucking industry gave back their COLA's. Why? Presumably to help management counter heightened nonunion competition stemming from 1980's Motor Carrier Act deregulation. Other workers in other industries—for example, the airline industry, the meat-packing industry, and the retail food store industry—have faced similar challenges and responded in a similar way.

It will be interesting to see if this trend continues. Large segments of the aluminum and steel industries negotiate this year. Will workers in these industries, hard pressed by foreign competition, be willing to give up their COLA's? The communications industry also bargains this year, with former Bell System employees negotiating separate contracts for the first time. Will workers in this industry, facing a newly deregulated environment, be willing to give up their COLA's? Workers and firms are searching for ways to compete more effectively, and COLA's are increasingly becoming a negotiable item.²³

²² Hendricks and Kahn, *Wage Indexation...*, pp. 221-237.

²³ As this article goes to press, COLA preservation has indeed emerged as an issue in the aluminum, steel, and telephone negotiations.

Summary

COLA's protect workers from unexpected price changes. At the same time, they make firms' labor costs more uncertain. COLA's are not that common economywide, but they are common in the union sector. In the past, as many as 60 percent of major contract private workers have had COLA coverage.

Since peaking in the late 1970s, however, COLA prevalence in the union sector has been declining, both in terms of the number of workers covered and in the proportion of workers covered. The decline last year was particularly sharp. And some industries have experienced sharper declines than

others. Disinflation, recession, deregulation, and dollar appreciation have probably all played a role in reducing the prevalence of COLA's.

In theory, a reduction in COLA's could have a large impact on an economy. Prices would be transmitted to wages at a reduced pace, with implications for both aggregate wages and aggregate employment. In the present case, however, the decline in COLA's is likely to have only a small impact because of the small and dwindling size of the union sector in the United States. Nevertheless, the decline in union COLA's could have a significant impact at the industry and firm level, allowing businesses to better cope with heightened domestic and foreign competition.

Deposit Deregulation, Credit Availability, and Monetary Policy

By William R. Keeton

In April of this year, the removal of the ceiling on passbook savings accounts completed the substantial deregulation of deposit rates that began in 1978. Concerns are sometimes voiced that deposit deregulation will significantly weaken monetary policy and raise the general level of interest rates. When deposit rates were subject to ceilings, monetary policy affected private spending partly through changes in open market interest rates and partly through changes in the availability of credit from commercial banks and thrifts. According to some economists, the removal of ceilings will greatly reduce the importance of credit availability as a channel of monetary policy. As a result, during times of strong demand, open market interest rates may need to rise to much higher levels than before to restrain the economy and prevent inflation from accelerating.

Economists who fear that deposit deregulation will weaken monetary policy give three reasons for believing that deposit rate ceilings gave rise

to significant availability effects. First, they argue that deposit rate ceilings prevented banks and thrifts from obtaining funds in periods of tight money, forcing them to sharply reduce the supply of credit. Second, they claim that banks and thrifts rationed credit partly through adjustments in non-price lending terms during such periods, causing total lending to fall significantly more than if they had merely raised their loan rates. Finally, it is claimed that these reductions in bank and thrift credit led to large declines in private spending because the nonfungibility of credit prevented borrowers from substituting alternative means of financing.

This article examines the theoretical and empirical evidence on the implications of deposit deregulation for availability effects. The article first reviews the various channels of monetary policy and explains how monetary policy affects the availability of bank credit. It then examines the three key links in the credit availability argument—the effect of deposit rate ceilings on the supply of bank and thrift credit, the propensity of banks and thrifts to ration credit by non-price means, and the nonfungibility of credit. The

William R. Keeton is a senior economist at the Federal Reserve Bank of Kansas City. Katherine Hecht, a research associate at the bank, provided research assistance.

article concludes that deposit deregulation will reduce availability effects but will not reduce them enough to significantly weaken monetary policy.

Monetary policy and availability effects

The channels of monetary policy

The transmission mechanism of monetary policy begins with changes in the rate of return on open market securities. Expansionary monetary policy reduces the rate of return on open market securities while restrictive policy increases the rate of return. These changes in open market rates lead eventually to changes in private spending. Exactly how that happens is a matter of some controversy, but four possible channels can be identified.

Changes in the open market rates may affect the amount of funds that commercial banks and thrifts have available to lend their customers.

The first channel is the cost of open market credit. Changes in open market rates alter the cost to businesses of borrowing in the open market to finance their investment in plant and equipment. Changes in open market rates also alter the opportunity cost to businesses and households of spending their accumulated wealth rather than holding it in open market securities.

The second channel of monetary policy is the wealth effect. Changes in open market rates lead to capital gains or losses on households' outstanding holdings of government securities, corporate bonds, and corporate stock. By altering the need to save for the future, such changes in wealth may raise or lower households' desire to consume in the present.

The third channel of monetary policy is the exchange rate effect. Any changes in U.S. interest rates that are not matched abroad will tend to alter

the value of the dollar relative to foreign currencies. A change in the value of the dollar may raise or lower the amount spent on U.S. goods and services by altering the cost of these goods and services relative to the cost of foreign goods and services.

The last channel of monetary policy is the availability effect. Changes in open market rates may increase or decrease the amount of funds that commercial banks and thrifts have available to lend their customers. One way decreases in lending may be achieved is through increases in loan rates that discourage borrowing. The other way is through credit rationing, the use of nonprice terms to shut marginal borrowers out of the market. Either way, borrowers who lack alternative means of financing may be forced to reduce their spending.

Economists who believe that deposit deregulation has reduced the effectiveness of monetary policy argue that the availability effects used to be very important but have become much less so now that deposit rate ceilings have been removed. If this argument is correct, a higher level of open market rates will now be required to achieve any given degree of restraint on the economy.¹

Availability effects: a closer look

To determine whether deposit deregulation will diminish availability effects, it is necessary to identify the various factors influencing the magnitude of those effects. These factors can be identified by examining the impact of a tight monetary policy on the market for bank loans under alternative

¹ See, for example, Albert M. Wojnilower, "The Central Role of Credit Crunches in Recent Financial History," *Brookings Papers on Economic Activity*, 1980:2; Richard G. Davis, "Credit Market Restraints and the Functioning of Monetary Policy," Research Paper No. 8015, Federal Reserve Bank of New York, September 1980; and Raymond E. Lombra, "The Changing Role of Real and Nominal Interest Rates," *Economic Review*, Federal Reserve Bank of Kansas City, February 1984.

assumptions about deposit rate ceilings and credit rationing.

Figure 1 shows how tight monetary policy affects the cost and availability of bank credit in three separate cases—the case of no deposit rate ceilings and no credit rationing, the case of deposit rate ceilings but no credit rationing, and the case of both deposit rate ceilings and credit rationing. In each panel, total bank lending is measured on the horizontal axis and the expected rate of return on bank loans on the vertical axis.² The expected rate of return on bank loans can increase in two ways, through higher loan rates or through stricter nonprice terms that reduce the risk of default. For convenience, Figure 1 assumes that banks do not care what mix of interest rates and nonprice terms is used to achieve any given expected rate of return.

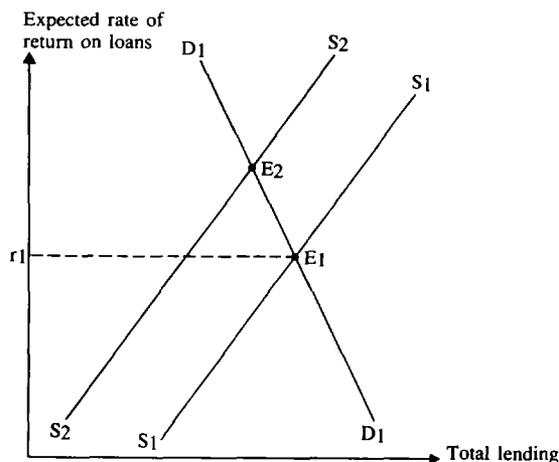
The supply curve SS shows how much banks would like to lend at each expected rate of return on loans, given the rate of return on open market securities. As the expected rate of return on loans increases, the supply of loans increases for two reasons. First, banks may be willing to invest a higher proportion of their available funds in loans rather than open market securities. And second, banks may be willing to pay higher rates on deposits and other liabilities, increasing the total volume of available funds.

The demand curve DD shows how much businesses and households would like to borrow from banks at each expected rate of return on loans. As the rate of return on loans increases, the demand for loans decreases for two reasons. First, higher rates may make bank credit less attractive to borrowers than other methods of financing expenditures, such as borrowing in the open

² The expected rate of return on bank loans is a weighted sum of all possible rates of return to the bank, with each possible rate of return weighted by its probability of occurrence. As long as there is some chance of default, the expected rate of return on a loan will be less than the loan rate.

FIGURE 1
Impact of tight money on the loan market

a. No deposit rate ceilings and no credit rationing

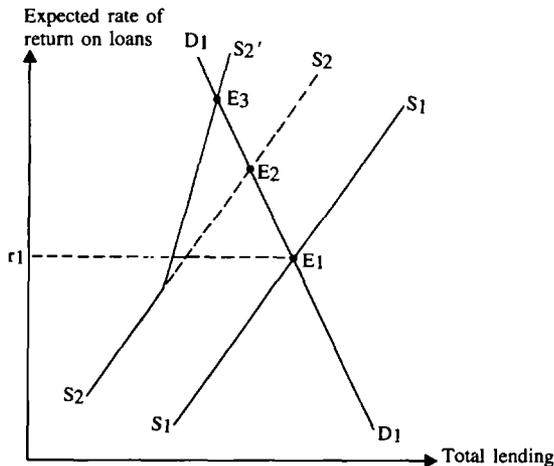


market or drawing down liquid assets. Also, as rates increase, borrowers may reduce their planned spending, decreasing the demand for bank credit indirectly.

Figure 1a shows how a tighter monetary policy will affect the market for bank loans if there is no ceiling on deposit rates and no possibility of credit rationing. The main effect of a tighter monetary policy is to cause a leftward shift in the supply curve, SS. As monetary policy is tightened, open market interest rates will rise, making bank deposits less attractive to the public and loans less attractive to banks. Thus, as long as the expected rate of return on loans remains unchanged, the total amount banks are willing to lend will decline, shifting the supply curve from S₁S₁ to S₂S₂.³

³ The increase in open market rates could also shift out the demand curve, DD, by making it less attractive to businesses and households to borrow in the open market. Provided the leftward shift in SS exceeds the rightward shift in DD, nothing is lost by ignoring this possibility.

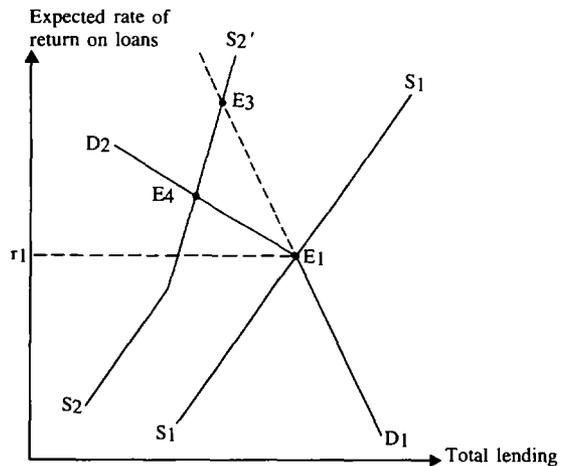
b. Deposit rate ceilings but no credit rationing



The leftward shift in the supply curve caused by tighter monetary policy will lead to a reduction in total bank lending. At the initial expected rate of return, r_1 , borrowers will desire more credit than banks are willing to supply. Thus, borrowers will bid up the expected rate of return on loans and banks will move up their new supply curve, raising their deposit rates to attract more funds and allocating a greater proportion of their available funds to bank loans. This process will continue until the excess demand for loans is completely eliminated. In Figure 1a, the new market equilibrium will occur at E_2 , with a higher rate of return on loans and a lower level of lending.

Figure 1b demonstrates that the same tightening of monetary policy will cause a greater decline in bank lending if ceilings prevent banks from raising their deposit rates. In this case, the supply curve will shift from S_1S_1 to S_2S_2' . As borrowers bid the expected rate of return on loans above r_1 , banks will still want to increase their lend-

c. Both deposit rate ceilings and credit rationing



ing and move up their new supply curve. However, because banks can no longer attract additional funds by raising deposit rates, the only way they will be able to increase their lending is by substituting loans for holdings of open market securities or borrowing in the open market. As a result, increases in the expected rate of return on loans will induce smaller increases in loan supply than when deposit rates are completely free of ceilings.⁴ Instead of shifting to point E_2 , the market equilibrium will shift all the way to E_3 .

Finally, Figure 1c shows that the tighter monetary policy will lead to a still greater decline in lending if there is not only a ceiling on the deposit rate but a market imperfection that

⁴ The kink in the supply curve occurs at the point where the deposit rate ceiling is just binding, the point where banks would be just content with their initial deposit rates. This point will be below r_1 because banks would want to raise their deposit rates at r_1 and attract more funds to invest in open market securities.

prevents banks from increasing their loan rates. As before, the shift in the supply curve will produce an excess demand for credit at the initial expected rate of return, r_1 . By assumption, however, banks will now be unable to raise their expected rate of return on loans by charging higher loan rates. Instead, the only way for banks to raise the expected rate of return on loans will be to alter nonprice lending terms in such a way as to reduce the risk of default, e.g., by increasing collateral requirements or tightening credit standards.

Any tendency for banks to ration credit by tightening their nonprice requirements would reinforce availability effects by causing more borrowers to go without credit.

Although banks will still be able to move up their new supply curve by tightening their nonprice terms, the effective demand for loans on the part of borrowers will fall more rapidly than if banks raised their loan rates. Some borrowers who would like to receive credit at the prevailing terms will be forced to drop out of the market because they cannot meet banks' stiffer nonprice requirements. Other borrowers who would have been willing to pay higher loan rates to continue receiving credit will voluntarily drop out of the market rather than meet the stricter nonprice terms. Borrowers' effective demand for loans is now represented by a curve such as D_1D_2 , which lies to the left of the original demand curve at all rates higher than r_1 . Thus, instead of shifting from E_1 to E_3 , the market equilibrium will shift all the way to E_4 . In other words, a tightening of monetary policy will produce an even greater decline in bank lending than in the previous case.

With the help of Figure 1, it is now possible to identify three important issues that must be resolved to determine if deposit deregulation will decrease the magnitude of availability effects.

First, to what extent did deposit rate ceilings make banks and thrifts more reluctant to supply credit to their borrowers during periods of tight money? In terms of Figure 1, how much farther to the left did deposit rate ceilings cause the supply curve SS to shift when open market rates rose and how much steeper did the curve become?

Second, to what extent were banks unable or unwilling to raise their loan rates during periods of tight money, causing them to ration credit by nonprice means? In terms of Figure 1, did borrowers move up the demand curve D_1D_1 shown in Figure 1b or the flatter demand curve D_1D_2 shown in Figure 1c? Although monetary policy could have significant availability effects even if the loan market always cleared, any tendency for banks to ration credit by tightening their nonprice requirements would reinforce those effects by causing even more borrowers to go without credit. The more unresponsive borrowers' demand for credit is to increases in loan rates, the more important will be the role played by credit rationing.

Finally, to what extent were bank and thrift borrowers able to maintain their spending during periods of tight money by substituting alternative sources of funds? That is, to what extent was credit fungible? In terms of Figure 1, it is not enough that borrowers be pushed up the demand curve D_1D_1 or D_1D_2 as open market rates rise. For monetary policy to have availability effects, the movement up the demand curve must reflect some decrease in planned spending and not just the replacement of bank credit by alternative means of financing.

Did ceilings reduce the supply of bank and thrift credit?

The impact of deposit rate ceilings on the supply of bank and thrift credit depends on two factors. One is the severity of disintermediation under deposit rate ceilings and the ability of banks and thrifts to make up for disintermediation by tap-

ping alternative sources of funds. The other factor is whether disintermediation would occur even in the absence of ceilings due to deposit rate sluggishness.

Deposit rate ceilings and disintermediation

Deposit rate ceilings were imposed on commercial banks in the 1930s but did not become a serious constraint until the mid-1960s. For the first 20 years, most commercial banks chose to pay relatively low rates on time and savings deposits. But as market rates rose in the late 1950s, commercial banks found it increasingly difficult to finance new lending. The large holdings of government securities they had built up during World War II were running out, corporate customers were becoming more reluctant to hold demand deposits, and thrift institutions were competing more aggressively for savings deposits. Commercial banks responded by raising their deposit rates, eventually bumping up against the ceilings. Once that happened, regulators promptly raised the ceilings, a sequence of events that was repeated several times over the next decade.

During the second half of the 1960s and first half of the 1970s, regulators abandoned the practice of raising deposit rate ceilings as soon as they became binding, giving rise to three separate "credit crunches."⁵ The first crunch came in 1966. As market rates rose to new heights, deposit rate ceilings were not increased because commercial

banks were believed to be outbidding thrifts for deposits. As shown in Chart 1, the failure to raise ceilings did not cause household investment in small time and savings deposits to decline any more in 1966 than it had in 1955 or 1959. However, the low level of ceilings did lead to a sharp drop in sales of large certificates of deposit (CD's), a source of funds that large commercial banks had recently come to rely on. The next credit crunch occurred in 1969-70. That time, market rates exceeded ceilings by an even greater amount and thrifts were subject to the ceilings as well as commercial banks. Not surprisingly, households allocated an even smaller percentage of their savings to small time and savings deposits than in 1966 and sales of large CD's again dried up. The last of the three credit crunches took place in 1973-74. Disintermediation was somewhat less severe during this episode, thanks to a lengthening in the average maturity of small time and savings deposits at thrifts and the complete removal of deposit rate ceilings on large CD's.

Among institutions, large commercial banks were the least affected by disintermediation because of their ability to tap nondeposit sources of funds. In 1966, large banks were able to make up for their loss of small deposits and large CD's by borrowing Eurodollars from their foreign branches. And, in 1969, they were able to develop new nondeposit sources of funds such as nonbank federal funds, repurchase agreements, and commercial paper issued by their holding companies. During the 1973-74 credit crunch, large banks continued to tap all these sources. By that time, however, the elimination of ceilings on large CD's made such borrowing much less necessary.

S&L's lacked direct access to the open market but were able to borrow indirectly through the Federal Home Loan Bank (FHLB) system. The FHLB sold bonds in the open market and reloaned the proceeds to S&L's at a small markup over its average cost of funds. Borrowing from the FHLB was relatively small in the 1966 credit crunch

⁵ The three credit crunches are discussed in more detail in Patric H. Hendershott and Kevin E. Villani, *Regulation and Reform of the Housing Finance System*, American Enterprise Institute for Public Policy Research, Washington, D.C., 1977, pp. 55-66, and Edward F. McKelvey, "Interest Rate Ceilings and Disintermediation," Staff Economic Studies No. 99, Board of Governors of the Federal Reserve System, 1978. To some extent, banks and thrifts were able to circumvent deposit-rate ceilings by paying their depositors an implicit return in the form of gifts, convenient locations, free checking, and other services priced below cost. However, these implicit interest payments could not be easily increased when market interest rates rose to high levels.

because at that time the FHLB considered itself a lender of last resort. By 1973, however, FHLB advances had become a more significant offset to disintermediation due to a conscious effort on the part of the FHLB to dampen cyclical fluctuations in mortgage lending.

Mutual savings banks and small commercial banks had the most difficulty tapping nondeposit sources of funds during credit crunches. They enjoyed neither the direct access to the open market of large commercial banks nor the indirect access of S&L's through membership in the FHLB.⁶

Impact of deposit deregulation

Although credit crunches were common during the era of binding deposit rate ceilings, it does not follow that the removal of deposit rate ceilings will eliminate credit crunches. In principle, other factors might prevent banks and thrifts from adjusting their deposit rates to changes in open market rates, producing new bouts of disintermediation.

The behavior of thrift deposit inflows before the extension of ceilings to thrifts supports the view that disintermediation can occur even in the absence of ceilings. Thrifts did not become subject to deposit rate ceilings until September 1966. Although there is disagreement about the magnitude of disintermediation in the late 1950s,⁷

⁶ McKelvey notes that commercial banks with assets under \$50 million suffered relatively little disintermediation in 1973-74, perhaps because their depositors were insensitive to market rates. Thus, despite their lack of access to alternative funds, these banks may not have had to contract their lending as much as some larger banks. See McKelvey, "Interest Rate Ceilings and Disintermediation," 1978, pp. 42-50.

⁷ For the view that thrift disintermediation was a serious problem in the 1950s, see Jack R. Vernon, "Savings and Loan Association Response to Monetary Policies, 1953-61: A Case Study in 'Availability,'" *Southern Economic Journal*, January 1965. The opposing view is expressed in Patric H. Hendershott, "Financial Disintermediation in a Macroeconomic Framework," *Journal of Finance*, September 1971.

there is no doubt that thrifts suffered a sharp reduction in deposit inflows in late 1965 and the first nine months of 1966. Indeed, it was precisely because of these reductions in deposit inflows that the ceilings on commercial banks were reduced and the new ceilings on thrifts set at higher levels.

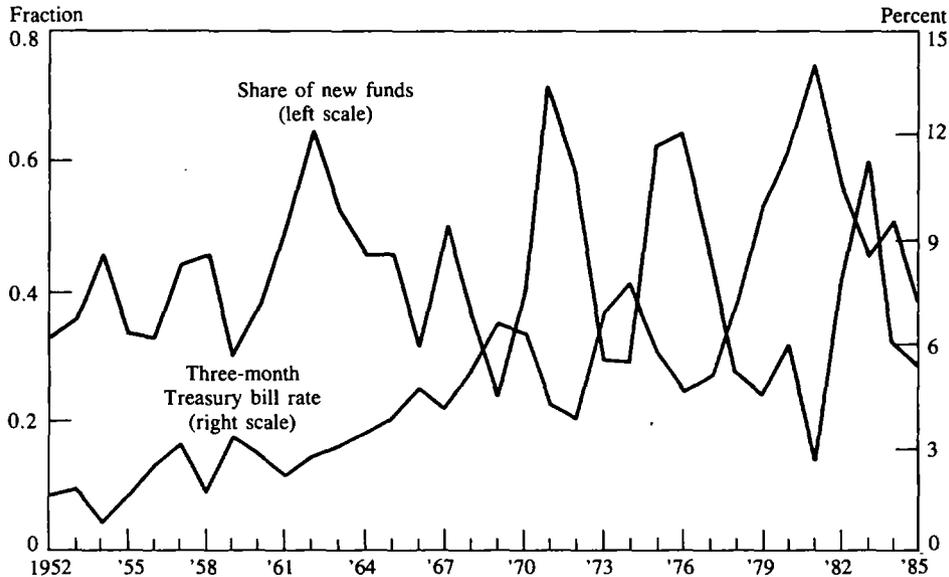
The behavior of deposit inflows since deregulation is more ambiguous. As shown in Chart 1, the share of new household funds allocated to small time and savings deposits has continued to vary inversely with market rates. The share declined sharply from 1976 to 1981, a period in which market rates were rising, and then recovered strongly from 1981 to 1983, a period in which market rates were falling. However, the sharp drop in deposit inflows from 1976 to 1981 may have occurred because deregulation was still incomplete and because the increase in market interest rates was so steep.⁸ Also, the sharp recovery in deposit inflows in 1982 and 1983 may have had less to do with declining market rates than with the introduction of money market deposit accounts (MMDA's). By enabling banks and thrifts to offer an account fully competitive with shares in money market mutual funds (MMMF's), this change led to a massive one-time shift in funds from MMMF's to MMDA's.

The ideal way to determine if deregulation has made deposit inflows less sensitive to market rates

⁸ Two studies estimate that the increase in market rates in the late 1970s would have caused an even greater decrease in deposit inflows to thrifts if six-month money market certificates had not been introduced in June 1978. See Dwight M. Jaffee and Kenneth T. Rosen, "Mortgage Credit Availability and Residential Construction," *Brookings Papers on Economic Activity*, 1979:2, pp. 364-365, and A. Thomas King, "Thrift Institution Deposits: The Influence of MMC's and MMMF's," *Journal of Money, Credit, and Banking*, August 1984. Also, a small part of the decline in household acquisition of small time and savings deposits in 1981 may have reflected a one-time shift of household funds into NOW accounts, which are close substitutes for passbook savings accounts but are not counted as savings deposits. See Bryon Higgins and Jon Faust, "NOW's and Super NOW's: Implications for Defining and Measuring Money," *Economic Review*, Federal Reserve Bank of Kansas City, January 1983, pp. 8-11.

CHART 1

Share of new household funds going to small time and savings deposits*



*Net acquisition of small time and savings deposits divided by net acquisition of all financial assets

Source: Flow of Funds, Board of Governors of the Federal Reserve System

would be to estimate the interest elasticity of small time and savings deposits. Unfortunately, the only studies that have taken this approach have focused on the non-M1 component of M2, which lumps small time and savings deposits together with overnight Eurodollars, overnight repurchase agreements, and shares in MMMF's. These studies have found that the non-M1 component of M2 became less sensitive to market rates after 1978.⁹ Although this finding could reflect a decrease in the interest sensitivity of small time and savings deposits, it could also result from the increased importance of Eurodollars, repurchase

agreements, and MMMF shares in M2. Thus, no firm conclusions can be drawn.

A more indirect way of evaluating the impact of deregulation is to observe the behavior of deposit rates without ceilings. Before thrifts were subjected to ceilings, the effective yield on their deposits was highly sluggish, increasing no more than two-tenths of a percentage point during the tight money periods of 1957, 1959, and 1966.¹⁰ Rates on MMDA's and Super-NOW's have been much more flexible. However, they have reacted more slowly to market rates than many observers expected. One study estimates that within the first three months of a change in the six-month Treasury bill rate, the rate on MMDA's changes

⁹ Howard Roth, "Effects of Financial Deregulation on Monetary Policy," *Economic Review*, Federal Reserve Bank of Kansas City, March 1985, p. 24, and John P. Judd and Brian Motley, "The 'Great Velocity Decline' of 1982-83: A Comparative Analysis of M1 and M2," *Economic Review*, Federal Reserve Bank of San Francisco, Summer 1984, pp. 66-68.

¹⁰ Jack Vernon, "Financial Disintermediation in a Macroeconomic Framework: Comment," *Journal of Finance*, September 1973, p. 1030.

only two-thirds as much as the bill rate and the rate on Super-NOW's only one-third as much.¹¹

The sluggishness in deposit rates does not necessarily mean that banks and thrifts will continue to suffer disintermediation in periods of high open market rates. That depends on the cause of the sluggishness. One reason banks and thrifts might fail to match increases in open market rates is that they know it is costly or inconvenient for depositors to switch to other investments. But in that case, deposit rate sluggishness will not be a source of disintermediation. Rather, it will be a symptom of depositors' insensitivity to market rates.

Did banks ration credit?

To determine if credit rationing has played a key role in availability effects, three issues must be addressed. The first is whether it makes any sense for banks and thrifts to allocate credit by nonprice terms. The second is whether there is any empirical evidence of credit rationing. And last is whether the removal of deposit rate ceilings will cause credit rationing to disappear.

Causes of credit rationing

In general, credit rationing can be said to occur when banks refuse to lend to borrowers who are identical to their other customers or when banks establish nonprice requirements that disqualify borrowers who would have been willing to pay higher loan rates in order to receive credit. The central question that any theory of rationing must answer is this: why do banks not accommodate these unsatisfied borrowers at a higher interest rate instead of rejecting them altogether? Several theories have been proposed to answer this ques-

¹¹ Paul F. O'Brien, "Deregulated Deposit Rate Behavior," unpublished paper, Division of Research and Statistics, Board of Governors of the Federal Reserve System, April 1986, p. 6.

tion. Some of these theories help explain why monetary policy would have strong availability effects. Others do not.

The first and most obvious explanation of credit rationing is usury ceilings, or legal limits on the loan rates that banks and thrifts can charge. Until recently, many states had ceilings on mortgage rates. In periods of high market rates, these ceilings became binding and thrifts compensated by tightening their nonprice requirements.¹²

A second explanation of credit rationing is that there are significant costs of adjusting loan rates, costs that can be reduced only by spreading the adjustment over a long period. According to this view, adjustment costs delay the response of loan rates to increases in open market rates, causing banks to temporarily tighten their nonprice requirements. Although this is one of the most com-

The central question that any theory of rationing must answer is why banks do not accommodate borrowers at a higher interest rate.

mon explanations given for credit rationing, it is also the least satisfactory, simply because the costs of adjustment are rarely made explicit.

A third explanation of credit rationing is based on the asymmetry of information between banks and borrowers. A bank usually has much less information about the inherent risk of a borrower or the amount of risk the borrower is taking than the borrower himself. As a result of this asymmetry in information, a rise in loan rates can affect borrowers' behavior in ways that increase the likelihood of default and decrease banks' expected rate of return. For example, an increase in loan rates may induce some borrowers to gamble on riskier investment projects—the problem of

¹² See James Ostas, "Effects of Usury Ceilings in the Mortgage Market," *Journal of Finance*, June 1976.

“moral hazard.” Or, an increase in loan rates may induce a higher proportion of safe borrowers to drop out of the market than of risky borrowers—the problem of “adverse selection.” In either case, banks may be unwilling to raise their loan rates beyond some maximum level when open market rates go up, even if this means denying credit to borrowers who would be willing to pay more than the maximum rate to receive a loan.¹³

Another explanation of credit rationing emphasizes the optimal sharing of risks through “implicit contracts.” According to this theory, banks are more willing to bear the risk of interest rate fluctuations than borrowers. As a result, banks and their customers enter informal agreements that guarantee stable loans but allow the bank to deny credit to a predetermined fraction of customers when market interest rates are high.¹⁴ This theory can explain why credit would be rationed in periods of tight money, but in contrast to other theories, it cannot explain why monetary policy would have strong availability effects. If there were no implicit contracts guaranteeing stable loan rates, just as many borrowers would fail to receive credit in periods of tight money. The only difference would be that these borrowers would go without credit voluntarily, discouraged by high loan rates.¹⁵

The next explanation of credit rationing is based on the observation that banks often charge a

uniform loan rate to borrowers they know to have different risk or different value as long-term customers. To some extent, a bank must base its evaluation of borrowers on subjective factors that cannot be independently verified. But a bank that tries to differentiate between borrowers on this basis may have difficulty attracting and keeping loan customers. To establish a reputation for fairness, the bank may prefer to charge a uniform rate within broad classes of heterogeneous borrowers, fully accommodating the demand of the most preferred borrowers in each class but rationing credit to the least preferred members.¹⁶ As in the case of optimal risk-sharing, though, this type of credit rationing need not enhance the availability effects of monetary policy. Because nothing will prevent banks from raising their loan rates when market rates go up, credit rationing could just as well decrease in periods of tight money as increase.

Although neither the risk-sharing theory nor the uniform rate theory explains the type of credit rationing that would contribute to availability effects, together the two theories can explain such rationing. A bank might want to charge a uniform rate to assure its customers of equitable treatment and at the same time keep the rate stable so customers do not have to bear the risk of interest rate fluctuations. Charging a uniform loan rate may cause the bank to ration its least-preferred customers even in periods of easy money. However, the commitment to a stable loan rate will cause these borrowers to be rationed to an even greater degree when money is tight, enhancing availability effects.

¹³ This explanation of credit rationing is developed in William R. Keeton, *Equilibrium Credit Rationing*, Garland, N.Y., 1979, ch. 3, and Joseph Stiglitz and Andrew Weiss, “Credit Rationing in Markets with Imperfect Information,” *American Economic Review*, June 1981.

¹⁴ The risk-sharing theory was first proposed as an explanation for labor unemployment. The extension to credit markets is in Joel Fried and Peter Howitt, “Credit Rationing and Implicit Contract Theory,” *Journal of Money, Credit, and Banking*, August 1980.

¹⁵ For the same reason, it is now recognized that risk-sharing labor contracts do not necessarily lead to Keynesian fluctuations in labor unemployment. See Sherwin Rosen, “Implicit Contracts: A Survey,” *Journal of Economic Literature*, September 1985, especially pp. 1154-1155.

¹⁶ The proposition that a bank would ration its riskiest customers if constrained to charge all customers the same rate was first proved in Dwight M. Jaffee and Franco Modigliani, “A Theory and Test of Credit Rationing,” *American Economic Review*, December 1969. Alex Cukierman extended the theory to borrowers who differ in their propensity to hold deposits and consume other bank services in “The Horizontal Integration of the Banking Firm, Credit Rationing, and Monetary Policy,” *Review of Economic Studies*, February 1978.

Empirical evidence on the existence of rationing

Researchers have tried to test for credit rationing in two ways—by determining if loan rates are sticky and by examining the behavior of nonprice lending terms.

Evidence on loan rate behavior. Most studies of loan rate behavior assume that stickiness in loan rates reflects temporary disequilibrium. According to this view, loan rates adjust only gradually to their long-run equilibrium level, either because there are costs to banks of making rapid rate changes or because banks have made implicit contracts to protect their borrowers from changes in market rates that are perceived as temporary. Typically, studies of this kind estimate a loan rate equation that includes as explanatory variables both the previous period's loan rate and a set of exogenous variables believed to affect the equilibrium loan rate through their influence on the supply of and the demand for credit. The greater the influence of the previous period's loan rate, the slower is the estimated speed of adjustment.

Disequilibrium loan rate studies generally find that loan rates have not responded immediately to changes in demand or supply conditions. However, the estimated speed of adjustment is higher for recent sample periods than for early sample periods, suggesting that loan rates were becoming less sluggish even before deposit deregulation. Also, mortgage rate studies generally estimate lower speeds of adjustment than commercial loan rate studies, most of which focus on loan rates charged by large banks.¹⁷

A second group of loan rate studies tests for a different kind of loan rate stickiness—the stickiness that can result from banks setting their loan rates as a markup over their average cost of funds. If banks' average cost of funds does not respond quickly to market rates, average-cost pricing will tend to slow the adjustment of loan rates. Many

economists view such pricing behavior as irrational, but it may simply be a convenient way for banks and borrowers to share the risk of interest rate fluctuations.

Empirical evidence on average-cost pricing is mixed. Controlling for market rates and other factors, Jaffee and Rosen found that the average cost of funds to S&L's was positively related to the S&L mortgage rate. However, skeptics argued that their result was due to faulty methodology. When different versions of their basic equation were estimated, opposite results were sometimes obtained.¹⁸ Small commercial banks have also been alleged to use average-cost pricing, but most of the evidence in support of this claim is highly casual. Time plots such as Chart 2 indicate that small banks' average cost of funds and average rate of return on loans both responded very little to open market rates before 1978 but both began moving much more closely with open market rates after that.¹⁹

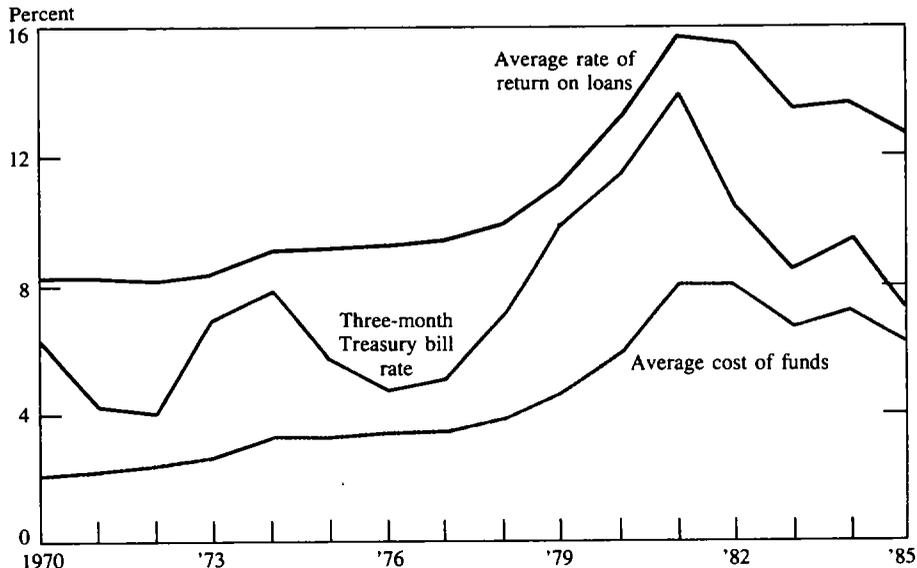
In evaluating loan rate studies, it is important to remember that stickiness in loan rates is a necessary condition for the existence of credit rationing but not a sufficient condition. When the loan rate is below the equilibrium level, banks and thrifts may choose to accommodate their

¹⁷ Jaffee and Rosen estimated that 57 percent of the gap between the actual mortgage rate and the equilibrium rate was eliminated within one quarter. For commercial loan rates, recent estimates range from 63 percent per quarter by Sealey to 87 percent per quarter by Ito and Ueda. See Jaffee and Rosen, "Mortgage Credit Availability and Residential Construction," 1979; C.W. Sealey, Jr., "Credit Rationing in the Commercial Loan Market: Estimates of a Structural Model Under Conditions of Disequilibrium," *Journal of Finance*, June 1979; and Takatoshi Ito and Kazuo Ueda, "Tests of the Equilibrium Hypothesis in Disequilibrium Econometrics: An International Comparison of Credit Rationing," *International Economic Review*, October 1981.

¹⁸ See Jaffee and Rosen, "Mortgage Credit Availability and Residential Construction," 1979; David H. Pyle, "Deposit Costs and Mortgage Rates," *Housing Finance Review*, January 1982; and Thomas A. King, "The Deposit Rate and the Mortgage Rate: Does Regulation Q Promote Homeownership?" Research Working Paper No. 85, Office of Policy and Economic Research, Federal Home Loan Bank Board, September 1979.

CHART 2

Average return on loans versus average cost of funds, small Tenth District banks*



*Small banks are defined as those with less than \$300 million of assets in 1985.

Source: Reports of Condition and Income

customers' loan demand, extending more credit than they would prefer on the basis of short-run profit maximization. For that reason, evidence on the stickiness of loan rates cannot prove that banks rationed credit.

Evidence on nonprice terms. If banks use nonprice terms to ration credit, they should be observed to tighten these terms in periods of tight money or strong credit demand. Also, as nonprice terms are tightened, borrowers' effective demand for credit should fall.

¹⁹ Similar evidence is presented in Thomas D. Simpson and Patrick M. Parkinson, "Some Implications of Financial Innovation in the United States," Staff Studies No. 139, Board of Governors of the Federal Reserve System, September 1984. For agricultural banks, there is more direct evidence of average-cost pricing in a recent survey of lending practices by Peter J. Barry and Jeffrey D. Calvert. See their "Loan Pricing and Profitability Analysis by Agricultural Banks," *Agricultural Finance Review*, 1983.

Several studies have found that nonprice terms do become more favorable to lenders in periods of tight money or rising loan rates. Jaffee and Modigliani argued that the percentage of commercial bank loans made at the prime rate could be used as a proxy for the average creditworthiness of borrowers because prime-rate customers were the least risky.²⁰ Controlling for the average loan rate, they found that the percentage of prime loans tended to rise when market rates were high or deposits unavailable, leading them to conclude that banks tightened credit standards in periods of tight money. Rudolph and Zumpano obtained similar results for the mortgage market, using average maturity, average loan size, and the average downpayment ratio as measures of nonprice

²⁰ Jaffee and Modigliani, "A Theory and Test of Credit Rationing," 1969.

terms.²¹ Finally, using data from the Federal Reserve's Senior Loan Officer Survey, Harris found that large commercial banks tended to tighten their credit standards at the same time they raised their loan rates. This finding suggested that banks used both measures to allocate credit when funds were scarce.²²

Studies of the mortgage and housing markets have found that tighter nonprice terms have a strong negative effect on demand. Ostas and Zahn estimated a simultaneous-equation model of the S&L mortgage market and found that increases in the average downpayment ratio tended to reduce mortgage demand.²³ Similarly, Kent found that increases in the average maturity of loans tended to raise mortgage demand.²⁴ Finally, numerous studies of housing investment have concluded that increases in average downpayment ratios tend to reduce the rate of starts.²⁵

Unfortunately, most studies of nonprice lending terms are subject to a serious flaw. Except for Harris' work using survey responses, all the studies assume that banks' nonprice requirements can be measured by the average value of such nonprice

characteristics as the quality of the borrower, the size of the downpayment, or the term to maturity. The implicit assumption is that if the average value of these characteristics changes in a direction favorable to banks, it is because banks have raised their minimum requirements. However, the average may change for an entirely different reason—because changes in open market rates or other market conditions cause borrowers to prefer a different set of nonprice characteristics. From the data, the two possibilities cannot be distinguished.²⁶

Impact of deposit deregulation on credit rationing

It is important to know if deposit rate ceilings were responsible in any way for credit rationing. If ceilings were not responsible, credit may continue to be rationed during periods of tight money and availability effects may remain important. But if ceilings were responsible, credit rationing will diminish as a result of deposit deregulation and the reduction in availability effects will be that much greater.

The only explanation of credit rationing in which deposit rate ceilings play a role is the one based on optimal sharing of risks.²⁷ Before

²¹ Patricia M. Rudolph and Leonard V. Zumpano, "A Test of the Equilibrium Credit Rationing Hypothesis," *Housing Finance Review*, October 1982.

²² Duane G. Harris, "Some Evidence on Differential Lending Practices at Commercial Banks," *Journal of Finance*, December 1973, and "Interest Rates, Nonprice Terms and the Allocation of Bank Credit," *Southern Economic Journal*, January 1974.

²³ James R. Ostas and Frank Zahn, "Interest and Non-Interest Credit Rationing in the Mortgage Market," *Journal of Monetary Economics*, April 1975.

²⁴ Richard J. Kent, "Credit Rationing and the Home Mortgage Market," *Journal of Money, Credit, and Banking*, August 1980.

²⁵ These studies are surveyed in James Kearl, Kenneth Rosen, and Craig Swan, "Relationships Between the Mortgage Instruments, the Demand for Housing and Mortgage Credit: A Review of Empirical Studies," *New Mortgage Designs for Stable Housing in an Inflationary Environment*, Federal Reserve Bank of Boston, Conference Series No. 14, 1975. Because the studies focus on housing starts rather than mortgage demand, they can also be viewed as tests of the nonfungibility of mortgage credit.

²⁶ Muth pointed out that average downpayment ratios could rise at the same time market rates were going up, not because lenders were raising their minimum downpayment ratios, but rather, because borrowers who preferred relatively low downpayment ratios were choosing to forego home purchases. See Richard F. Muth, "Interest Rates, Contract Terms, and the Allocation of Mortgage Funds," *Journal of Finance*, March 1962. The same point was made about Jaffee and Modigliani's use of the percentage of prime loans to measure bank credit standards in Peter A. Frost, "Book Reviews," *Journal of Political Economy*, November/December 1973.

²⁷ Because usury ceilings have been relaxed over the last several years, deposit deregulation has probably been accompanied by a significant decline in rationing from that source. However, this is quite different from saying that deposit deregulation caused the decline in credit rationing.

deregulation, thrifts and small commercial banks may have been willing to offer stable loan rates to their customers because a large percentage of their funds were small deposits subject to rate ceilings. This reliance on small regulated deposits tended to protect their average cost of funds from fluctuations in market interest rates, making it more efficient for them to bear the risk of those fluctuations than their borrowers. Now that ceilings have been removed, the average cost of funds to thrifts and small commercial banks responds much more quickly to changes in market rates (Chart 2). This change should make them less willing to assume the risk of interest rate fluctuations and, therefore, less willing to offer stable rates.

It is unclear whether the refusal of banks to assume the risk of interest rate fluctuations will make them more willing to maintain their lending in periods of tight money. Banks offering loan rates that are stable but nonuniform will not reduce their lending any more in periods of tight money than banks with variable loan rates. Thus, a greater reluctance on the part of banks to offer stable loan rates need not reduce the importance of availability effects. However, to establish a reputation for fairness, banks may have offered rates that were not only stable over time but uniform across customers. To the extent that banks did behave this way, deposit deregulation may reduce the contribution of credit rationing to availability effects.

Although none of the empirical studies of credit rationing have tried to determine if rationing has become less important with deregulation, Chart 3 provides some tentative evidence that it has. The upper panel of the chart shows the fraction of banks in the Federal Reserve's Senior Loan Officer Survey that said they had tightened credit standards for new borrowers minus the fraction that said they had eased them. The lower panel shows the change in the average short-term loan rate at another sample of large banks. As Harris noted, changes in credit standards tend to mirror changes

in loan rates. Since 1978, however, fluctuations in credit standards have narrowed while fluctuations in loan rates have widened. This shift suggests that banks may now be relying more on loan rates to allocate credit and less on nonprice terms.

Is credit fungible?

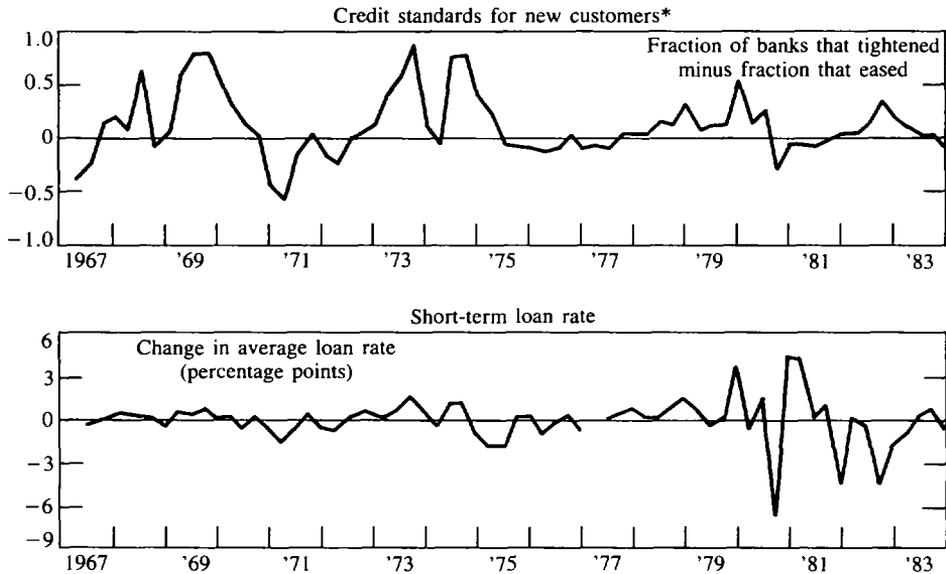
Whether credit is allocated by price or nonprice means, disintermediation should reduce lending by banks and thrifts. It does not follow, however, that private spending will be reduced by the same amount. Some of the borrowers deprived of bank loans may be able to finance their spending in other ways. The greater the extent to which such substitution occurs, the less tendency there will be for availability effects to enhance the effectiveness of monetary policy.

In the case of mortgages, an important source of fungibility is the existence of a secondary market where mortgage loans can be resold to private investors. The federal housing credit agencies have played a key role in fostering this market, both by buying mortgages with funds borrowed in the open market and by providing guarantees that make it easier for private parties to sell shares in mortgage pools.²⁸ Even before deposit deregulation, the growth in the secondary market had helped reduce the impact of disintermediation on housing investment by enabling thrifts to continue originating mortgages for resale and by enabling homebuyers to obtain financing from mortgage bankers as well as thrifts. In other words, the secondary market made it easier for homebuyers

²⁸ The two agencies that buy mortgage loans directly are FHLMC ("Freddie Mac") and FNMA ("Fannie Mae"). Freddie Mac finances its purchases by issuing pass-through securities backed by mortgage pools, while Fannie Mae finances its purchases both by issuing pass-through securities and by selling its own debt. GNMA ("Ginnie Mae") promotes the secondary market indirectly, by guaranteeing certain kinds of privately issued mortgage-backed securities.

CHART 3

Relative use of price and nonprice terms by commercial banks



*The change in credit standards is for new customers only through the first quarter of 1981 and for both new and nonlocal customers after that.

Source: Senior Loan Officer Opinion Survey on Bank Lending Practices and Quarterly Survey of Terms of Bank Lending, Board of Governors of the Federal Reserve System

to substitute funds borrowed in the open market for funds borrowed from thrifts.

Although there is still not a well developed secondary market for commercial bank loans, some businesses have had access to other forms of financing not available to homebuyers. Large, well established firms have always been able to raise funds directly by selling commercial paper or corporate bonds to private investors. Growth in the commercial paper market was especially rapid in the 1970s, making it relatively easy for most large firms to maintain spending in periods of reduced bank credit. Because they are not well known by investors, small firms have more difficulty borrowing in the open market. In some cases, small firms that are denied bank credit may be able to substitute trade credit from larger firms that act as their suppliers. But because the effective cost of trade credit can be significantly greater

than the cost of bank borrowing, reductions in bank credit are likely to have more effect on the spending plans of small firms than of large firms.²⁹

Almost all of the empirical evidence on fungibility is concerned with the impact of mortgage availability on housing investment. A common approach to this question is to estimate an equation for housing investment that includes the supply of thrift deposits or mortgage funds as one

²⁹ In the last several years, large money center banks have begun selling some of their commercial loans. However, most of the loans are to large firms that already enjoy access to the commercial paper market and most of the loans are sold to other banks rather than to private investors. A broad secondary market seems more likely to develop for auto loans because these loans are well collateralized and can be pooled into pass-through securities with highly predictable cash flows. See Charles A. Luckett, "Recent Developments in Automobile Finance," *Federal Reserve Bulletin*, June 1986, pp. 363-364.

of the explanatory variables. Most studies that have taken this approach have concluded that mortgage credit is not perfectly fungible, but a few studies have reached the opposite conclusion.

The most widely cited study confirming the importance of mortgage availability is the one by Jaffee and Rosen noted earlier. In this study, housing starts were explained by an equation that included demographic variables, the mortgage rate, and two measures of mortgage availability—the change in deposits at thrift institutions and the amount of FHLB advances and new mortgage commitments by the federal credit agencies. The two availability measures were found to have a strong positive effect on starts, suggesting both that thrifts rationed credit and that credit was non-fungible.³⁰

The importance of mortgage availability was strongly denied in studies by Arcelus and Meltzer and by DeRosa. They argued that the correlation typically observed between mortgage availability and housing starts was coincidental—mortgage availability was positively related to housing starts only because high open market rates simultaneously decreased thrift deposits and reduced housing demand. To resolve this problem, Arcelus and Meltzer substituted open market interest rates for mortgage rates in the equation for housing starts. They found that housing starts were stimulated by declines in open market interest rates but not by increases in availability, suggesting that mortgage credit was highly fungible.³¹ DeRosa took

a different approach. If mortgage credit is non-fungible, credit rationing should reduce the rate at which households are able to adjust their actual holdings of houses toward ideal levels. DeRosa found that this rate of adjustment was no lower in credit crunches than in normal times, suggesting either that credit rationing did not intensify in credit crunches or that mortgage credit was fungible.³²

Although the results of Arcelus and Meltzer and DeRosa cast some doubt on the link between mortgage availability and housing investment, availability could affect private spending in another way. One reason changes in mortgage availability might have little effect on housing investment is that households use mortgage credit to replace other forms of borrowing or to build up their liquid assets. Another possibility, however, is that households use mortgage credit to increase their consumption spending. During the housing inflation of the late 1970s, for example, households borrowed heavily against the increased equity in their homes and used much of the borrowed funds to finance increased consumption.³³ Thus, changes in mortgage availability could have a significant effect on total private spending, even if housing did not always bear the main burden of the impact.

Conclusions

The argument is sometimes made that deposit rate deregulation will weaken monetary policy and raise the general level of interest rates by reducing credit availability effects. Economists who take this position base their argument on three

³⁰ Jaffee and Rosen, "Mortgage Credit Availability and Residential Construction," 1979. Using a different measure of borrowing costs that allowed for taxes and inflation, Hendershott found a somewhat smaller relationship than Jaffee and Rosen. See Patric H. Hendershott, "Real User Costs and the Demand for Single-Family Housing," *Brookings Papers on Economic Activity*, 1980:2.

³¹ Francisco Arcelus and Allan H. Meltzer, "The Markets for Housing and Housing Services," *Journal of Money, Credit, and Banking*, February 1973, Part I. For a critique of Arcelus and Meltzer's methodology and conclusions, see Craig Swan, "Comment," *Journal of Money, Credit, and Banking*, November 1973.

³² Paul DeRosa, "Mortgage Rationing and Residential Investment: Some Results from a Brainard-Tobin Model," *Journal of Money, Credit, and Banking*, February 1978.

³³ See David F. Seiders, "Mortgage Borrowing Against Equity in Existing Homes: Measurement, Generation, and Implications for Economic Activity," Staff Economic Studies No. 96, Board of Governors of the Federal Reserve System, 1978.

assertions—deposit rate ceilings helped reduce the supply of bank and thrift credit during periods of tight money by increasing disintermediation; the impact of disintermediation on bank and thrift lending was reinforced by nonprice credit rationing; and finally, borrowers were unable to finance their spending in other ways when bank and thrift lending fell. This article has critically evaluated each of these three key links in the credit availability argument.

Deposit rate ceilings did lead to significant disintermediation during periods of tight money, but this disintermediation had much more effect on lending by thrifts and small commercial banks than on lending by large banks. The impact of disintermediation fell most heavily on thrifts and small commercial banks because these institutions depended on small deposits as a source of funds. Large commercial banks had greater access to nondeposit funds and large unregulated deposits and were thus better able to maintain their lending when inflows of small deposits fell. Now that ceilings have been removed, disintermediation of small deposits should become much less important even if deposit rates respond sluggishly to changes in open market rates. This reduction in disintermediation will help stabilize the supply of credit from thrifts and small commercial banks but will affect only the mix of funds at large commercial banks.

Credit rationing may have reinforced the impact of disintermediation on bank and thrift lending while ceilings were in place, but it is difficult to say how large this effect was or whether rationing will continue to be a factor now that ceilings have been removed. Although many theories have been offered to explain why banks and thrifts might ration credit by nonprice means, only some of the theories imply that credit rationing would strengthen monetary policy and all of the theories

have proven difficult to test empirically. Surveys of bank credit standards suggest that banks may now be relying less on nonprice terms to allocate credit and more on loan rates. In principle, deposit deregulation could have caused such a change in lending practices by making banks and thrifts less willing to offer stable loan rates that protect their customers from interest rate risk. But more evidence is needed to determine if credit rationing has truly declined, and if so, why.

Finally, although some borrowers were forced to reduce their spending when bank and thrift lending fell, long-term changes in financial markets were gradually increasing the fungibility of credit, weakening the link between credit availability and private spending. The impact of mortgage availability on housing investment has long been a subject of heated debate among economists. But no matter how important mortgage availability once was, the rapid growth of the secondary mortgage market in the 1970s clearly made household spending less dependent on mortgage funds borrowed from thrifts. Equally important, the expansion in the commercial paper market allowed increasing numbers of businesses to bypass commercial banks and borrow directly in the open market. Thus, even before deposit deregulation began, the availability effects of monetary policy had been considerably weakened.

On balance, the theoretical and empirical evidence suggests that deposit deregulation will reduce availability effects but will not reduce them enough to significantly weaken monetary policy. With deposit rate ceilings removed, open market interest rates may have to rise somewhat higher to restrain the economy in periods of strong demand. But the level of interest rates will depend much more on other factors, such as the profitability of investment and the magnitude of public and private saving.

Research Working Papers

Recent Research Working Papers published by the Federal Reserve Bank of Kansas City are listed below. Copies may be obtained by writing the Research Division, Federal Reserve Bank of Kansas City, 925 Grand Avenue, Kansas City, Missouri 64198.

V. Vance Roley

"The Reponse of Interest Rates to Money Announcements Under Alternative Operating Procedures and Reserve Requirement Systems," RWP 85-14, December 1985.

C. Alan Garner

"Equity in Economic Relationships: Towards a Positive Theory," RWP 85-13, December 1985.

Marsha J. Courchane and David B. Nickerson

"Rational Expectations and Countercyclical Monetary Policy with Bisymmetric and Common Incomplete Information," RWP 85-12, December 1985.

David B. Nickerson

"The Neutrality of Countercyclical Monetary Policy in Models with a Wealth Effect," RWP 85-11, December 1985.

Marsha J. Courchane and David Nickerson

"Optimal Buffer Stock and Futures Market Policies for Commodity Price Stabilization," RWP 85-10, December 1985.

Ian Domowitz, R. Glenn Hubbard, and Bruce C. Petersen

"The Intertemporal Stability of the Concentration-Margins Relationship," RWP 85-09, October 1985.

Howard L. Roth

"A Monte Carlo Study of Feasible Predictors of the Linear Regression Model," RWP 85-08, September 1985.

Ian Domowitz and Lars Muus

"Restricted Instrumental Variables Estimation for Systems of Dynamic Nonlinear Implicit Equations," RWP 85-07, September 1985.

Karlyn Mitchell

"Interest Rate Risk at Commercial Banks: An Empirical Investigation," RWP 85-06, July 1985.

Stuart E. Weiner

"Labor Market Flows and Nested Survival Models," RWP 85-05, July 1985.

Gordon H. Sellon, Jr.

"Estimation of the Borrowing Function: Pre and Post-October 1979," RWP 85-04, July 1985.

Douglas K. Pearce

"Short-Run Inflation Expectations: Evidence From A Monthly Survey," RWP 85-03, June 1985.

Craig S. Hakkio

"Does the Exchange Rate Follow a Random Walk? A Monte Carlo Study of Four Tests for a Random Walk," RWP 85-02, June 1985.

Craig S. Hakkio and Douglas K. Pearce

"The Reaction of Exchange Rates to Economic News," RWP 85-01, June 1985.

V. Vance Roley

"Money Demand Predictability," RWP 84-12, December 1984.

Economic Review
Federal Reserve Bank of Kansas City
Kansas City, Missouri 64198
June 1986, Vol. 71, No. 6