

FEDERAL RESERVE BANK OF KANSAS CITY

Economic Review



March/April 1990

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Although pawnshops are an important source of credit for many low-income customers, no serious study of pawnbroking in the United States has been made since the 1930s. Such a study may give policymakers a better idea of the cost to consumers of being excluded from mainstream credit markets and thus may assist in judging the potential effectiveness of consumer financial legislation.

Caskey and Zikmund describe pawnshop operations, their customers, and the growth of the pawnbroking industry. The authors then examine some policy issues related to pawnbroking and consumer credit.

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By Jon Faust

The increase in corporate debt in the United States in the 1980s has confronted society with a host of important questions. One question emerges as particularly significant for U.S. monetary policy: Will higher corporate debt worsen future recessions?

This question is important because one goal of monetary policy is to minimize the detrimental effects of recession. Policymakers must often balance the inflation-fighting benefits of tight monetary policy against the risk that such a policy might precipitate a recession. How corporate debt will affect the severity of future recessions is an important factor in this balancing act.

Faust examines the implications of increased corporate debt for future recessions by considering two related questions. Will increased corporate debt increase firms' risk of bankruptcy? And, will increased bankruptcy risk worsen future recessions? Faust finds the answer to both questions is probably yes.

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By Charles S. Morris

Following the stock market collapse on October 19, 1987, the stock and futures markets adopted circuit breakers to stop prices from falling in times of panic selling. Circuit breakers are rules that

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Not everyone agrees circuit breakers can reduce such price declines. Nonetheless, most observers agree that if circuit breakers are to have any chance of success, they must be coordinated across both the stock and futures markets. In other words, the circuit breakers must impose the same trading restrictions in both markets at virtually the same time.

Morris examines circuit breakers in these two markets and shows they are not coordinated. He finds that circuit breakers may actually increase the size of a decline in stock prices in times of panic selling. He concludes that more coordinated circuit breakers could enhance their overall effectiveness.

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By William F. Fox and Tim R. Smith

Construction of public infrastructure in the United States has slowed considerably in the past 25 years. Since most spending for public infrastructure occurs at state and local levels, many state and local policymakers believe the continued economic health of their regions requires the building of new infrastructure.

Policymakers need to know whether expanding infrastructure in specific locations can bring renewed prosperity to ailing local economies or sustain growth in healthy local communities. While there is little doubt infrastructure is vital to economic growth, the economic benefits of building new infrastructure facilities are uncertain.

Fox and Smith discuss the relationship between public infrastructure policy and economic development. The authors find that not all communities can expect infrastructure to stimulate their economies, but most communities can benefit from exploring new ways to deliver infrastructure services.

Pawnshops: The Consumer's Lender of Last Resort

By John P. Caskey and Brian J. Zikmund

Legislators and financial regulators have long been concerned with consumers' access to credit markets. With the extensive deregulation of the financial system in recent years, this concern has focused on the access of the economically disadvantaged to credit markets. Most discussion of this issue has centered on financial institutions' fulfillment of the requirements of the Community Reinvestment Act and on the need for legislation guaranteeing basic banking services to all consumers. Surprisingly, however, little or no attention has been paid to credit alternatives for those excluded from mainstream financial institutions.

This article examines the role of the pawnbroking industry in providing credit to consumers excluded from mainstream credit markets. The

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study has two principal motivations. First, while pawnshops are an important source of credit for many low-income consumers, no serious study of pawnbroking in the United States has been made since the 1930s. Second, and more important, the study of pawnbroking may give policymakers a better idea of the cost of being excluded from mainstream credit markets and so may assist in judging the potential effectiveness of consumer financial legislation.

The first section of this article discusses the role of pawnbroking in consumer credit markets. The second section describes the business of pawnbroking, including the regulation of the industry and the characteristics of pawnshop loans. The third section examines the geographic distribution of pawnshops and the growth of the industry. The fourth section discusses some policy issues related to pawnbroking and consumer credit.

I. An Overview of Pawnbroking

Pawnshops are one of many financial institutions supplying consumer credit, yet they do not

compete directly with other financial institutions for customers. Rather, they lend to those excluded from mainstream financial markets. This section discusses consumer lending of mainstream financial institutions, the role played by pawnshops in consumer finance, the magnitude of credit extended by pawnbrokers, and growth trends in the industry.

Mainstream consumer credit institutions

The major suppliers of consumer credit are mainstream financial institutions—commercial banks, finance companies, credit unions, and savings and loan associations. These institutions provide credit on either a secured or an unsecured basis. Secured credit is common for large-value loans, such as home mortgages and automobile loans. Unsecured lending is more common for small-value loans, such as those for items purchased with credit cards.

In providing consumer loans, whether secured or unsecured, mainstream financial institutions screen customers for credit risk. In the case of an unsecured loan, the rationale for this procedure is obvious since the financial institution has no collateral if the borrower defaults. In the case of a secured loan, the screening is important because the collateral may be worth less than the loan and because significant costs often arise when transferring collateral in case of default.

To determine credit risk, mainstream financial institutions generally employ a fairly standardized screening method, called “scoring.” Among the variables commonly used in determining a credit score are the applicant’s years on job, education, occupation, checking and savings account status, credit card ownership, total outstanding debt excluding mortgage debt, and credit repayment history. Applicants likely to be denied access to credit are those with poor credit records, excessive debt burdens relative to their incomes, low and unstable incomes, or an

inability to maintain positive bank account balances.

Pawnshops and their customers

Pawnshops play a specialized role in consumer finance. They cater to those consumers whose credit needs are not accommodated by mainstream financial institutions. Broadly speaking, pawnshop customers have two characteristics. First, these customers have high credit risk and so cannot borrow on an unsecured basis. Indeed, pawnshop lending rules require the borrower to leave personal property with the pawnbroker as collateral. Second, pawnshop customers typically require very small-denomination loans that traditional lenders are unable or unwilling to provide on a secured basis.

While there are no estimates of the percentage of the population whose risk characteristics exclude them from mainstream consumer credit sources, available evidence suggests the number is large. Moreover, the poor and poorly educated are disproportionately represented. Not only are many low-income consumers excluded because of their income, but they are also much more likely than the middle class to have unstable incomes and employment patterns (Andreason 1975). In addition, many consumers, especially those with low incomes and little education, do not maintain bank accounts, almost ensuring they would not pass the typical screening requirements of a bank or finance company. For example, the Federal Reserve Board’s 1983 Survey of Consumer Finances found that 12 percent of all families did not have a checking or savings account (Canner and Maland 1987).¹ Of these families, 57 percent fell into the lowest quintile for family income, and 59 percent were headed by individuals without a high school education.

Interviews with pawnshop owners support this picture of pawnshops and their customers.² While pawnbrokers report customers from all segments of society, the overwhelming majority

are low-income individuals who operate independently of mainstream financial institutions. Brokers believe most of their customers would not pass bank or finance company credit-risk screening procedures. Brokers also suspect some of their customers would feel ill-at-ease in a bank because they rarely or never interact with banks.

Cash America Investments, a publicly traded company operating about 100 pawnshops in Texas, Oklahoma, and Louisiana, is typical of pawnbrokers in its description of its customers. For example, in its 1988 Annual Report, Cash America states,

It has been estimated that 20 to 30 percent of America's adult population chooses to deal with cash-only transactions which require neither bank accounts nor credit cards . . . These are Cash America's customers. (p.5)

While pawnbrokers believe most of their customers turn to pawnshops for credit because other financial institutions are closed to them, they also point out that some of their customers, with access to bank or finance company credit, use pawnshops for their discretion and convenience. This is especially true at the small minority of pawnshops that target their business to middle-income and high-income customers by setting comparatively high minimum loans, accepting only jewelry as collateral, and offering the discretion of private booths for taking out a loan.

The significance of pawnbroking in consumer credit markets

Measured by the percentage of total consumer credit supplied, pawnshops may appear to play only a minor role in consumer credit markets. However, measured by the number of pawnshops or the percentage of the population served, pawnshops appear to play a much more

important role in consumer finance.

Unfortunately, there are no official estimates of the amount of credit supplied by pawnshops. Thus, for example, national statistics on total domestic credit collected by the Federal Reserve System do not include an estimate of outstanding pawnshop loans. The only data available on pawnshop lending come from state regulatory agencies. While some states collect very detailed information on pawnbroking, other states collect little or no information.

According to estimates made by the authors, pawnshops are probably the source for about one-tenth of 1 percent of consumer credit in the United States. Extrapolating from the data provided by a few state regulatory agencies, total pawnshop credit outstanding at the end of 1988 would appear to be about \$689 million, with pawnshops making about \$1,723 million of loans over the year.³ For comparison, outstanding consumer credit at the end of 1988 totaled \$744 billion, of which \$371 billion was accounted for by commercial bank loans, \$174 billion by finance companies, and \$87 billion by credit unions.

By other measures, however, pawnshops are important in consumer credit markets. For example, in 1988 approximately 6,900 pawnshops operated in the United States—about one pawnshop for every two commercial banks.⁴ In addition, pawnbroking is very significant when measured by the percentage of the population using this credit market. In 1988, the data suggest pawnshops made about 35 million loans. Because the average pawnshop loan is only around \$50, even allowing for multiple loans to a core group of customers, pawnshops probably serve several million Americans each year, and perhaps as much as 10 percent of the adult population.

Trends in pawnbroking

In examining the pawnbroking industry over

time, three observations stand out. First, the number of pawnshops and pawnshops per capita is now larger than it was at the beginning of the century. Second, over time the industry has shifted from a concentration in older major urban areas, primarily in the Northeast, to Southern and Central Mountain states. Third, in the 1980s, the pawnbroking industry grew in almost all states for which there are data; and in some states the growth was extremely strong.

Perhaps one of the reasons pawnbroking has been overlooked in credit market studies is because there is a popular perception these credit institutions have largely died out since the 1930s. In fact, this appears to be the case in many other advanced industrialized societies. In Great Britain, for example, approximately 3,000 pawnshops operated in 1900. In 1987, only about 175 remained (Lohr 1987).

In the United States, in contrast, pawnbroking has not died out. On the contrary, it has grown. Samuel Levine reported there were 1,976 licensed pawnbrokers in the country in 1911—about one for every 47,500 citizens (Levine 1913). Now, there are nearly 6,900 pawnshops in the United States—about one for every 35,700 inhabitants.

The industry has not only grown since the turn of the century, but it has also shifted from older major urban areas to urban and rural areas in the Southern and Central Mountain states. Levine noted that in 1911 pawnshops were heavily concentrated in the major urban areas: citing 201 pawnshops in greater New York City, 102 in Philadelphia, 77 in Chicago, 72 in Boston, and 47 in San Francisco. A contemporary count for Levine's cities yields 15 pawnshops in New York City, 23 in Philadelphia, 13 in Boston, and 20 in San Francisco. At the same time, 893 pawnshops operated in Florida in 1988, 515 operated in Georgia, 285 in North Carolina, 369 in Oklahoma, and 1,270 in Texas. Today's per capita distribution of pawnshops is highly uneven across the United States (Figure 1). Sunbelt and

Central Mountain states tend to have the most pawnshops per capita, while the New England and Great Lake states have the least.

Recent data suggest the pawnbroking industry grew in the 1980s—in some states very rapidly. Time series data on state pawnshop licenses are available for only a few states, but the available data show the number of outstanding pawnshop licenses grew in six out of seven states (Table 1). In Oklahoma and Texas, part of the rapid growth in pawnbroking may be explained by the economic disruptions caused by the fall in oil prices. However, the data show strong growth in Texas pawnshops from 1980 to 1982, which predates the downturn in the state's economy. Of the seven states reporting data, only New Jersey shows a contraction in the industry.

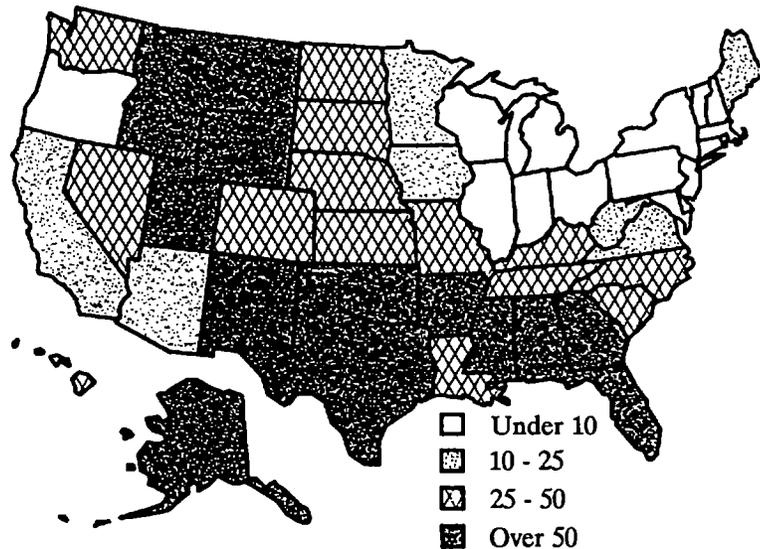
II. The Business of Pawnbroking

Financial historians trace the birth of institutionalized pawnbroking in the western world to the later Middle Ages. Starting in fifteenth-century Italy, charitable groups or governments in Continental Europe and Latin America opened nonprofit pawnshops as a public service for the poor, a tradition persisting to this day. In England and the United States, on the other hand, pawnshops were almost exclusively privately owned and operated for profit.⁵

The regulatory environment

Beginning in England in 1745 and later spreading to the United States, governments generally saw a need to license and regulate private pawnshops. Without regulation, governments worried pawnshops might aid in the transfer of stolen goods. Governments also wanted to prevent unscrupulous brokers from taking advantage of unsophisticated or desperate customers in need of credit. In England, the national government established the regulations;

Figure 1
Pawnshops per Million Inhabitants



in the United States, state and local governments oversee pawnbroking.

In the United States, pawnshop regulations currently vary from state to state, but generally follow a similar pattern. When a customer pawns an item, terms of the loan contract must be specified on a pawn ticket. The customer retains a copy of the ticket which states the customer's name and address, type of identification provided by the borrower, a description of the pledged item with applicable serial numbers, amount lent, maturity date, interest rate, and amount that must be paid to redeem the good. This last requirement ensures the customer understands the consequences of the interest charge. Pawnshops must also file daily or weekly police reports listing all items pawned and identifying the individuals

pawning the goods.⁶ In addition, some states regulate the type of items that can be pawned.⁷

Most states regulate pawnshop interest rates and other charges, such as storage or insurance fees. Including these charges, effective interest rate ceilings vary across states from 1.5 percent a month to 25 percent a month.⁸ Compounding is not allowed. A few states impose no limits, and the legal limits are widely ignored in some other states. In most states, the broker has the right to charge one month's interest if a pledge is redeemed in less than one month.

If a customer defaults, the collateral becomes the property of the pawnshop after the loan is overdue by a specific amount of time, commonly one to three months. Most states require the broker to notify the owner of the

Table 1
Pawnshop Licenses per Million Inhabitants

	<u>1980</u>	<u>1982</u>	<u>1984</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Indiana						
Number of shops	26	25	25	28	28	32
Shops per million capita	4.7	4.6	4.6	5.1	5.1	5.7
Maine						
Number of shops	8	10	8	9	12	13
Shops per million capita	7.1	8.8	6.9	7.7	10.1	10.8
New Jersey						
Number of shops	27	22	16	15	15	16
Shops per million capita	3.7	3.0	2.1	2.0	2.0	2.1
Oklahoma						
Number of shops	n.a.	279	312	340	351	369
Shops per million capita	n.a.	86.6	93.9	102.8	107.3	113.1
Oregon						
Number of shops	11	13	14	13	13	13
Shops per million capita	4.2	4.9	5.2	4.8	4.8	4.7
Pennsylvania						
Number of shops	27	28	29	30	32	37
Shops per million capita	2.3	2.4	2.4	2.5	2.7	3.1
Texas						
Number of shops	787	953	980	1,103	1,195	1,270
Shops per million capita	55.3	62.0	60.9	66.1	71.2	75.7

Source: State regulatory agencies.

pledge by mail that he will lose the right to his property unless he redeems it within the stipulated grace period. In case of default, some states require the collateral be sold at public auction. Thirteen states and the District of Columbia require any surplus from the sale of the collateral over the amount owed the pawnbroker, including accumulated interest and any costs related to the sale, revert to the customer.

Regulatory barriers to entry into pawnbroking are minimal. States or local governments require a license, and some require the broker to be bonded and insured. Even with these requirements, however, a pawnshop can be opened with a modest amount of capital. While a publicly traded company owns a chain of pawnshops in the South Central United States, the vast majority of pawnshops are small shops

that are independently owned and operated. The typical pawnshop owner finances his loans with his own capital and with bank credit.

Characteristics of pawnshop lending

As noted earlier, pawnshops occupy a special niche in consumer finance by providing a type of lending not performed by mainstream financial institutions. Broadly speaking, pawnshop loans have three features: the loans are for very small amounts and short maturities, they are fully collateralized by personal property, and interest and other charges are extremely high relative to other types of lending.

Most pawnshop loans are for relatively small amounts. For example, in Indiana, Oklahoma, and Oregon, average loan sizes range from \$40 to \$60 (Table 2). In most states, pawnbrokers make loans with one-month or two-month maturities. However, it is not uncommon for customers to renew these loans by paying the interest on the loan at the end of the month. Brokers report many pledges are redeemed within a week or two. The typical pledge, however, is redeemed in two to three months.

Because pawnbrokers lend only on the basis of collateral, brokers do not gather information to determine credit risk. If any screening occurs, it is to ensure the customer owns the item being pledged. Otherwise, the broker's efforts are directed toward properly evaluating the collateral. Once this is determined, a cash loan is advanced immediately upon the completion of the pawn ticket. A typical pawnshop loan requires less than ten minutes.

Default rates on pawnshop loans are quite high. Default rates as a percentage of the number of loans range from 14 to 22 percent (Table 2). Default rates as a percentage of the value of loans are somewhat less, however, suggesting that default rates are higher on smaller loans.⁹

To prevent a loss in case of default, a broker lends a customer a percentage of the value the

broker believes the collateral would bring in a sale. The loan-to-collateral ratio varies over time and across pawnshops, but typically the amount loaned is 50 to 60 percent of the resale value of the collateral. Though brokers almost always make a one-time profit from a default, almost all say they prefer customers repay the loan. Such customers are likely to return to the same pawnshop for future credit needs. Indeed, brokers report about 70 to 80 percent of their customers are repeat customers. Moreover, credit customers often purchase goods the shop sells and, if they blame the broker for the loss of their collateral, they are less likely to patronize the shop.

Commonly pawned items include jewelry, electronic and photographic equipment, musical instruments, and firearms. These items maintain their value over a reasonable period of time and are easy to store, especially jewelry. In some states, loans are made on automobiles, with the customer leaving the title for security. The mix of collateral varies across regions. For example, in regions of the country where firearms are more common, they more often collateralize pawnshop loans.

Examination of police records in one northeastern city showed that, over an eight-day period, one pawnshop made 221 loans for \$10,790. The average loan was \$46, and the size of loans ranged from \$5 to \$500. Of the items pledged, 68 percent were watches and jewelry; 21 percent television, stereo, or video equipment; 4 percent musical instruments; 2.7 percent camera equipment; and 2.7 percent firearms. This pattern of activity is probably fairly typical.

Another feature of pawnshop credit is its high cost (Table 2). Each of the states listed in this table imposes a ceiling on pawnshop interest rates.¹⁰ The ceiling interest rates in these states for an average size loan range from 0.5 percent per month in Pennsylvania to 20 percent per month in Oklahoma.¹¹ In addition, several of the states allow storage and insurance fees, which

Table 2

Characteristics of Pawnshop Loans

	<u>Ind.</u>	<u>N.J.</u>	<u>Okla.</u>	<u>Ore.</u>	<u>Pa.</u>
Average loan size	\$43.11	n.a.	\$41.00	\$61.31	n.a.
Default rate, number of loans	20.6%	n.a.	22.2%	13.9%	n.a.
Default rate, value of loans	13.8%	n.a.	19.6%	9.3%	n.a.
Legal interest rate ceiling (monthly)	3.0%	3.0%	20%	3.9%	.5%
Interest charge on two-month \$51 loan	\$3.06	\$3.06	\$20.40	\$3.06	\$.51
Permissible storage & insurance fees (for item left on pledge two months)	\$3.00	none	none	\$5.00	\$2.55
Implicit APR interest rate on two-month \$51 loan (includes storage & other fees)	71.3%	36.0%	240.0%	94.8%	36.0%

Source: State regulatory agencies, 1987 and 1988.

raise the effective price of the loan. For each state, the dollar outlay for a two-month, \$51 loan plus applicable fees is shown in Table 2.¹² For comparison with other types of consumer credit, annual percentage interest rates (APR) inclusive of fees are also illustrated. Thus, for borrowers from pawnshops in these states, effective interest rates range from 36 percent APR in New Jersey and Pennsylvania to 240 percent APR in Oklahoma. Such high rates are not uncommon. In more than half of the states, pawnshops levy effective interest rates of 120 percent APR or more on average-size loans.

III. Explaining Trends in the Pawnbroking Industry

This section offers explanations for the three notable developments in the U.S. pawnbroking industry discussed in the first section: (1) the number of pawnshops per capita is currently larger than it was at the beginning of the century; (2) the industry is now heavily concentrated in the Southern and Central Mountain states; and (3) the industry appeared to grow throughout the United States in the 1980s. In addressing these observations, this section begins with the cur-

rent regional concentration of pawnshops and then turns to examine long-run and recent growth trends in the industry.

Explaining the geographic distribution of U.S. pawnshops

Over the last century the pawnbroking industry in the United States has shifted from the Northeast to the Southern and Central Mountain states. The current concentration of the industry in these states is most likely related to structural features of the industry, state regulations, and consumer demand for pawnshop credit.

The pawnbroking industry has two important features: significant customer transportation costs and relatively low barriers to new firms entering the industry. To obtain a pawnshop loan or redeem collateral, a customer must physically transport the collateral to or from the pawnshop. With an average loan of only \$50, the transportation costs per dollar of credit are significant, and customers tend to use the closest shop. Because regulatory barriers to entry are low, new pawnshops enter areas that promise high profits. As they enter, lending per shop falls, because many customers will switch to patronize the most

convenient shop. As lending falls, pawnshop profits fall because each pawnshop must cover its fixed costs from a smaller cash flow.

This industrial structure suggests that states with more generous usury laws should have higher numbers of pawnshops per capita. With high ceiling rates, a pawnshop with a large customer base could make extraordinary profits. These profit opportunities would encourage new pawnshops to open, until each pawnshop has a sufficiently small customer base that it no longer makes unusually high rates of return. Similarly, states that do not require the return to customers of any surplus from a default should have more pawnshops per capita because such a law should favorably affect pawnshop profits.

In addition to industrial structure and regulation, customer demand for pawnshop credit should also affect the number of pawnshops per capita. In states where a large percentage of the population is excluded from mainstream credit markets, demand for pawnshop services should be strong. Given customers' transportation costs, one would expect this demand to be met by numerous pawnshops located strategically throughout the state.

To examine the links between pawnshops per capita, pawnshop regulations, and state demographic characteristics, this article employs cross-sectional regression analysis for 28 states using 1987-88 data. The number of pawnshops per million capita (PPC) in each of the states is the dependent variable. Two explanatory variables represent the effect of state regulations on pawnshops per capita: the state pawnshop interest rate ceiling (INT) and a dummy variable (SUR) for states with rules requiring any surplus from the sale of the collateral be returned to the pledger.¹³

There are no data directly measuring the percentage of a state's population whose risk characteristics exclude them from bank or finance company credit. However, based on the earlier discussion of pawnshop customers;

measures of state poverty and education levels should serve as crude proxies. Accordingly, the explanatory variables include the percentage of persons in the state below the national poverty standard (POV) and the percentage of people 25 years old and over in the state attaining at least four years of high school education (ED).¹⁴

The results from the regression are:

$$PPC = 11.5 + 429.8 INT + 203.7 POV - 166.6 ED + 7.9 SUR$$

(62.7) (115.8) (56.6) (7.8)

(Standard errors in parentheses - $R^2 = 0.78$)

The signs on the interest rate, poverty, and education variables are as expected and are statistically significant at reasonably high levels of confidence.¹⁵ The sign on the surplus rule is not consistent with expectations, but the standard error indicates little confidence can be attached to the estimate. The independent variables explain about 78 percent of the variation in pawnshops per capita observed among the 28 states in the sample.

According to these results, three factors explain the disproportionate concentration of pawnshops in the Southern and Central Mountain states: more generous usury ceilings, higher poverty rates, and lower education levels. Presumably, in states with higher poverty rates and lower education levels, a larger percentage of people must pay the higher cost of borrowing from pawnshops because their risk characteristics exclude them from bank or finance company credit.

Explaining the long-run growth in U.S. pawnbroking

The contrast between the almost total decline of the British pawnbroking industry over this century and the expansion of the American industry is striking. While part of this contrast may be attributable to differences in general social conditions or banking systems, the main explana-

tion is undoubtedly the combined effect of differences in usury laws and falling personal transportation costs.

In England before the mid-1980s, the pawnshop interest rate ceiling was set nationally and remained under 35 percent APR for over a century.¹⁶ In the United States, where pawnshop usury laws are established at the state level, numerous states in recent decades have maintained usury ceilings of well over 120 percent APR, some have had no ceiling rate, and others have not enforced their pawnshop usury laws. In states with enforced usury ceilings consistently below 50 percent APR, pawnbroking has declined over this century, as illustrated by the sharp drop in the number of shops in the older major urban areas. In states with more generous usury laws, pawnbroking has flourished.

Adding to the effect of less binding usury laws has been a significant decline in personal transportation costs. Even with very high interest rates, a pawnshop needs a substantial number of customers to operate profitably. In the early part of this century, pawnbroking was probably not viable outside the major urban areas because high transportation costs prevented a pawnshop from drawing customers from more than a few miles away. It was for this reason that William Patterson wrote in his 1899 study of the pawnbroking industry, "The business of the pawnbroker requires not only an urban population, but a dense urban population, such as is found in the greater centers of industry. . . . Outside of the North Atlantic Section there are but few states with even two cities of sufficient size to support the business (Patterson 1899a, p. 256)." With the advent of the automobile and a well-developed highway system this is no longer true. Pawnshops are well represented in the rural areas of many of the southern and western states, and these shops commonly draw customers from a 50-mile radius, something unthinkable 70 years ago.

The growth of U.S. pawnbroking over the

century is therefore a result of two interrelated factors, falling transportation costs and generous usury laws. One is not sufficient without the other. States in the Northeast and Great Lakes region of the United States also experienced falling transportation costs, but because of more restrictive usury laws, pawnshops are rarely found in the small cities and rural areas of these states. Similarly, without the low-cost personal transportation brought by the automobile, pawnshops would probably not exist outside of urban areas in any region of the country regardless of usury laws.

Growth in pawnbroking in the 1980s

Explaining the growth of U.S. pawnbroking in the 1980s requires an appeal to different factors, for state usury laws and transportation costs did not change appreciably over the decade. Rather, explanations of the growth of pawnbroking in the 1980s focus on the effects of bank deregulation, falling average real wages of production workers, and increases in the poverty rate.

Prior to 1980, service fees and minimum-balance requirements on checking and savings accounts either did not exist or were much lower than today. Following the enactment of the Depository Institutions Deregulation and Monetary Control Act of 1980, banks moved toward pricing services to cover costs, making it more expensive for depositors to maintain small-balance accounts. In addition, in response to a more competitive banking environment, banks closed unprofitable branches, many of which were located in low-income neighborhoods.

Perhaps as a result of these changes, from 1977 to 1983 the percentage of low-income families who did not maintain bank accounts increased. A recent Federal Reserve study showed that 28 percent of the families in the lowest quintile for family income did not maintain any depository accounts in 1977. By 1983,

36 percent of families in this group did not maintain either checking or savings accounts (Canner and Maland 1987).

Such developments may have contributed to the growth of pawnbroking because individuals without bank accounts would be unlikely to pass bank or finance company credit checks and could be forced to turn to pawnshops for loans. Policy-makers have also expressed concern that changes in the banking system in the 1980s may have excluded many low-income consumers from mainstream credit. For example, on October 2, 1986, the Federal Financial Institutions Examination Council, consisting of representatives of the Federal Reserve Board of Governors and other federal agencies that regulate financial institutions, stated

Some institutions have begun to explicitly price their products, consolidate or eliminate services they believe to be unprofitable, and close branch offices. . . . Considerable concern has developed about the potential impact of these changes in effectively denying or reducing convenient access of many individuals to the payments system and to safe depositories for small savings. Because credit availability is often dependent on an account relationship with a financial institution, access to credit for low-income or young consumers may also be adversely affected. (*Federal Reserve Bulletin* April 1987, p. 268)

Other factors contributing to the growth in pawnbroking in the 1980s could be the decline in average real wages for production workers and increases in the national poverty rate. In 1978, the average weekly earnings for a production worker in nonagricultural private sector employment was \$204. By 1988, this average had dropped to \$181 (in constant 1978 prices). Over this same period, the national poverty rate rose from 11.4 percent to 13.1 percent, an increase of 7.5 million people below the poverty line.

Regardless of whether these trends reflected changes in demographics or a fundamental transformation of labor markets, they may signal an increase in the percentage of Americans excluded from mainstream credit markets. If so, the growth in pawnbroking in the 1980s could reflect increased demand for credit alternatives to banks and finance companies.

IV. Policy Implications

This study of pawnbroking raises policy issues for regulators of financial institutions and policymakers at all levels of government. At the national level, the issue is whether changes in bank regulations and labor markets have forced many low-income consumers to pay much higher prices to meet their credit needs. At the state and local levels, the issue is whether pawnshop customers are better served by a low usury ceiling or a relatively high one.

Some might interpret this study as supporting the need for policy measures to encourage the provision of bank services in low-income neighborhoods and to guarantee that all consumers can afford to maintain a basic transaction account. If an increasing percentage of society is unable to afford bank accounts and, consequently, is losing access to mainstream credit markets, there is a cause for concern. In states where pawnshops are rare, most people will not have an institutional alternative if excluded from bank and finance company credit. Thus, losing access to those mainstream credit institutions could be disruptive and costly. In states where pawnshops are a ready alternative, pawnshop credit tends to be far more expensive than credit from mainstream institutions. Thus again, losing access to mainstream credit markets is costly for consumers.

Given the limited data, however, the link between the recent growth in pawnshops and changes in access to bank accounts is open to question. Statements about trends in the owner-

ship of bank accounts and the growth of pawnshops are, at this point, based on only a few observations. Even accepting the trends, it need not apply that one is causing the other. In particular, given that pawnshops mainly provide very small collateralized loans and mainstream financial institutions provide comparatively large consumer loans or open-ended lines of credit, such as credit cards, the growth of pawnbroking could be unrelated to changes in the banking industry.

In any case, the large number of pawnshops in states with generous usury laws reveals a strong demand for small consumer loans not met by other credit institutions. It also emphasizes the critical importance of pawnshop usury laws, which were drafted to protect unsophisticated consumers and to ensure access to moderately priced small loans.¹⁷ Economists have generally criticized state usury laws as detrimental to low-income consumers. Financial institutions under binding interest rate ceilings tend to allocate credit to only the most credit-worthy borrowers, who generally belong to middle-income or high-income groups.¹⁸ This is not the case with pawnshops, however, because all customers provide collateral, eliminating the need to distinguish high-risk from low-risk borrowers. Rather, the major effect of a low pawnshop usury ceiling is to reduce the number of shops in the state.

In the case of pawnbroking, therefore, state regulators face a somewhat different trade-off than that faced in regulating mainstream credit institutions. A high interest rate ceiling provides

individuals excluded from mainstream credit institutions access to a convenient, but expensive, alternative. A low ceiling rate reduces the cost of this alternative, but also makes access to pawnshops prohibitively inconvenient for many.

V. Summary

Measured by the percentage of population served, pawnshops are an important and growing source of consumer credit. Pawnshop loans are differentiated in key ways from those of other credit institutions. The average loan is very small, around \$50. The interest rate is comparatively high, often as much as 240 percent APR. Collateral in the possession of the pawnshop fully insulates it from credit risk. And, the default rate on pawnshop loans is relatively high, around 10 to 20 percent.

Most pawnshop customers come from low-income economic groups and are probably ineligible for bank or finance company credit. Pawnshops are heavily concentrated in the Sunbelt and Central Mountain states, which tend to have the most generous pawnshop usury ceilings. Factors such as financial deregulation and an increase in the national poverty rate both may explain some of the growth of pawnshop activities in the 1980s. Further study of the role that pawnbroking plays in credit markets may assist policymakers in understanding the effects of financial deregulation and the costs to consumers who are excluded from mainstream credit markets.

Endnotes

¹ Unfortunately, the Federal Reserve's Survey of Consumer Finance does not classify participants obtaining credit from pawnshops. They are simply identified as obtaining credit from a nontraditional source, including individual-to-individual loans as well as pawnshops.

² From May 1989 to February 1990, the authors interviewed pawnbrokers in Missouri, New York, Oklahoma, Oregon, and Pennsylvania.

³ An appendix, available from the authors, presents the methodology behind these estimates.

⁴ This estimate was constructed by contacting state regulatory agencies and counting yellow page listings for states without pawnshop oversight agencies. The actual count was 6,853. For the states for which both official and yellow page counts exist, the two numbers are very close.

⁵ In the late nineteenth century, charitable organizations in the United States formed nonprofit pawnshops in several major cities to serve the credit needs of the working class. All of these have now closed except the Provident Loan Society in New York City, which makes loans from a number of branches at an interest rate of 23 percent a year. Its 1894 founders included such financial luminaries as Solomon Loeb, J.P. Morgan, and Cornelius Vanderbilt.

⁶ In response to the popular belief that pawnshops act as fronts for burglars, all brokers adamantly insist that they do not knowingly accept stolen goods as collateral. They point out it is not in their interest because the police can seize the goods and the pawnshop owner loses the collateral and the loaned money. In addition, given the police report requirement, it would not be in the interest of a thief to pawn a stolen good.

Although many items, especially jewelry, do not have serial numbers and would be difficult to identify from police reports, the data appear to support the brokers' claims. For example, Oklahoma reports that in 1987 the police seized only 0.15 percent of pawned goods for being stolen property.

⁷ An interesting example is Delaware, where it is illegal for a pawnbroker to accept a customer's false teeth or artificial limb as collateral.

⁸ In states such as Alabama, Florida, Iowa, and South Dakota, which set no pawnshop interest rate ceilings, interest rates on a \$51 loan commonly range from 18 to 28 percent a month.

⁹ Because pawn tickets are legally transferable in almost all states, the reported default rate need not represent the default rate of the original borrowers. If a debtor is unable to redeem his collateral, for example, he may be able to sell the ticket if the pledged item is worth more than the principal and interest needed to redeem it. Outside of New York City, however, where businesses advertise offering to purchase pawn tickets, reported default rates probably only slightly under-represent actual default rates.

¹⁰ A survey by the authors determined that pawnshops in these states generally charge the ceiling rate.

¹¹ In Oklahoma, as in several other states, the pawnshop usury ceiling depends on the size of the loan, with lower rates for larger loans. For example, in Oklahoma a pawnshop can levy a 20 percent monthly interest rate on a loan up to \$150, a 15 percent monthly interest rate on that amount over \$150 but less than \$250, and so on.

¹² The table uses \$51 rather than \$50 because in some states the regulated storage or interest fees may vary at exactly \$50.

¹³ In states without usury limits, the number of pawnshops per capita could affect the interest rate as well as vice versa, so to prevent any simultaneity bias the regression employed only data from the 28 states with clear binding usury laws.

¹⁴ The *1988 Statistical Abstract of the United States* is the source for the state education and population data. Plotnick 1988 is the source for the poverty data.

¹⁵ In the 28 states, the average number of pawnshops per million inhabitants was 29.2. The mean of the independent variables was 9.0 percent for the monthly interest rate, 13.4 percent for the poverty rate, and 31.0 for the percentage of citizens completing their high school education.

¹⁶ England abolished its pawnbroking usury ceiling in the mid-1980s, and the industry has grown in recent years. In 1980, for example, there were 115 pawnshops in England. By 1987, the number had risen to 175 (Lohr 1987).

¹⁷ It does not appear usury laws were intended to limit pawnshop profits, and because there is free entry into pawnbroking one would not expect to find higher pawnshop profits in states with generous usury laws. In a high-ceiling state, more pawnshops enter the market, leaving fewer customers per shop and raising the fixed costs per customer.

¹⁸ Nathan 1980 surveys this literature.

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Will Higher Corporate Debt Worsen Future Recessions?

By Jon Faust

In the decade of the 1980s, huge debt-financed takeovers spotlighted the rapid growth in corporate debt in the United States. With the rise in debt, nonfinancial corporations enter the 1990s with debt equal to about 40 percent of gross national product, up almost ten percentage points from a decade ago.

The increase in corporate debt confronts society with a host of important questions. For example, will heavy debt burdens induce managers to run firms more efficiently, allowing the firms to compete better in world markets? Do stockholders benefit from the rise in a firm's debt? Can heavily indebted firms afford to invest for the future?

Among the questions raised by higher corporate debt, however, one emerges as particularly significant for monetary policy: Will higher corporate debt worsen future recessions? This question is important because one goal of policy is to minimize the detrimental effects of recession.

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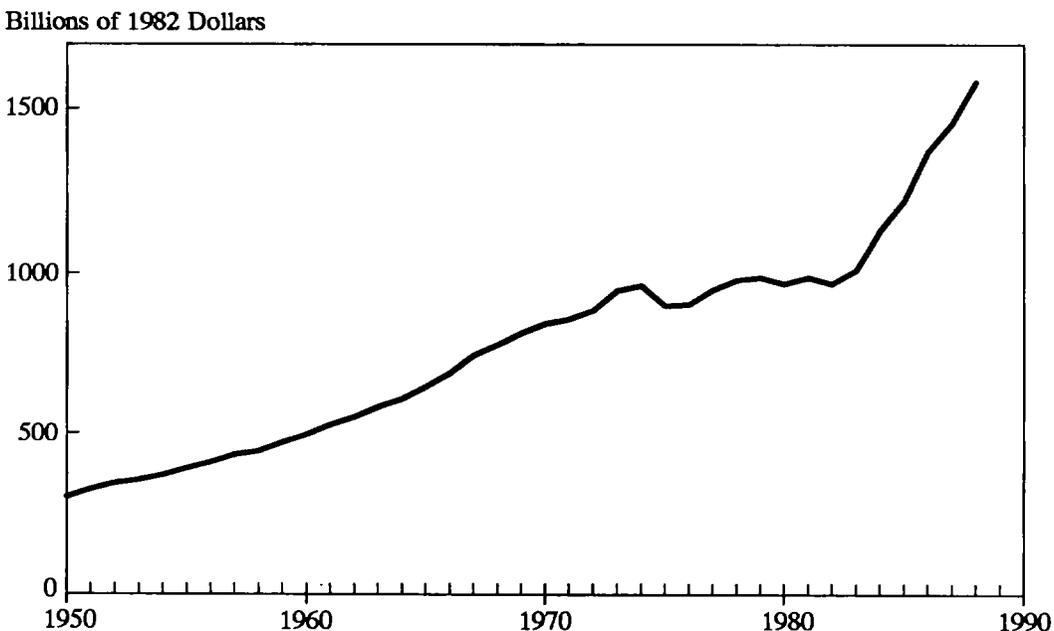
Policy. Policymakers must often balance the inflation-fighting benefits of restrictive monetary policy against the risk those policies might precipitate a recession. How corporate debt will affect the severity of future recessions is an important factor in this balancing act.

This article examines the implications of increased corporate debt for future recessions by considering two related questions. First, will increased corporate debt increase firms' risk of bankruptcy; and second, will increased bankruptcy risk worsen future recessions? While economists have not fully resolved either of these questions, the available evidence supports the conclusion that increased corporate debt will increase bankruptcy risk, which in turn will probably worsen future recessions.

I. The Rise in Corporate Debt

In the second half of the 1980s, corporations amassed a record amount of debt. In dollar terms, corporations took on \$700 billion of additional debt from 1984 to 1988, with total debt rising to about \$1.9 trillion.¹ After adjustment for

Chart 1
Nonfinancial Corporate Debt Adjusted for Inflation



Sources: Board of Governors of the Federal Reserve System, "Balance Sheets for the U.S. Economy 1949-88"; U.S. Department of Commerce, *Survey of Current Business*, various issues.

inflation, the rise in debt was particularly striking; real corporate debt rose 40 percent from 1984 to 1988 (Chart 1). Such reliance on debt represented an unprecedented change in the way corporations finance their business activities. This section reviews the role debt plays in corporate finance and documents the increased reliance on debt in the 1980s.

Corporate reliance on debt financing

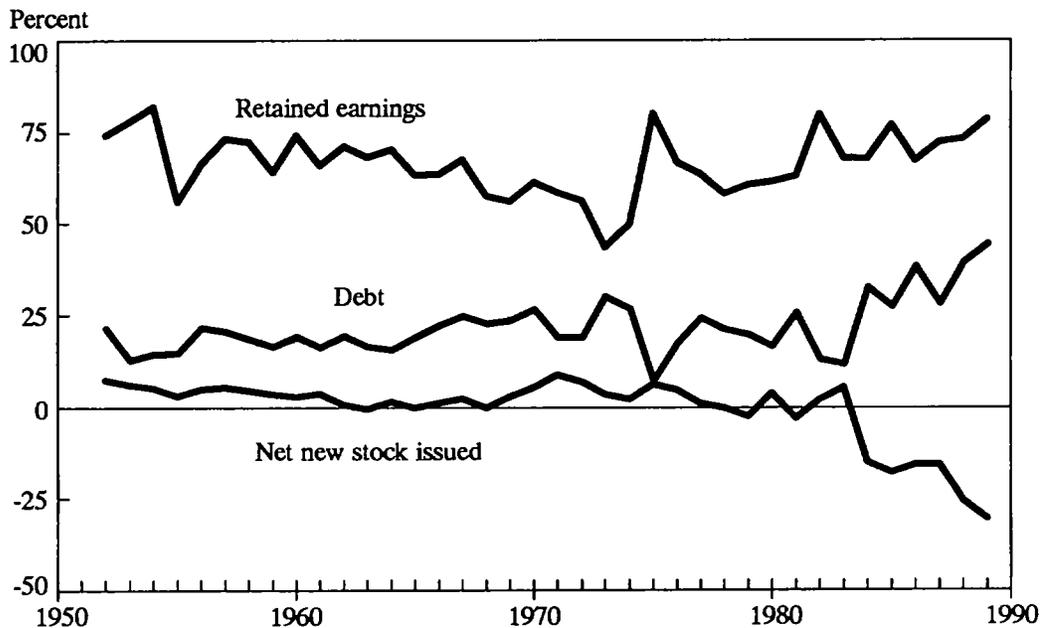
Corporations can raise funds in three ways: take on debt, sell stock, and retain earnings. Debt comprises funds borrowed in any form, with bank loans and corporate bonds the two primary forms of corporate debt. The second major way firms raise funds is by selling new stock in share

or equity issues. The third source of corporate funding is retained earnings, which are the portion of after-tax profits in a given period not paid out to owners of the firm.

Among the three sources of finance, corporations relied more heavily on debt in the 1980s than in the three previous decades (Chart 2).² Prior to 1984, debt's share of total corporate financing fluctuated around an average of 21 percent each year. Since then, debt's share has averaged about 37 percent, rising to 46 percent in the first three quarters of 1989.

The increased reliance on debt has come at the expense of new stock issuance rather than retained earnings. In fact, new stock issuance dropped precipitously after 1984. Prior to then, corporations obtained an average of about 3 per-

Chart 2
Sources of Corporate Finance



Source: Board of Governors of the Federal Reserve System, "Flow of Funds Account," various issues.

cent of their funds each year by selling stock. Since then, corporations have repurchased almost \$500 billion more stock than they have sold. In contrast, retained earnings' share of total funds increased in the 1980s, rising from about 66 percent for the period through 1984 to an average of 74 percent since then. In the first three quarters of 1989, retained earnings' share was 79 percent.

Measuring the burden of increased corporate debt

While the increase in corporate debt in the 1980s was unprecedented, other factors need to be considered in evaluating the financial position of corporations. It is important to take into

account not only the amount of corporate debt, but also corporations' capacity to bear debt. Obviously, a \$100,000 debt that would swamp many small businesses would impose little burden on General Motors.

Financial analysts use two common statistics for measuring the debt burden of a firm, debt-equity ratios and interest-coverage ratios. Called measures of leverage, these statistics measure the size of a firm's debt relative its capacity to repay its debt.

Debt-equity ratios report the ratio of the principal a firm owes on its debt to the firm's equity value, or net worth. A firm with a small debt-equity ratio has little debt compared to its net worth. Such a firm has a small debt burden

because the firm's net worth could drop significantly and the firm would still be able to repay its debts. A firm with a high debt-equity ratio, on the other hand, faces a higher risk that a drop in its net worth would leave it unable to pay its debts. If that happens, the firm is insolvent and, unless reorganized, will ultimately go bankrupt.

Analysts often consider two different ways of measuring debt-equity ratios. The two ratios are based on different measures of the firm's equity value: a market-value measure and a measure based on book value adjusted for inflation. The market value of equity in a firm is, generally speaking, the value of the firm if it were to be sold on the market. For publicly held firms, the market value of equity is the value of all the firm's shares on the stock market. Book value of equity is measured by the net worth of the firm based on the firm's books. This is approximately the net value left over if the firm were broken up, all assets sold at book value, and all debts paid off at book value. The particular book-value measure discussed below adjusts the value of the firm's physical capital—its property and equipment—for the effects of inflation.

The *interest-coverage ratio* relates the size of a firm's interest payments on debt in any period to the amount of cash it takes in during that period. Specifically, it is a ratio of interest payments to cash flow, where cash flow is defined as profits before interest payments, taxes, and depreciation charges.³ A large interest-coverage ratio suggests a substantial portion of a firm's cash intake goes to pay interest on its debt. Thus, even if it remains solvent, the firm may have difficulty making debt-service payments if profits temporarily dip. A solvent firm not earning enough cash to make its interest payments has a liquidity problem. Liquidity problems are less serious than insolvency, and temporary loans or a rescheduling of debt payments will allow the firm to remain in business.

Debt burdens have increased

The interest-coverage ratio and book-value debt-equity ratio reveal a similar picture of rising debt burdens in the 1980s (Chart 3).⁴ From 1984 to 1988, the debt-equity ratio rose from 36 percent to 52 percent. From 1984 to 1989, interest payment's share of each dollar of cash flow rose from 15 to 21 cents.

The evidence provided by these measures reveals leverage is far higher now than in the 1950s and early 1960s. And, although debt burdens reached high levels in the 1973-75 recession, today's levels are considerably above that earlier peak.

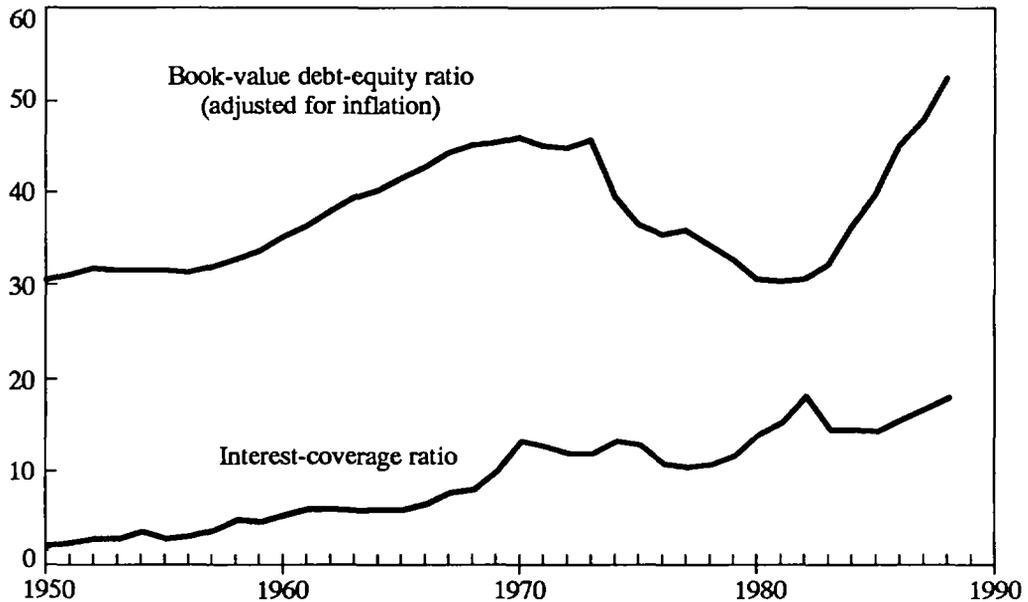
A contrasting view of debt burdens is provided by the market-value debt-equity ratio (Chart 4). This measure has fluctuated since the late 1970s, showing no increase during the rapid debt growth of the 1980s. While the market-value measure agrees with the other two measures that debt burdens are higher now than in the 1950s and early 1960s, the market-value debt-equity ratio reached its highest level in 1974, well above the current level.

Why do these measures of the debt burden diverge? An important reason is that the interest-coverage and book-value measures of leverage tend to reflect current or past capacity to bear debt, while the market-value measure is more forward-looking. For example, the interest-coverage ratio relates the current interest burdens to current corporate cash flow. Thus the growth in the interest-coverage ratio indicates the debt burden has risen relative to current cash flow, but the ratio will not reflect any anticipated rise in cash flow. Similarly, the book-value debt-equity ratio measures debt relative to the value of assets when they were purchased (adjusted for inflation), but it will not reflect any appreciation in these assets due to enhanced business prospects.

In contrast, the market-value debt-equity ratio is forward-looking. The market value of a firm should be related closely to the profits the

Chart 3

Interest-Coverage Ratio and Book-Value Debt-Equity Ratio



Source: Board of Governors of the Federal Reserve System, "Balance Sheets for the U.S. Economy 1949-88"; U.S. Department of Commerce, *Survey of Current Business*, various issues.

firm's owners are likely to accrue in the future. The rapid rise in the market value of equity in the 1980s, under this view, reveals that market participants expect a rise in corporate profitability and are therefore willing to pay more for company shares.

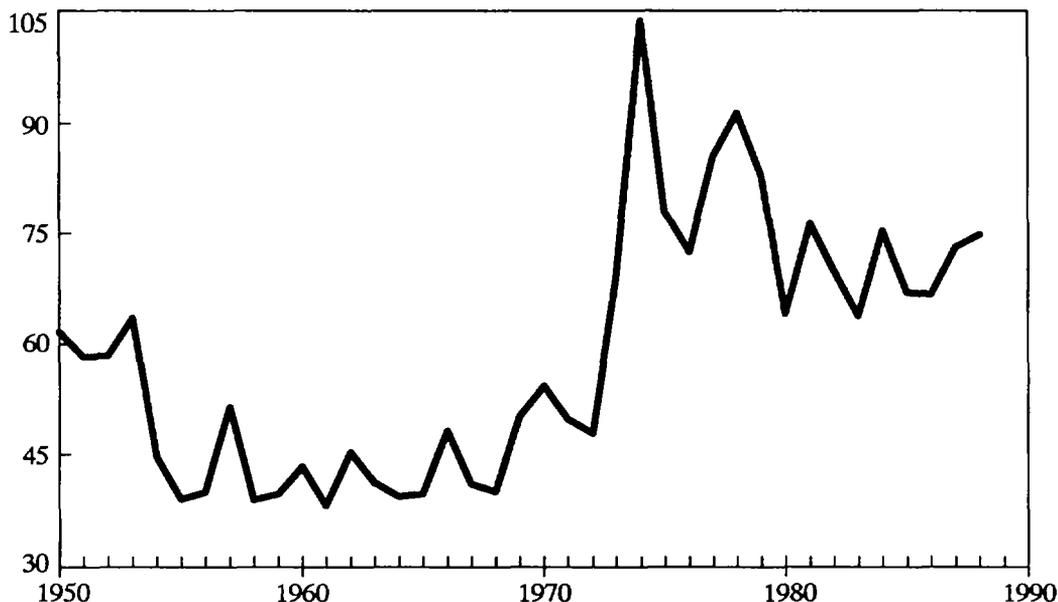
Some analysts suggest the market-value measure may be the most useful measure of the debt burden.⁵ Of course, if corporate profitability does rise, then the capacity to bear debt will also rise. Thus, the market-value debt-equity ratio may suggest that, in the view of stock market participants, corporate debt has not risen appreciably relative to future corporate profits. If the market forecasts of future profits are correct, the market-value debt-equity ratio provides good reason to believe debt burdens have not risen.

There are several reasons to place more weight on the measures showing a rise in the debt burden, however. The stock market has shown wide swings in the 1980s, casting some doubt on whether the market always provides an accurate forecast of future corporate profitability.⁶ This doubt is underscored by the continued rise of the interest-coverage ratio, which reveals that six years into a robust economic expansion the rapid profit growth signaled by the strong stock market has not yet materialized.

From a monetary policy perspective, there is another reason to place emphasis on measures that show the debt burden rising relative to current capacity to pay. Policymakers must consider what will happen in a future recession. That is, what will happen if the expectations of higher

Chart 4

Market-Value Debt-Equity Ratio



Source: Board of Governors of the Federal Reserve System, "Balance Sheets for the U.S. Economy 1949-88."

profits reflected in the market-value measure of the debt burden do not materialize? In this case, the interest-coverage ratio or book-value debt-equity ratio may present a more accurate picture of the debt burdens.

In sum, the evidence indicates corporate reliance on debt has risen significantly in the 1980s. Debt has risen significantly relative to corporate capacity to pay, as measured by book value of equity and current cash flow. The market-value debt-equity ratio provides reason to question whether the debt burden has risen relative to the prospective corporate earnings reflected in the market value of equity. In assessing the likely effects of a future recession, however, the measures not anticipating increased earnings are probably the most relevant.

II. Increased Corporate Debt and Bankruptcy Risk

Analysts who are concerned increased debt may worsen future recessions have focused on the risk of bankruptcy faced by heavily indebted firms. These analysts argue that heavy debt burdens will magnify the detrimental effects of future recession by increasing bankruptcies and by subjecting more firms to distress near bankruptcy. Their argument has two important and distinct steps: first, increased debt burdens will increase the risk of bankruptcy; and second, increased bankruptcy risk will worsen future recessions. The present and following sections take up these two points in order.

Resolving whether increased corporate debt

has increased firms' risk of bankruptcy is complicated because the 1980s witnessed many changes that may have mitigated bankruptcy risk. Examination of the available evidence suggests, however, that the current level of corporate debt has heightened the bankruptcy risk firms will face in any future recession.

Factors affecting bankruptcy risk in the 1980s

Most economists agree increased debt burdens have tended to increase the risk of bankruptcy.⁷ By definition, a firm with a heavier debt burden has larger liabilities relative to its assets than a less burdened firm. Any fall in the value of the heavily indebted firm's assets, therefore, is more likely to send the firm into bankruptcy.⁸ Economists who argue bankruptcy risk has not increased do not deny higher corporate debt has increased bankruptcy risk; rather, they argue increased bankruptcy risk has been attenuated by other changes in the economy.

Several changes in the 1980s may have reduced the bankruptcy risk associated with a given level of debt. These changes allow firms to more accurately control cash and have more flexibility in meeting their debt obligations. Either type of change increases the likelihood firms will be able to meet their debt obligations.

One major development in the 1980s was the rise of the junk (low-grade) bond market. While the junk bond market allowed firms to take on more debt, it also may have made it easier to bear large amounts of debt in two ways. First, the junk bond market is a new source of funds to corporations who cannot issue investment-grade bonds. In the past, these corporations were often forced to rely on bank borrowing, which is difficult to obtain in periods of tight credit. These corporations can now turn to the junk bond market when they need to borrow additional funds to meet financial obligations. Second, some analysts believe junk bonds are more closely held

than traditional debt. That is, the debt holders take a more direct and active interest in the firms than do holders of other forms of debt. If so, debt holders may be unlikely to force a distressed firm to declare bankruptcy, preferring instead to reschedule debt payments and to aid in reorganizing the firm. Whether junk bonds are more closely held than traditional debt, however, is debatable.

A number of other innovative financing techniques emerged in the 1980s that may reduce bankruptcy risk. For example, strip financing may have increased the tendency of debt holders to negotiate with a distressed firm, rather than forcing bankruptcy. In strip financing, investors hold a fixed combination of the firm's debt and equity instruments. Because debt holders also have an equity stake, they may have an incentive to keep the firm afloat.⁹

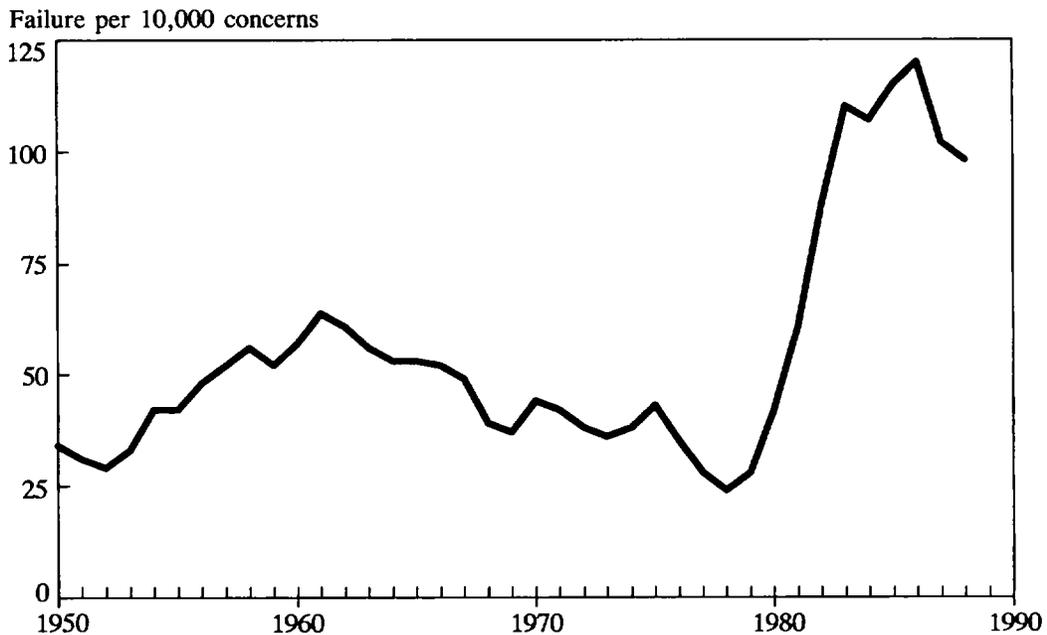
Also, firms' liabilities other than debt have become more flexible in the 1980s, allowing firms to safely take on more fixed debt liabilities. For example, since the deep recession of 1981-82, labor unions seem to be more willing to give concessions to a distressed firm than in the past. If so, heavily indebted firms may have more flexibility than in the past to reduce obligations to labor when distressed.¹⁰

The net effect of these changes on bankruptcy risk is difficult to gauge based on argument alone. While the increased debt burden certainly has tended to increase the risk of bankruptcy, these other developments may have mitigated the increased risk in part or in whole. Fortunately, evidence on the performance of heavily indebted firms sheds some light on this subject.

Evidence indicates bankruptcy risk will be higher in future recessions

The important question is whether the combined changes in the 1980s have increased the likelihood firms will go bankrupt in the next

Chart 5
Business Failure Rate



Source: Dun and Bradstreet, *Business Failure Record*, various issues.

recession. Answering this question is complicated because many of the relevant changes have occurred in the seven years since the last recession in the United States. Thus, there is no direct experience upon which to base judgments about how changes in the 1980s will affect firms in recession.

The risk of bankruptcy in the next recession, however, can be assessed in two ways. The first approach is to examine empirical evidence from the late 1980s to see if increased debt burdens did in fact raise bankruptcy risk. Evidence of heightened bankruptcy risk during this period of economic expansion will provide a basis for concluding firms with high debt burdens face a higher risk of bankruptcy in the next recession. The second approach involves simulating the

effects of past recessions to predict the bankruptcy risk firms would face if similar events occurred with today's corporate debt burden.

Bankruptcy risk evidence from the late 1980s. The first piece of evidence to consider when assessing bankruptcy risk is the dramatic rise in business failures in the 1980s.¹¹ Business failures per 10,000 firms averaged 109 from 1985 to 1988, compared with 49 from 1950 to 1984 (Chart 5).

Although a number of analysts point to this evidence as strong support for the view that bankruptcy risk has increased, others contend the interpretation of the data is clouded by two special factors. First, bankruptcy laws changed in 1979, increasing the attractiveness of declaring bankruptcy. Second, because new businesses

always have a high rate of failure, the failure rate in the current economic expansion may be distorted by a large number of business starts.

These two special factors probably cannot account for the entire rise in the measured failure rate, however. While the first factor, the change in the bankruptcy laws in 1979, may have permanently increased the rate of failures, the increase in the rate due to this factor was probably completed in the early 1980s. In contrast, the measured failure rate rose through 1986. The second factor, the failure of newly formed businesses, does seem to have been important in the early part of the expansion, as the share of failures accounted for by young firms (age five years or less) rose sharply. In the late 1980s, however, this share dropped to an unusually low level, while the failure rate remained high. Thus, while interpretation of the failure rate data is complicated, the data do seem to reflect an increased risk of bankruptcy.

Further evidence on bankruptcy risk is provided by assessments of corporate bond riskiness. Two major services, Moody's and Standard and Poor's, rate the quality of corporate bonds. These ratings are intended to reflect the likelihood the issuing corporation will meet its debt obligations. Evidence from both rating services shows a general decline in the quality of bonds. For example, since the end of the recession in 1982, Moody's has downgraded the bonds of 154 firms per year and upgraded only 72. Rather than abating as the economic expansion continued, the downward trend in quality ratings accelerated. From 1983 to 1985, downgrades exceeded upgrades by about 45 per year. From 1986 to 1989, downgrades outnumbered upgrades by over 100 per year.¹² In contrast, over the entire period from 1973 to 1982, downgrades exceeded upgrades by an average of only 24 per year.

It might be argued the rating services are downgrading firms simply because financial measures of their debt burdens have increased and, therefore, the ratings do not reflect the

changes in the 1980s that may have made debt less risky. This objection, however, is not supported by the interest rates paid on these bonds.

The objection suggests higher quality borrowers are being improperly assigned to lower rating categories. If so, then the average quality of bonds in the Baa category, for example, should have increased in the 1980s. And, if Baa bonds were safer than in the past, the interest-rate premium Baa bonds pay relative to Treasury bonds (which have no default risk) should have decreased. In actuality, the interest-rate premium on Baa bonds over ten-year Treasury bonds has grown.¹³ Since 1984, this spread has been 213 basis points, about 20 basis points larger than in any expansion before the 1980s, and nearly as large as the spread of 215 basis points experienced in the deep recession of 1973-75. Thus, gauging by the premium investors require to hold these bonds, Baa bonds have become more, not less, risky.¹⁴

In brief, evidence from the late 1980s suggests bankruptcy risk has increased. The actual failure rate is up significantly and the rated quality of bonds has fallen. Even after the downgrading of bonds, interest rate premium data reveal bonds within a given category are riskier than before.

Bankruptcy risk evidence from simulations. Bankruptcy risk normally rises in recessions as business slows and profits fall. Thus, evidence from the economic expansion in the late 1980s may not reveal the full risk corporations will face in a future recession. One way to shed light on bankruptcy risk in recession is to use a statistical model to simulate the effect of a future recession on firms with today's debt burdens.

A recent study by Bernanke and Campbell (1988) provides just such an assessment. They examined 643 large firms with varying debt burdens, simulating the effect on the firms of recessions resembling the severe recessions of 1973-75 and 1981-82. Their study concludes that

such severe recessions would lead to severe problems for 10 percent of the firms in their sample. In a recession as in 1981-82, about 10 percent of the firms would be unable to make debt payments and would require additional lending or a rescheduling of payments in order to avoid bankruptcy. A recession as in 1973-75 would present greater problems, with about 10 percent of firms becoming insolvent. Recent work extending and updating Bernanke and Campbell's study to consider the rise in debt burdens in 1987 and 1988 suggests an event greater share of firms will face distress in a future recession (Warszawsky 1990).

The simulation evidence must be viewed with caution because it does not reflect the changes in the financial environment in the 1980s that may have increased the firm's ability to avoid bankruptcy. Furthermore, simulations of this kind cannot anticipate the steps a firm might take to avoid bankruptcy if the risk were to arise. The basic point, however, is consistent with the evidence from the late 1980s, indicating a significant increase in bankruptcy risk.

In summary, available evidence supports the view businesses will experience higher bankruptcy risk in a future recession than if debt burdens were smaller. Given this conclusion, determining the cost bankruptcy risk will impose on the economy in a future recession is very important.

III. Increased Bankruptcy Risk and Economic Recession

Since the buildup of corporate debt began, analysts have questioned how heavier debt burdens might affect the economy in a future recession. The major concern probably is not that increased corporate debt will precipitate economic recessions. Rather, the concern is that bankruptcies and near-bankruptcies of heavily indebted firms will increase the severity of recessions caused by factors other than debt. This sec-

tion examines the implications of increased bankruptcy risk, concluding that bankruptcy risk will probably contribute to the severity of future recessions.

Alternative views of bankruptcy risk

The cost of bankruptcy risk can be divided into direct and indirect costs. The direct costs, incurred only if a firm actually goes bankrupt, are the legal and administrative costs associated with resolving the bankruptcies. The indirect costs may be incurred by any firm facing a high risk of bankruptcy, whether or not the firm ultimately avoids bankruptcy. The indirect costs arise because of the damage high bankruptcy risk can do to a firm's business dealings. While most analysts agree there are direct and indirect costs of bankruptcy risk, their views on the magnitude of these costs differ widely.¹⁵ The views of most analysts fall into two broad categories: the large-cost view or the small-cost view.

Analysts supporting the *large-cost view* of bankruptcy typically emphasize the indirect costs of bankruptcy risk. In this view, high bankruptcy risk adversely affects the choices of everyone involved with a firm—investors, managers, suppliers, employees, and customers.

Investors, aware they may lose their money, may charge a large premium to lend to a firm near bankruptcy or simply be unwilling to lend to the firm.¹⁶ Faced with a high cost of borrowing and the prospect that borrowing may become altogether impossible, a firm's managers may cancel otherwise profitable investment projects. The potential loss of credit sources may also lead managers to enhance the store of cash on hand by liquidating inventories and cutting production.

Because high bankruptcy risk precludes stable, long-run business relations, a firm facing high bankruptcy risk could also have troubles with employees, suppliers, and customers. For example, top-quality employees may refuse to work for a firm near bankruptcy, and a manufac-

turing firm near bankruptcy may have difficulty finding suppliers willing to produce specialized parts.¹⁷

In short, high bankruptcy risk may precipitate general retrenchment of a firm's business activities under the large-cost view. High-risk firms will have problems taking advantage of new business opportunities and sustaining old ones.

Analysts who defend the *small-cost view* of bankruptcy see the business world quite differently. In this view, investors can protect themselves from bankruptcy risk by hedging and diversifying their portfolios. Because investors can protect themselves, firms near bankruptcy do not have problems borrowing funds. Further, long-term relations are unimportant in this view: when a firm goes bankrupt, its employees, suppliers, and customers switch to other firms swiftly and without cost. Since bankruptcy poses so few inconveniences in this view, employees, suppliers, and customers do not hesitate to deal with firms near bankruptcy.

Thus, the primary costs associated with a high risk of bankruptcy in the small-cost view are the direct administrative and legal expenses of resolving actual bankruptcies. Supporters of this view believe these direct costs of bankruptcy are small and, therefore, argue high bankruptcy risk poses no significant problems for firms or the economy.¹⁸

Case studies reveal significant cost of bankruptcy risk

One way to assess opposing views of the cost of bankruptcy is to examine actual cases of firms facing a high bankruptcy risk. Noteworthy examples are provided by the major bankruptcy or near-bankruptcy cases of Campeau, Chrysler, Braniff, and Texaco corporations. In each of these cases, the corporations involved suffered many of the symptoms predicted by the large-cost view of bankruptcy.

For example, Campeau, a large retailing conglomerate, declared bankruptcy in January 1990 while struggling under heavy debt burdens amassed in several large buyouts. When major financial problems surfaced several months before the bankruptcy, Campeau had serious problems with suppliers. Many apparel manufacturers cut off Campeau's credit lines and stopped shipping merchandise to Campeau's department stores (Agin 1989).

When Chrysler approached bankruptcy in 1979, it contended its share of new car sales dropped two percentage points due to buyer concern the firm would fail (Altman 1984). Customers were concerned about long-run support for their automobiles. Similarly, Braniff, which was twice reorganized under bankruptcy in the 1980s, faced a "fear of buying" by consumers who were worried their Braniff tickets might not be honored (McKanic 1989).

While these and similar cases seem to provide support for the large-cost view of bankruptcy, analysts cite two arguments that temper this conclusion.¹⁹ First, there is the chicken-and-egg problem. Did high bankruptcy risk lead to business difficulties, or did business difficulties lead to high bankruptcy risk? For example, did Chrysler really lose sales because of fear Chrysler would not back their cars in the future, or was Chrysler facing bankruptcy because buyers believed Chrysler's cars were inferior?

The second problem with such evidence is that it only considers the loss of the distressed firm and not the gain to its competitors. In the small-cost view, financial distress of one firm merely shifts business from the distressed firm to its competitors, with only minor costs to the economy as a whole. This point has some merit. For example, while the traveler who avoided Braniff may have had to switch to more time-consuming routes, the actual cost to society of this inconvenience may be minor.²⁰ Because these two problems raise questions about the cost of bankruptcy risk in the cases of Campeau,

Chrysler, and Braniff, analysts look to the case of Texaco and Pennzoil, which may be less clouded by these problems.

From 1984 to 1988, Texaco and Pennzoil were engaged in litigation over Texaco's preemption of Pennzoil's attempt to purchase Getty Oil. The original verdict required Texaco, a firm valued at about \$8 billion, to pay Pennzoil over \$10 billion. Ultimately, the case was settled for about \$3 billion, but Texaco faced four years of financial distress while the case was being resolved.

The case of Texaco and Pennzoil was analyzed by Cutler and Summers (1988), who suggested it was not subject to the two problems mentioned above. First, financial distress was caused by a single management decision on Texaco's part, not an overall pattern of bad management that had driven the firm to near bankruptcy. Second, it may be possible to tell if Texaco's loss was offset by the gains of others. The legal judgment involved a transfer of assets from Texaco to Pennzoil. In the small-cost view of bankruptcy, any loss to Texaco from the transfer should provide a gain to Pennzoil, with few other effects. Thus, in the small-cost view, the legal dispute should have had little effect on the combined value of the two firms (after the legal and administrative costs to the two firms are deducted). Cutler and Summers found, however, the litigation reduced the combined wealth of investors in the two firms by about \$2 billion and reduced the combined wealth of equity holders by almost 10 percent.

In assessing the cause of this tremendous drop in value, one of the central explanations put forward by Cutler and Summers was that the financial distress imposed on Texaco adversely affected its ability to do business.²¹ Texaco experienced very similar problems with creditors and suppliers to the ones experienced by Campeau, Chrysler, and Braniff. For example, one market analyst noted of Texaco, "They've been unable to refinance debt, they've missed

opportunities in the oil patch, and the diversion of management has to cost something" (Crossen and Siconolfi 1987).

Overall, the evidence from case studies is consistent with the view that firms facing high risk of bankruptcy may have serious difficulty sustaining their business dealings. Furthermore, the evidence suggests some significant losses of distressed firms are not simply offset by gains to the firm's competitors. While the evidence from these cases supports the large-cost view, more general evidence must also be considered.

Broader evidence supports the large-cost view

The best general evidence supporting the large-cost view of bankruptcy deals with the difficulties financially weak firms have in obtaining credit. The evidence suggests firms facing a substantial risk of bankruptcy find it difficult or extremely costly to obtain funds.²²

The most powerful evidence linking bankruptcy risk and borrowing probably comes from the Great Depression. The balance sheets of small and medium-sized firms deteriorated dramatically from 1929 to 1933. The fall in firm income raised interest-coverage ratios, and firm net worth shrank with the general deflation in the economy. The combined effect of these factors was to make it extremely difficult for small and medium-sized firms to obtain credit, which probably contributed to the severity of the Great Depression (Bernanke 1983).

More modern evidence links bankruptcy risk with how firm investment is affected by cash flow. Cash flow is important because if managers cannot finance investment out of cash flow, they must either cut back on investment or turn to credit markets to obtain funds. The large-cost view predicts some firms facing difficulty raising funds will reduce investment.

A number of studies confirm the prediction that when firms are short of cash they tend to

reduce investment rather than raise additional funds in credit markets (Gertler and Hubbard 1988). In a recent study, for example, it was found a one-dollar decrease in cash flow reduced firm investment by between 20 and 50 cents (Fazzari and others 1988). This more general evidence supports the contention bankruptcy risk may greatly affect firms' access to credit.²³

While much evidence supports the large-cost view of bankruptcy, however, some important problems are still unanswered. For example, although the evidence is quite suggestive, it is difficult to quantify with any precision the cost of a given level of bankruptcy risk. Furthermore, neither the large-cost nor the small-cost view offers a good explanation for why corporations chose to take on so much debt in the 1980s. Until more is known about what caused the rapid growth in corporate debt, any conclusion about the implications of the rise in debt for bankruptcy must be viewed with caution. Nonetheless, while these objections serve to emphasize that the cost of bankruptcy risk is not fully understood, neither objection overthrows the central conclusion of the large-cost view.

Altogether, the case studies and modern and historical evidence provide considerable evidence supporting the view that firms facing a high risk of bankruptcy may have substantial difficulties sustaining their business operations. Because bankruptcy risk is likely to rise in recession, firms are likely to face these problems when the economy is weakest.

Implications for future recessions

Overall, the analysis above suggests two important conclusions regarding future recessions. First, because of increased debt burdens, a significantly larger portion of firms than in the past may face a high risk of bankruptcy in a future recession. Second, the high risk of bankruptcy may pose important obstacles to these firms in raising funds and in their other business

dealings, causing them to curtail business activities. What then are the implications of these two conclusions for the performance of the economy in future recessions?

Perhaps the most ominous implication is that the retrenchment of heavily indebted firms in recession may adversely affect other firms. For example, when a firm cuts back investment and production, it reduces the earnings of the firms from which it buys raw materials and investment goods. In turn, these firms may be forced into the same cycle of cutting production and investment.²⁴

Financial institutions may also play an important role in propagating the recessionary forces.²⁵ The failure of some borrowers to meet their debt-service obligations could contribute to liquidity or solvency problems of banks or other financial institutions. Just as deterioration of a firm's financial conditions may lead the firm to cut production, financial institutions faced with similar problems may curtail lending and take other steps to increase their liquidity.²⁶ Reduced lending, of course, would magnify the problems of nonfinancial firms.

How important are these consequences of heavier debt burdens likely to be in a future recession? Views on this question differ widely. Henry Kaufman (1986, p. 22) has argued, "Huge debt will add a very troubling dimension to the next business recession. If a major economic and financial upheaval is to be avoided, official policymakers must act with alacrity." In contrast, Lawrence Summers (1988, p. 130) has written, "Corporate debt is to national economic policy about what disputes with Norway over fishing rights are to foreign policy."

The evidence presented here supports a less extreme position than either of these. The rise in corporate debt probably does pose risks for the economy in a future recession. Yet the 1980s rise in debt must be kept in perspective. As long as the United States has had corporations, it has had corporate debt and corporate bankruptcies.

Thus, the economy has long been vulnerable to the problems discussed here. The significant rise in corporate debt in the 1980s will probably intensify this vulnerability, however, worsening future recessions.

IV. Summary

The rapid growth of corporate debt in the 1980s has raised many important questions regarding how increased debt may enhance or diminish U.S. economic performance. This article has focused on a potential cost of increased corporate debt, namely, whether increased debt will worsen future recessions. The article has not addressed the potential benefits of increased debt,

such as enhanced corporate efficiency. Thus, the conclusions of this analysis form only one part, albeit an important part, of a total analysis of increased corporate debt.

The implications of increased corporate debt for future recessions hinge on two questions. First, will more debt raise the risk of bankruptcy; and second, will a higher risk of bankruptcy increase the severity of future recessions? The article finds that increased debt will raise firms' bankruptcy risk in future recessions and that higher bankruptcy risk is likely to cause firms problems in sustaining their business activities. For these reasons, increased corporate debt will probably worsen future recessions.

Endnotes

¹ The data on sources of corporate finance are from the Federal Reserve Board of Governor's flow of funds accounts and cover nonfarm, nonfinancial corporations. The numbers presented in this article are generally the most recent at the time of publication. Some data are not released as rapidly as others, however, so for various series the most recent data available will range from 1987 to 1989.

² Total corporate financing is defined as capital expenditures plus the net increase in financial assets of corporations plus a statistical discrepancy. The retained earnings measure is total internal funds plus an inventory valuation adjustment.

³ Net interest payments are used, defined as interest paid on debt less any interest earned on financial assets. There are many definitions of cash flow. While the interest-cover ratios based on these measures tell the same story of rising debt burdens, the value of the ratios may differ substantially. The cash flow measure used here is profits before net interest payments and taxes plus book-value depreciation.

⁴ For a more sophisticated analysis with similar results to those here, see Warshawsky 1990, Bernanke and Campbell 1988, and Taggart 1985.

⁵ See the discussion in Bernanke and Campbell 1988.

⁶ For example, the stock market collapse in October 1987, which did not seem to be justified by any expected change in profitability, provides an important reason to question

the reliability of the market.

⁷ Indeed, to many economists who favor rising corporate debt, it is the increased risk of bankruptcy risk that yields part of the benefit of debt. For example, bankruptcy risk may provide the impetus for firms to reorganize on a more efficient basis (Jensen 1988).

⁸ This point is generally true in economic theory. For example, in finance theories in which the debt burden is irrelevant to business decisions (such as the famous theory originally laid out in Modigliani and Miller 1958), debt raises fixed obligations, but does not alter revenues. This must increase the circumstances in which a firm fails to meet its obligations. The point is more subtle in theories (called agency cost theories) in which debt may alter business decisions and revenues. In most agency cost theories, however, increased debt burdens do raise bankruptcy risk.

⁹ Other financial instruments that have become prominent in the 1980s include interest-rate swaps and interest-rate futures. Both of these may allow corporations better to manage their debt liabilities.

¹⁰ Indeed, a large part of shareholder gains observed in leveraged buyouts may be the result of concessions by labor (Shleifer and Vishny 1988).

¹¹ In the Dun and Bradstreet data, business failures include more than just bankruptcies. Business failures "consist of businesses involved in court proceedings or voluntary

actions involving losses to creditors'' (Dun and Bradstreet 1988). Certain categories of firms were added to the pool considered by Dun and Bradstreet in 1984. Strictly, this invalidates comparing the pre-1984 and post-1984 data. The general perspective reported here carries over to breakdowns of the data, however, suggesting this point may not be of major importance.

12 These data on upgrades and downgrades were compiled using Moody's published ratings (Moody's various issues).

13 Similar results are obtained for other rating categories.

14 This use of a market indicator to judge risk is consistent with the possibility, raised in Section I, that today's stock market may be unduly optimistic. Whether justified or not, such optimism would be expected to shrink risk premia.

15 The costs of bankruptcy have been debated by economists primarily in the context of a "capital mix" debate. In this debate, the question is whether the debt-related costs of bankruptcy risk are large in the sense they offset the tax advantages of using debt instead of equity financing. The capital-mix issue is different from the issue considered in this article, which is whether bankruptcy risk will impose large costs on the economy in the event of recession. This recession issue deals with costs borne by the firm's investors and costs borne by society, while the capital-mix question only considers costs borne by investors. Further, the costs of bankruptcy risk in a recession are premised upon the occurrence of recession, whereas in the capital-mix debate the costs are unconditional, expected costs based on the likely course for the economy. Given these two facts and the fact the tax advantage of debt has often been quite large, it may be bankruptcy risk has small costs in the capital-mix debate, but still has important adverse implications for the economy in a recession.

16 Bankruptcy risk can damage the lender-borrower relation, causing lenders to become concerned about the quality

of the managers' investment projects and about how the managers will use borrowed funds. These problems are called "agency problems." Jensen and Meckling 1976 is the seminal paper on this topic.

17 If the firm actually goes bankrupt, bankruptcy laws may compound the problems a firm faces by placing severe restrictions on the activities of firms during bankruptcy proceedings.

18 Warner 1977 suggests these direct costs of bankruptcy are quite small, but Altman 1984 disagrees.

19 Altman 1984.

20 For example, in the months before Braniff's bankruptcy, no direct commercial flight operated between Philadelphia and Kansas City except Braniff's.

21 Cutler and Summers discuss several explanations. For example, they note the possibility Pennzoil's managers would waste the award. This possibility suggests investors are suspicious of managers and is consistent with the large-cost view of bankruptcy. They also suggest legal and administrative costs were probably far below \$2 billion. The remaining possibility discussed was that the loss in value was simply due to investors acting irrationally.

22 Gertler and Hubbard (1988) review this evidence.

23 While this association between investment spending and cash flow has long been noted, economists have proposed many possible explanations. Because some of these explanations are inconsistent with the large-cost view of bankruptcy, this evidence must be viewed as supportive of, but not definitive regarding, the large-cost view. See the discussion in Fazzari and others 1988.

24 Stiglitz and Greenwald (1989) emphasize these problems.

25 Benjamin Friedman (1986) suggests the economy faces large risks in this regard.

26 The recent plight of savings and loan institutions may provide examples of this sort of behavior.

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Coordinating Circuit Breakers In Stock and Futures Markets

By Charles S. Morris

Following the stock market collapse on October 19, 1987, the stock and futures markets adopted rules to temporarily restrict trading after large and rapid price declines. These rules, called circuit breakers, are designed to stop prices from falling in times of panic selling by providing a short cooling-down period.

Not everyone agrees circuit breakers can reduce price declines caused by panic selling. Nonetheless, most observers agree that if circuit breakers are to have any chance of success, they must be coordinated across both the stock and futures markets.

Of concern to some observers is that the circuit breakers currently in place are not adequately coordinated. As an example, they point to October 13, 1989, the first time the circuit breakers were tripped and when the Dow Jones Industrial Average dropped sharply by 191 points. As a result, it is charged that instead of reducing the size of a decline of stock prices in

times of panic selling, the circuit breakers currently in place may actually increase the size of a decline.

This article argues that better coordination of circuit breakers could enhance their overall effectiveness. The first section of the article defines circuit breakers. The second section describes the circuit breakers in the stock and futures markets and explains why they are not fully coordinated. The third section shows how better coordination of circuit breakers could reduce the size of a decline in stock prices.

I. What Are Circuit Breakers?

In its report on the October 19, 1987 stock market collapse, the Presidential Task Force on Market Mechanisms, known as the Brady Commission, recommended that the stock and stock index futures exchanges adopt circuit breakers to help prevent future market collapses.¹ In October 1988, the New York Stock Exchange (NYSE) approved circuit breakers for stocks and the Chicago Mercantile Exchange (CME) approved circuit breakers for the most popular stock index

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futures contract, the Standard & Poor's (S&P) 500 futures contract (see box).

Circuit breakers are temporary trading restrictions that are usually imposed after large and rapid price declines. One common trading restriction is a price limit, such as currently in place in the futures market. For example, if the price of the S&P 500 futures contract falls 12 points below the previous day's closing price, the exchange prohibits trading at lower prices for a half hour. Another common circuit breaker is a trading halt, such as currently in place in the stock market. For example, if the Dow Jones Industrial Average stock index falls 250 points below the previous day's closing value, all trading on the NYSE must stop for one hour. The time limits imposed by circuit breakers are typically quite short, lasting from as little as five

minutes to the remainder of a trading day.

Circuit breakers are designed to stop prices from falling in times of panic selling by providing a short cooling-down period for investors to reevaluate the situation. Large and rapid price declines in the stock market might cause investors to panic and sell their stocks before the price falls any further. By providing a short time-out, circuit breakers give investors time to evaluate and digest new information, to talk to other traders and find buyers, and to work out credit arrangements. After such a time-out, some investors might decide there really is no reason to sell. Some may even decide stocks are actually a bargain at the lower prices, causing them to buy stocks. In such cases, circuit breakers would stop prices from falling further.²

Circuit breakers are not meant to stop prices

The S&P 500 futures contract

The S&P 500 futures contract is one of several financial futures contracts. A financial futures contract is an agreement between two parties to buy or sell a financial asset, such as a Treasury bond or foreign currency, at a given time in the future for a predetermined price. Nothing is exchanged when a futures contract is written; instead, the buyer and seller simply agree to make an exchange at a future date. In an S&P 500 stock index futures contract, the underlying asset is the group of stocks included in the Standard & Poor's 500 Composite Stock Price Index.

The S&P 500 futures contract does not allow a seller to actually deliver the S&P 500 stocks at the future date because it would be impractical to deliver all 500 stocks in exactly the proportion in which they make up the index. Indeed, in most financial futures contracts, the physical exchange of the underlying asset rarely occurs because a buyer can offset his position

simply by selling the same number of futures contracts that he bought, and a seller can offset his position simply by buying futures contracts. Because the S&P 500 futures contract does not allow delivery, sellers must settle their position by buying futures and buyers must settle by selling futures.

The price of the S&P 500 futures contract is simply the price that the buyer would pay the seller if the stocks were actually delivered. The price of the S&P 500 futures contract is quoted as an index, and the value of an S&P 500 index futures contract is \$500 times the level of the index. For example, if the S&P 500 futures price is 320, the value of one contract would be \$160,000. Thus, if the seller could deliver the stocks, the buyer would pay the seller \$160,000 for the stocks when they are delivered at the future date. For a more complete discussion of stock index futures, see Morris 1989.

from falling when the decline is due to economic fundamentals. For example, suppose bad news about the economic outlook causes investors to sell stocks. If the sales lead to a large decline in prices, circuit breakers would be activated. During the time-out provided by the circuit breakers, investors would review the situation and see that prices were falling for an appropriate reason. When the circuit-breaker period ends, investors would continue to sell and prices would continue to fall, just as if the circuit breakers had never tripped.

II. Circuit Breakers in the Stock and Futures Markets

Most experts agree that to have any chance of success, circuit breakers must be coordinated across markets. Such coordination was sought by the NYSE and CME when they worked together to adopt circuit breakers for stocks and the S&P 500 futures contract (see appendix). However, these circuit breakers are not fully coordinated. The lack of coordination became clear on October 13, 1989, when circuit breakers were activated for the first time.

Why NYSE and S&P 500 futures circuit breakers are not coordinated

To be fully coordinated across the futures and stock markets, circuit breakers must impose the same trading restrictions in both markets at virtually the same time. Say, for example, the price of the S&P 500 futures contract falls 12 points below the previous day's closing price. This 12-point decline would trip a circuit breaker in the futures market and stop prices from falling for 30 minutes. To achieve coordination across markets, a circuit breaker in the stock market should also keep prices from falling for 30 minutes. Thus, for circuit breakers to be fully coordinated across the futures and stock markets, they must meet three criteria: (1) circuit breakers

in one market must have counterparts in the other market, (2) counterpart circuit breakers must impose similar restrictions in both markets, and (3) counterpart circuit breakers must trip in both markets at the same time. The circuit breakers currently in place in the stock and futures markets do not meet all three criteria.

Counterparts. Two of the circuit breakers adopted by the CME for the S&P 500 futures do not have counterparts on the NYSE. The S&P 500 futures has an opening price limit that is five points above or below the previous day's closing price. The S&P 500 futures also has a maximum daily limit of 50 points above or below the previous day's closing price; that is, the S&P 500 futures price cannot change more than 50 points in a day. Counterparts for neither of these circuit breakers exist on the NYSE.³

Restrictions. While some of the CME circuit breakers do have counterparts on the NYSE, the counterparts do not always impose similar restrictions. For example, if the S&P 500 futures price falls 12 points from the previous day's close, such a decline would trip circuit breakers in both the futures and stock markets. The circuit breaker in the futures market keeps the S&P 500 futures price from falling further for 30 minutes or until 2:30 p.m. Chicago time, whichever comes first. The circuit breaker on the NYSE, however, only delays for five minutes program trading orders (simultaneous orders for 15 or more different stocks) for S&P 500 stocks entered through the exchange's computer system.⁴ After five minutes, trading in any S&P 500 stock on the NYSE—not just stocks included in program orders—is halted if the price falls too much.⁵

The different restrictions imposed by a 12-point decline in the S&P 500 futures price make the circuit breaker in the futures market more restrictive than in the stock market. To see why, suppose the 12-point circuit breaker trips and the price floor for the futures contract is higher than the new equilibrium futures price.

Because the futures price at the price floor is too high, no one will want to buy the futures and trading will virtually stop. On the other hand, although a circuit breaker also trips on the NYSE, stock trading might continue with few interruptions for three reasons. First, the five-minute delay in executing orders applies only to stocks that are part of a program trade. Second, because program trading orders are delayed only if they are entered through the computer system, traders can avoid the delay by carrying the order by hand to the trading floor. And third, trading in a stock is halted only if a trade causes a stock's price to fall too much.

Timing. Circuit breakers imposing the same restrictions are not fully coordinated if they do not always trip at the same time. For example, one S&P 500 futures circuit breaker trips when the futures price falls 30 points from the previous day's closing price; another trips when the futures price falls 50 points. The NYSE counterparts to these circuit breakers trip when the Dow falls 250 and 400 points below the previous day's close. These circuit breakers are coordinated to some extent because, when the circuit breakers were adopted, a one-point change in the S&P 500 index was generally associated with an eight-point change in the Dow. But this eight-to-one relationship is not perfect, so the circuit breakers do not always trip at the same time. For example, if the futures price falls 30 points while the Dow falls less than 250 points, futures prices would be restricted from falling further for one hour; at the same time, stock prices could continue to fall until they were 250 points below the previous day's close.

A case study of circuit breakers: October 13, 1989

The first test of the circuit breakers adopted by the NYSE and CME came when the Dow fell 191 points on Friday, October 13, 1989. Circuit breakers tripped on two occasions that day:

first, when a 12-point fall in the S&P 500 futures price tripped circuit breakers in both markets; and second, when a 30-point fall in the futures price tripped a circuit breaker in the futures market. On neither occasion were the circuit breakers fully coordinated.

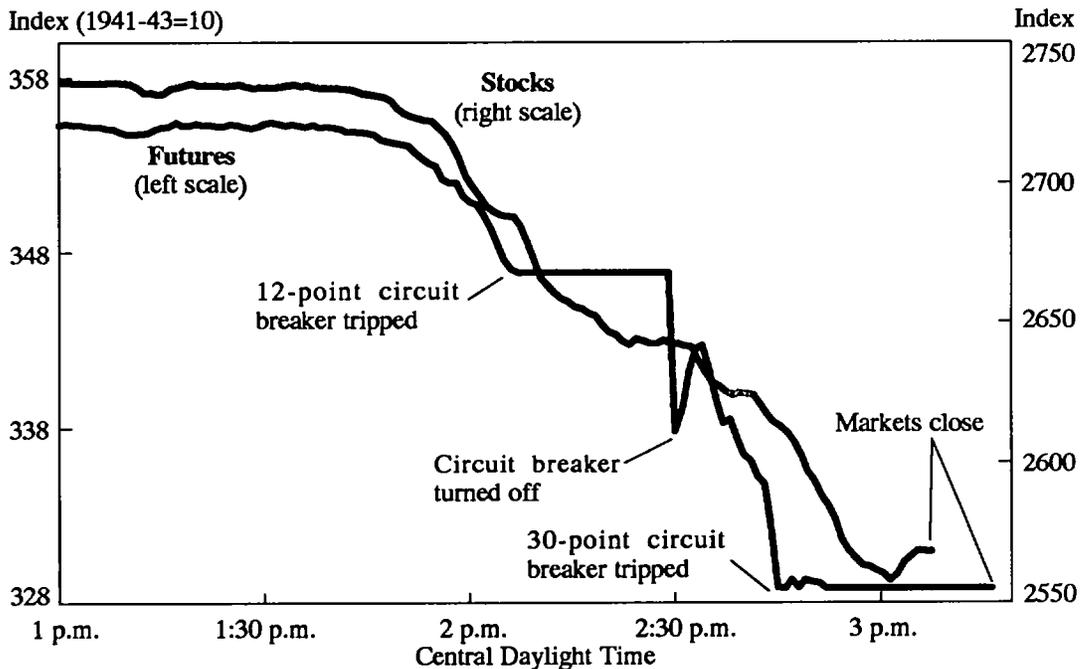
At 2:07 p.m. on October 13, 1989, the S&P 500 futures hit a price 12 points below Thursday's closing price, tripping circuit breakers in both the stock and futures markets at virtually the same time (Chart 1). The circuit breakers imposed different trading restrictions in the two markets, however, causing stock and futures prices to behave differently. Prices in the futures market held steady at the floor until the circuit breakers were relaxed at 2:30 p.m. Meanwhile, prices in the stock market continued to fall throughout the period, despite the five-minute delay on program trading orders entered into the NYSE computer system.

When the futures market circuit breaker was turned off at 2:30 p.m., futures prices plunged again, rose briefly, and then resumed their free-fall, hitting the 30-point price floor at 2:45 p.m. Once again, prices behaved differently, but this time it was because the NYSE counterpart to the CME's 30-point price floor did not trip at the same time. The 30-point decline tripped a one-hour circuit breaker in the futures market, and futures prices remained at the floor until the market closed at 3:15 p.m. But because prices in the stock market did not fall to their 250-point floor, the counterpart circuit breaker on the NYSE did not trip. Consequently, while futures prices held steady, stock prices continued to fall throughout the period.⁶

Summary

For circuit breakers in the stock and futures markets to stop price declines caused by panic selling, they must be coordinated. In other words, a circuit breaker in the futures market must have a counterpart in the stock market that

Chart 1
Stock and Futures Prices
 October 13, 1989



Note: The futures price is the minute-by-minute average of the December 1989 S&P 500 stock index futures contract traded at the Chicago Mercantile Exchange. The stock price is the minute-by-minute average of the Dow Jones Industrial Average.

Source: Tick Data Inc., Lakewood, Colorado.

imposes similar restrictions at virtually the same time. Although the NYSE and CME attempted to coordinate their circuit breakers in this way, examination shows the circuit breakers are not fully coordinated for three reasons: (1) some S&P 500 futures circuit breakers have no counterparts on the NYSE, (2) some S&P 500 futures circuit breakers are more restrictive than their counterparts on the NYSE, and (3) circuit breakers in one market may trip more often or at different times than circuit breakers in the other market. Evidence from October 13, 1989, shows circuit breakers in the futures market are more confining than their counterparts on the NYSE because they are more restrictive and trip more often.

III. Uncoordinated Circuit Breakers and Stock Prices

Uncoordinated circuit breakers that are more confining in the futures market than in the stock market may actually increase the size of a price decline caused by panic selling. When panic selling causes futures prices to fall, traders in the futures market normally absorb some of the downward pressure on prices that otherwise would flow to the stock market. Uncoordinated circuit breakers that confine futures trading, however, prevent futures traders from absorbing any of this selling pressure. As a result, stock prices fall more when futures trading is confined. Better coordination would reduce the likelihood

circuit breakers would increase the size of a decline in stock prices.

How futures sales cause stock prices to fall

Under panic selling conditions, the behavior of futures market participants determines how much selling pressure is transferred to the stock market. The major participants in the futures market are investors, index arbitrageurs, and speculators. During times of panic selling, investors sell stock index futures, while index arbitrageurs and speculators buy stock index futures. Although both index arbitrageurs and speculators buy futures, their roles are different. Index arbitrageurs transfer selling pressure to the stock market. Speculators absorb selling pressure.

Investors. Investors use stock index futures as a hedging asset to protect their portfolios against a falling stock market. When the stock market falls, the value of most stock portfolios also falls.⁷ In general, investors hedge against a falling market by buying or selling a hedging asset, such as stock index futures, so that profits on the hedging asset offset losses on the portfolio. Stock index futures are an effective hedging asset because the prices of stock index futures and stocks move in the same direction. This relationship makes it easy for investors to calculate how many futures contracts are needed to offset potential losses in the value of a stock portfolio.⁸

An investor sells stock index futures to hedge a portfolio of stocks because he earns profits from the futures sale when stock prices fall.⁹ To see why, suppose stock prices fall, causing an investor to lose \$10 on his stock portfolio. Because stock prices fell, futures prices would also fall. The investor would earn a profit on the futures that he sold because he would offset his futures position by buying futures for less than he paid. For example, if the investor sold futures for \$320 and futures prices fell to \$310, the

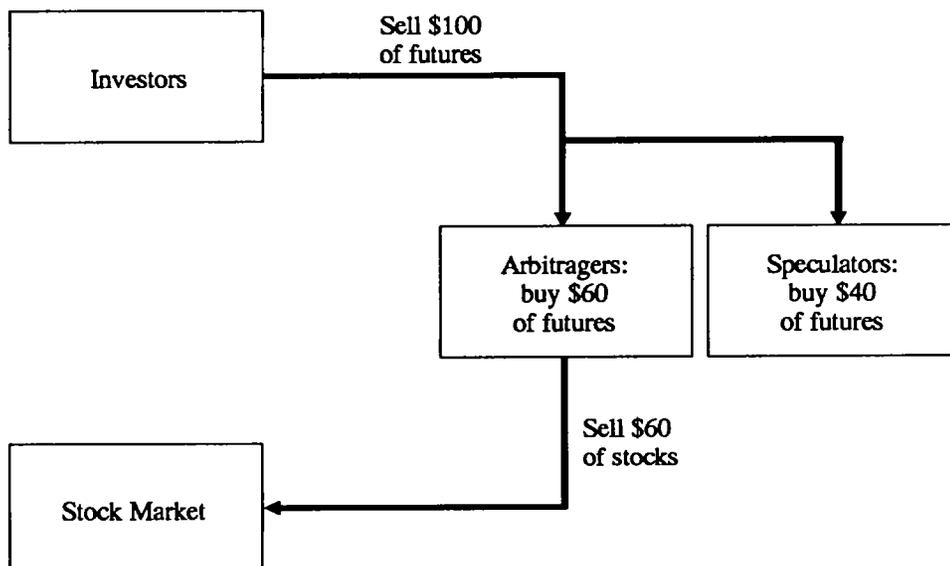
investor could buy futures for \$310 and make \$10.¹⁰ The \$10 profit on the futures would offset the \$10 loss on the stocks.¹¹

Index arbitrageurs. Index arbitrageurs use stock index futures to make a profit from temporary differences between stock prices and stock index futures prices. In theory, the price of the S&P 500 futures contract should roughly equal the S&P 500 index. In practice, however, discrepancies often develop for short periods of time that make either the futures contract or the actual stocks in the S&P 500 cheap relative to the other. When these gaps occur, arbitrageurs buy the cheaper one and sell the more expensive one, locking in the difference for a profit. For example, suppose investors sell S&P 500 futures to protect themselves from a falling stock market, driving the futures price below the S&P 500 index.¹² Arbitrageurs would lock in a profit by buying futures and simultaneously selling stocks.

Speculators. Speculators use futures to profit from expected changes in stock prices because futures prices and stock prices are closely related. When speculators expect the market to rise, they buy stock index futures. If the market does rise, they make a profit because they can offset their position by selling futures for more than they paid. Conversely, when speculators expect the market to fall, they sell stock index futures. If the market does fall, they make a profit because they can offset their position by buying futures for less than they sold futures. Of course, if speculators guess wrong, they suffer a loss.

When panic selling causes stock prices to fall, some speculators will buy stock index futures. Panic selling causes stock prices to fall below the values consistent with fundamental economic conditions. In other words, stock prices are too low. If stock prices are too low, they should rise in the future. Speculators who realize stock prices are too low buy futures because, if futures prices do rise, they can earn a profit by selling futures for more than they paid.¹³

Figure 1
Selling Pressure: Futures Trading Not Restricted



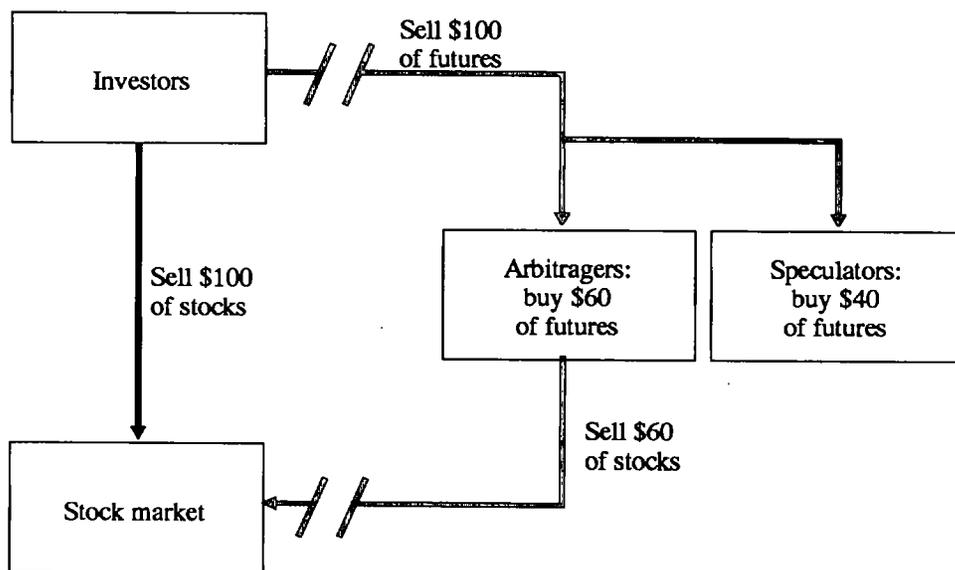
Transfer and absorption of selling pressure. Index arbitrageurs transfer selling pressure from the futures market to the stock market, while speculators absorb selling pressure. The box at the top of Figure 1 represents an investor who hedges his stocks against falling stock prices by selling \$100 of stock index futures. The sale of futures causes futures prices to fall below stock prices. Because futures prices are lower than stock prices, arbitrageurs would buy futures and sell stocks. For example, suppose arbitrageurs buy \$60 of futures and, therefore, sell \$60 of stocks. Speculators who believe stock prices are going to rise would then buy the remaining \$40 of futures. In this example, speculators absorb 40 percent of the futures sale. In other words, only 60 percent of the futures sale is transferred to the stock market.

The effect of the futures sale on stock prices depends on how much of the sale speculators absorb. Suppose, for example, stock prices fall \$10 when speculators absorb 40 percent of the sale. If speculators absorb more than 40 percent, stock prices will fall less than \$10. But if speculators absorb less than 40 percent, stock prices will fall more than \$10.

How uncoordinated circuit breakers increase a fall in stock prices

Circuit breakers can increase the size of price declines in the stock market if they are more confining in the futures market than in the stock market. When investors sell futures, only part of the selling pressure is transferred to the stock market because speculators absorb some of the

Figure 2
Selling Pressure: Futures Trading Restricted



selling pressure. When circuit breakers confine futures trading, however, all of the selling pressure flows to the stock market because speculators do not absorb any of the selling pressure. As a result, stock prices fall more than they would if futures trading were not confined.

Selling pressure in the stock market increases when circuit breakers are more confining in the futures market (Figure 2). As in Figure 1, the box at the top of Figure 2 represents an investor who wants to hedge his portfolio against falling stock prices by selling \$100 of futures. But because futures trading is confined, the investor cannot sell futures. The investor can achieve the same goal, however, by switching to the stock market and selling \$100 of stocks.¹⁴ Thus, when futures trading is confined, the selling pressure increases from \$60 to \$100.

Selling pressure increases when futures trading is confined because speculators do not absorb any of the selling pressure. When futures trading is not confined, speculators absorb \$40 of the selling pressure. When futures trading is confined, however, speculators do not switch to the stock market to buy stocks because it is too costly.¹⁵ As a result, when futures trading is confined, the decline in stock prices increases.

Better coordination of circuit breakers in the stock and futures markets would reduce the decline in stock prices because the selling pressure would not increase. Coordinated circuit breakers would impose the same trading restrictions in the stock and futures markets, preventing investors from switching from the closed to the open market. For example, if trading is halted in both the stock and futures

markets, investors who wanted to sell futures could not switch to the stock market and sell stocks. Instead, they would have to wait for both markets to reopen. If the trading halt did not alter anyone's views by the time the markets reopened, investors, speculators, and index arbitragers would behave just as if trading had never been interrupted. As a result, stock prices would fall just as if there had been no circuit breakers. In other words, coordinated circuit breakers would cause stock prices to fall less than uncoordinated circuit breakers. Moreover, if the original price decline was due to panic selling and traders realized there was no real reason to sell, stock prices would fall even less.¹⁶

IV. Conclusion

The New York Stock Exchange and Chicago Mercantile Exchange adopted circuit breakers for stocks and stock index futures to stop panic-

induced price declines. Although the two exchanges tried to coordinate their circuit breakers, the circuit breakers have not proved to be fully coordinated. Overall, circuit breakers appear to be more confining in the futures market than in the stock market because futures market circuit breakers tend to trip more often and are more restrictive. As a result, rather than reducing the decline of stock prices in times of panic selling, the circuit breakers adopted by the exchanges might actually increase the size of a decline.

This article has argued that better coordination of circuit breakers could enhance their overall effectiveness. Better coordination could be achieved by tightening circuit breakers in the stock market. Alternatively, the futures market could relax its circuit breakers. In any event, both markets must work together to improve the degree of coordination.

Appendix

Circuit Breakers on the New York Stock Exchange and the Chicago Mercantile Exchange's S&P 500 Stock Index Futures Contract

This appendix describes the current and proposed circuit breakers for the Chicago Mercantile Exchange's (CME) S&P 500 stock index futures contract and the New York Stock Exchange (NYSE).

Current circuit breakers

On October 20, 1988, the following coordinated circuit breakers were put into effect for the CME's S&P 500 stock index futures contract and the NYSE.

S&P 500 stock index futures:

1. Five-point opening limit: The S&P 500 futures price can open no more than five points above or below the previous day's closing price. If the opening futures price falls (rises) five points but trades at a higher (lower) price within ten minutes, the limit is removed. If after ten minutes the price is still stuck at the five-point limit, trading is halted for two minutes.
2. 12-point intermediate limit: If the S&P 500 futures price falls 12 points below the previous day's closing price, the price cannot fall further for 30 minutes or until 2:30 p.m. Chicago time, whichever comes first.
3. 30-point circuit breaker:
 - a. If the S&P 500 futures price falls 30 points below the previous day's closing price and the Dow Jones Industrial Average falls less than 250 points, the price cannot fall further for one hour.

- b. If the S&P 500 futures price falls 30 points below the previous day's closing price and the Dow falls 250 points, trading is halted for one hour. After one hour, trading can resume when 50 percent of the capitalization of the S&P 500 index has resumed trading in the stock markets.

4. 50-point daily price limit: The S&P 500 futures price cannot change more than 50 points above or below the previous day's closing price. In addition, if the S&P 500 futures price falls 50 points below the previous day's closing price and the Dow falls 400 points, trading is halted for two hours. After two hours, trading can resume when 50 percent of the capitalization of the S&P 500 index has resumed trading in the stock markets, but the futures price cannot fall further.

New York Stock Exchange:

1. 12-point decline in the S&P 500 futures price (sidecar): If the S&P 500 futures price falls 12 points below the previous day's closing price, the CME will notify the NYSE. At that time:
 - a. Program trading orders—simultaneous orders for 15 or more different stocks—for S&P 500 stocks that are entered through the NYSE's Designated Order Turnaround (DOT) computer system are sent to an undisclosed computer file (sidecar) for five minutes. After five minutes,

the file will be opened and the orders will be eligible for execution.

- b. During or at the end of the five-minute period, trading in any S&P 500 stock—not just stocks included in program orders—is halted if:
 - (i) a stock last sold for less than \$20 and a trade would cause its price to fall more than one point,
 - (ii) a stock last sold for \$20 or more and less than \$100 and a trade would cause its price to fall more than two points, or
 - (iii) a stock last sold for \$100 or more and a trade would cause its price to fall more than three points.
 - c. If trading is halted in any of the 50 largest capitalized S&P 500 stocks trading on the NYSE or any Major Market Index stocks and there is an order imbalance of 50,000 shares or more, including orders entered through DOT or by hand, the size of the imbalance must be made public. A trading halt is not required on the basis of 50,000-share imbalance alone.
 - d. The sidecar rule can be used only once in a day and will not be put into effect during the last 35 minutes of a trading day.
- 2. 250-point fall in the Dow: The market will close for one hour if the Dow falls 250 points from the previous day's closing price.
 - 3. 400-point fall in the Dow: The market will close for two hours if the Dow falls 400 points from the previous day's closing price.

Proposed circuit breakers

To date, circuit breakers have tripped on three occasions: October 13, 1989, October 24, 1989, and January 12, 1990. On all three occasions, circuit breakers were tripped in the futures and stock markets by a 12-point decline in the S&P 500 futures price. On October 13, 1989, the 30-point circuit breaker also tripped in the futures market. In response to the two October episodes, the CME and NYSE proposed changes for the circuit breakers. The proposed changes had not yet been approved when circuit breakers tripped on January 12, 1990.

S&P 500 stock index futures:

- 1. Five-point opening limit: The opening limit is still five points above or below the previous day's closing price. However, the limit applies for a full ten minutes, even if trades occur at higher (lower) prices when the market opens five points down (up). If prices stay at the limit throughout the ten-minute period, trading is halted for two minutes.
- 2. 12-point intermediate limit: No change.
- 3. 20-point circuit breaker: This is an entirely new limit that basically replaces the old 30-point circuit breaker, except that it is not affected by the Dow. If the S&P 500 futures price falls 20 points below the previous day's closing price, the price cannot fall further for one hour. In addition, if the limit is hit after 1:30 p.m. Chicago time, the limit applies for the remainder of the day.
- 4. 30-point daily price limit: The S&P 500 futures price cannot change more than 30 points above or below the previous day's closing price. In addition, if the S&P 500 futures price falls 30 points below the previous day's closing price and the Dow falls 250 points, trading is halted for one hour. If the S&P 500 futures

price falls 30 points below the previous day's closing price and the Dow falls 400 points, trading is halted for two hours. After the one-hour or two-hour period, trading can resume when 50 percent of the capitalization of the S&P 500 index has resumed trading in the stock markets, but the futures price cannot fall further.

5. 50-point daily price limit: This limit is eliminated.

New York Stock Exchange:

1. 12-point decline in the S&P 500 futures price (sidecar): If the S&P 500 futures price falls 12 points below the previous day's closing price, the CME will notify the NYSE. At that time:

a. Program trading orders for S&P 500 stocks that are entered through DOT are sent to an undisclosed computer file (sidecar) for 30 minutes, instead of five minutes. After 30 minutes, the file will be opened and the orders will be eligible for execution.

b. During or at the end of the 30-minute period, trading in any sidecar stock—as opposed to the old rule which applied to any S&P 500 stock—is halted if:

(i) a stock last sold for less than \$20 and a trade would cause

its price to fall more than one point,

(ii) a stock last sold for \$20 or more and less than \$100 and a trade would cause its price to fall more than two points, or

(iii) a stock last sold for \$100 or more and a trade would cause its price to fall more than three points.

c. If trading is halted in any of the 50 largest capitalized S&P 500 stocks trading on the NYSE or any Major Market Index stocks and there is an order imbalance of 50,000 shares or more, the size of the imbalance must be made public. A trading halt is not required on the basis of a 50,000-share imbalance alone.

2. 50-point decline in the Dow (sidecar): If the Dow falls 50 points below the previous day's closing price, the sidecar procedures that are followed after a 12-point decline in the S&P 500 futures price will be followed except that the sidecar period will last only 15 minutes instead of 30 minutes.

3. 250-point fall in the Dow: No change.

4. 400-point fall in the Dow: No change.

Endnotes

¹ Actually, the Brady Commission recommended coordinated circuit breakers for the stock, stock index futures, and options markets because, to have any chance of success, circuit breakers must be coordinated across all markets that trade stocks and products based on stocks (Brady 1988). Although this article concentrates on the stock and futures markets, the arguments apply to all markets that trade products based on stocks.

² Experts disagree, however, about whether coordinated circuit breakers can stop price declines caused by panic selling. In addition, some argue that even if circuit breakers can stop panic-induced price declines, the costs of circuit breakers might outweigh the benefits (Edwards 1988). This article does not address these questions.

³ Specialists can delay the opening of a stock with the NYSE's approval under certain circumstances (New York Stock Exchange 1989).

⁴ An order can be sent to the NYSE's trading floor either through the exchange's Designated Order Turnaround (DOT) computer system or it can be carried by hand. Program trading orders carried by hand are not delayed.

⁵ Specifically, the NYSE's (1989) *Floor Official Manual* states that trading must be halted if: (1) a stock last sold for less than \$20 and a trade would cause its price to fall more than one point, (2) a stock last sold for \$20 or more and less than \$100 and a trade would cause its price to fall more than two points, and (3) a stock last sold for \$100 or more and a trade would cause its price to fall more than three points.

⁶ Unfortunately, the data in Chart 1 cannot be used to determine whether circuit breakers were effective on October 13, 1989, for two reasons. First, although stock and futures prices fell throughout the day, the data provide no information about whether prices would have fallen more or less in the absence of circuit breakers. Second, if the decline in prices was due to economic fundamentals rather than panic selling, the circuit breakers are not supposed to be effective.

⁷ Stock index futures are used in both static and dynamic hedging strategies. In a static hedging strategy, investors try to guarantee their return on an investment by reducing both downside and upside risk. That is, investors buy or sell a hedging asset such that losses on the portfolio are offset by profits on the hedging asset, and profits on the portfolio are offset by losses on the hedging asset. In a dynamic hedging strategy, investors try to set a lower bound on their return on an investment by reducing downside risk but not upside risk. That is, investors actively buy or sell

a hedging asset such that losses on the portfolio are offset by profits on the hedging asset, but profits on the portfolio are not offset by losses on the hedging asset. For a more detailed description of different hedging strategies, see Figlewski 1986.

⁸ Investors also use futures to hedge because the transactions costs of selling futures, such as brokers fees, are very small.

⁹ Investors can sell stock index futures even though they do not own any because a futures contract is simply an agreement to sell stocks at a later date. Furthermore, since delivery is not allowed in stock index futures contracts, the investor simply buys stock index futures at a later date to offset the initial sale.

¹⁰ While changes in stock index futures prices and portfolio values are closely related, in general, they are not equal. The changes will be equal in the special case where the portfolio is made up of the stocks in the index because the price of a stock index futures contract is approximately equal to the sum of the prices of the underlying stocks. But for other portfolios, the relationship between changes in prices need not be one-for-one. For example, futures prices might consistently change twice as much as the value of a portfolio.

¹¹ Of course, if stock prices rise \$10, the investor would lose \$10 on the futures. The \$10 loss on the futures would offset the \$10 profit on the stocks.

¹² Actually, the equilibrium S&P 500 futures price is slightly higher than the S&P 500 index if the risk-free interest rate is larger than the dividend rate—dividends per dollar of stock. Thus, index arbitrageurs might buy futures and sell stocks even if the S&P 500 futures price is greater than the S&P 500 index.

¹³ If stock prices are falling because of economic fundamentals, however, speculators would probably expect stock prices to fall in the future so that they would sell futures. These sales would push down stock and futures prices to their new equilibrium values faster than otherwise.

¹⁴ Because the investor sells \$100 of stocks when futures trading is restricted, the example in Figure 2 implicitly assumes that the hedging strategy requires the investor to sell \$1 of futures for every \$1 of stock in the portfolio. That is, the hedge ratio is assumed to equal one. In general, the qualitative results are not affected if the hedge ratio does not equal one.

¹⁵ The cost of switching to the stock market is high because the futures trading restrictions make a speculator's existing position riskier. For example, suppose a speculator buys

futures during a panic selling period. Normally, if he changes his views about future stock prices, he can offset his position simply by selling futures. But when futures circuit breakers are tripped, the speculator's position becomes much riskier because he cannot sell futures. As a result, speculators would probably not want to take on additional

risks and switch to the stock market when futures trading is restricted.

¹⁶ Some critics of circuit breakers would argue that temporary trading restrictions, even when coordinated, impose unnecessary costs on traders.

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Public Infrastructure Policy And Economic Development

By William F. Fox and Tim R. Smith

Construction of public infrastructure in the United States has slowed considerably in the past 25 years. In 1987, new infrastructure spending represented just 1.7 percent of gross national product, down from 2.3 percent in 1964. Since most spending for public infrastructure occurs at state and local levels, many state and local policymakers are concerned the economic health of their regions will depend on building new infrastructure.

There is little doubt roads, water and sewerage systems, electricity, telecommunications, railroads, and airports generally support economic activity. Yet the degree to which such public infrastructure stimulates economic development in specific locations is less clear. Projects to improve infrastructure may spur development in some places but not in others. Moreover, building new infrastructure may not

always be the best way to enhance infrastructure. Improving the services delivered by existing facilities can often enhance infrastructure at a lower cost than building new facilities.

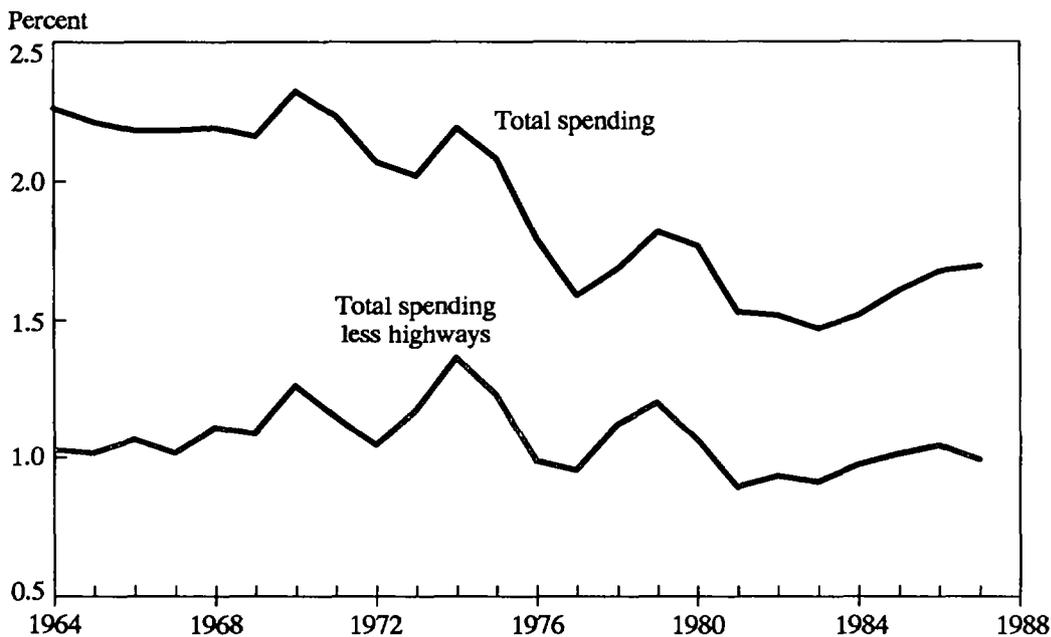
This article discusses the relationship between public infrastructure policy and economic development. The article concludes that infrastructure cannot be expected to stimulate the economies of all communities, but most communities can benefit from exploring new ways to deliver infrastructure services. The first section of the article briefly describes the slowdown in state and local spending on infrastructure. The second section discusses how the linkage between public infrastructure and economic development depends on the individual location in question. The third section discusses some options available to state and local officials who wish to deliver infrastructure services more efficiently.

I. Trends in Public Infrastructure

Public infrastructure is defined as the physical capital investments—for example, roads, water and sewerage systems, electric power

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Chart 1
Infrastructure Spending by State and Local Governments, 1964-87
 (Percent of GNP)



Note: Spending includes all categories of capital expenditures by state and local governments, except for education and gas, electric, and transit utilities.

Source: U.S. Department of Commerce, Bureau of the Census, *Government Finances*.

plants, telecommunications facilities, railroads, and airports—traditionally provided by the public sector to private households and businesses.¹

Spending on public infrastructure occurs mainly at the state and local level regardless of its funding source. For example, most of the federal funding for interstate highways is included as state and local spending on highways. The section, therefore, examines recent trends in public infrastructure by reviewing such spending by state and local governments.

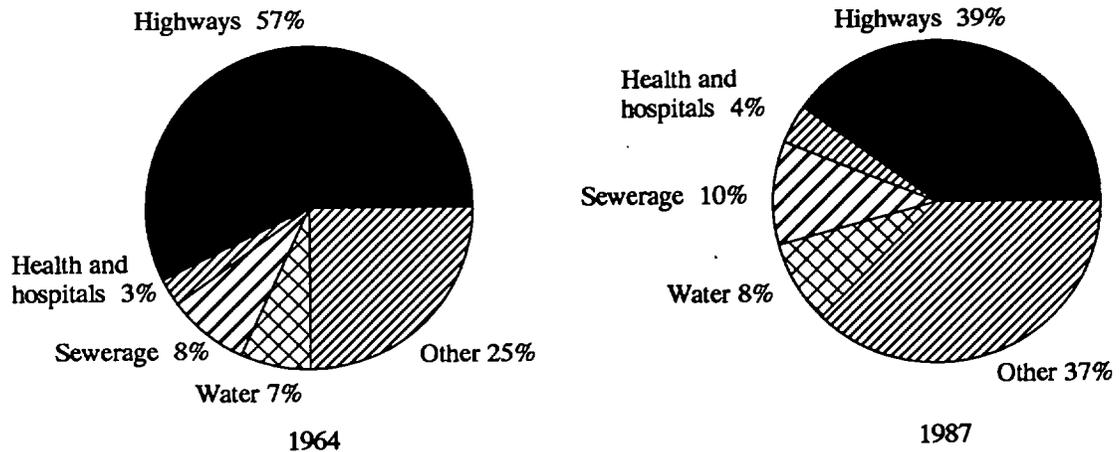
The slowdown in public infrastructure investment

Spending by state and local governments on infrastructure has slowed considerably over the

past quarter-century. Chart 1 indicates how infrastructure spending by state and local governments has declined in relation to overall economic activity in the United States from 1964 to 1987. Specifically, spending on public infrastructure declined from 2.3 percent of GNP in 1964 to 1.7 percent in 1987.²

The decline in infrastructure spending has been concentrated in one of infrastructure's most important categories—highways. Spending on highways represents the largest share of infrastructure spending and is generally thought to be an important stimulus to economic growth.³ While most other major spending categories—health and hospitals, sewerage, and water—have maintained their share of total infrastructure spending, the share accounted for by highways

Chart 2
Infrastructure Spending
 (Percent of total)



Note: Spending includes all categories of capital expenditures by state and local governments, except for education and gas, electric, and transit utilities.

Source: U.S. Department of Commerce, Bureau of the Census, *Government Finances*.

has declined from 57 percent in 1964 to 39 percent in 1987 (Chart 2).⁴ The decline in highway spending largely reflects the completion of the interstate highway system. Spending on infrastructure other than highways has remained relatively constant at about 1 percent of GNP from 1964 to 1987 (Chart 1). The relatively constant spending on infrastructure other than highways does not mean concern about the linkages between infrastructure and economic development is unfounded. Those linkages are formed at the local level, where national average data may overlook the direction of infrastructure spending.

Infrastructure in individual states

The general slowdown in infrastructure investment is common to all states. Table 1 lists average annual spending on infrastructure as a percent of gross state product (GSP) in three periods from 1964 to 1986. In every state, average infrastructure spending was a smaller share of GSP in the 1982-86 period than in the 1964-72 period.

Although infrastructure spending slowed in all states, some states maintained higher average spending levels than other states over the entire period (Table 1). Alaska maintained the greatest emphasis on infrastructure with an average expenditure of 4.6 percent of GSP from 1964 to 1986. Indiana, on the other hand, emphasized

Table 1
Infrastructure Spending by State
(Average spending as a percent of gross state product)

	Overall period	Subperiods		
	1964-86	1964-72	1973-81	1982-86
U.S. total	1.8	2.2	1.8	1.6
Alabama	2.1	2.7	2.1	1.8
Alaska	4.6	7.9	4.2	4.3
Arizona	2.6	2.8	2.4	2.7
Arkansas	2.3	6.1	1.9	1.2
California	1.5	2.1	1.4	1.3
Colorado	2.1	2.4	2.1	2.0
Connecticut	1.4	2.1	1.3	1.2
Delaware	2.0	3.0	1.9	1.6
Florida	2.4	2.4	2.4	2.3
Georgia	2.0	2.3	2.2	1.8
Hawaii	2.9	4.2	3.1	2.3
Idaho	2.1	2.5	2.0	2.0
Illinois	1.6	1.7	1.6	1.5
Indiana	1.3	1.6	1.2	1.2
Iowa	2.0	2.4	2.0	1.9
Kansas	2.1	2.3	2.3	1.7
Kentucky	2.1	2.7	2.3	1.6
Louisiana	2.0	2.6	2.0	1.7
Maine	1.8	2.3	2.1	1.4
Maryland	2.5	2.6	2.8	2.2
Massachusetts	1.4	1.7	1.4	1.3
Michigan	1.4	1.7	1.5	1.2
Minnesota	2.3	2.7	2.4	2.0
Mississippi	2.3	3.5	2.5	1.6
Missouri	1.6	2.0	1.6	1.4
Montana	2.9	4.0	2.6	2.7
Nebraska	2.0	2.3	2.3	1.7
Nevada	2.7	3.3	2.7	2.6
New Hampshire	1.8	2.5	2.1	1.3
New Jersey	1.5	1.7	1.5	1.3
New Mexico	2.3	2.8	2.1	2.3
New York	1.9	2.3	1.9	1.6
North Carolina	1.5	1.9	1.7	1.2
North Dakota	2.4	3.2	2.5	2.1
Ohio	1.6	1.9	1.7	1.4
Oklahoma	1.7	2.2	1.7	1.6
Oregon	2.1	2.7	2.2	1.8
Pennsylvania	1.5	2.1	1.6	1.2
Rhode Island	1.6	2.2	1.5	1.4
South Carolina	1.7	2.2	1.7	1.4
South Dakota	3.0	3.4	2.8	3.1
Tennessee	2.1	2.7	2.2	1.7
Texas	1.7	2.2	1.7	1.6
Utah	2.4	2.8	2.2	2.4
Vermont	2.0	3.4	1.9	1.5
Virginia	1.9	2.5	2.1	1.4
Washington	2.4	2.9	2.3	2.2
West Virginia	2.5	3.2	2.7	1.8
Wisconsin	1.7	2.1	1.7	1.6
Wyoming	3.0	3.9	2.7	3.0

Notes: Spending includes all categories of capital expenditures by state and local governments, except education and gas, electric, and transit utilities. U.S. total for infrastructure spending is expressed as a percent of GNP.

Sources: U.S. Department of Commerce, Bureau of the Census, *Government Finances*.
U.S. Department of Commerce, Bureau of Economic Analysis.

infrastructure the least of all states over the entire period with an average expenditure of only 1.3 percent of GSP. States with the smallest average expenditure in the 1982-86 period were Arkansas, Connecticut, Indiana, Michigan, North Carolina, and Pennsylvania.⁵

The slowdown in infrastructure investment has raised questions about the impact on regional economic development. And the disparity in spending across states has raised questions about whether infrastructure shortfalls will limit some states' ability to attract economic activity. State and local policymakers, therefore, are asking if building new infrastructure will enhance the economic development prospects of their regions. An understanding of the linkages between infrastructure and economic development helps answer these questions.

II. Linking Infrastructure and Economic Development

Most analysts agree that infrastructure generally supports economic activity.⁶ However, there is less agreement about whether infrastructure can be used as a tool to stimulate economic development in individual locations.⁷ Understanding the linkage between infrastructure and economic development, therefore, might aid local policymakers in developing a better infrastructure policy for their community. For example, such understanding might help state policymakers determine which locations within their state will benefit most from additional expenditures on infrastructure.

What is economic development?

Economic development is a popular concept, but one which is often misunderstood. An area's level of development refers to its economic performance relative to the economic performance of other areas. This performance might be measured by per capita personal income,

employment, or value added. Because development is a relative concept, a place is said to be highly developed if its per capita income, for example, is well above average.

A region's economic development is enhanced through economic growth. Growth alone, however, does not reflect a higher level of development. To achieve a higher level of development, a region must grow faster than the average region so its development position changes relative to other regions.

How fast a region can grow and develop depends on the presence of certain economic resources in the area. Economists do not agree on the exact recipe for economic development, but they do have a common list of potentially important ingredients for regional economic development: sufficient quantity and quality of labor, access to raw materials and markets, and the presence of adequate financial capital, land, and infrastructure.⁸ Also instrumental in the recipe for economic development is the availability of technology to combine these ingredients and entrepreneurship to take risks under uncertainty.⁹

Infrastructure and economic development in three types of regions

A useful method to determine whether infrastructure will contribute to economic development is to consider the economic characteristics of the region in question. Based on an analysis by Hansen (1965), regions can be classified into three categories—intermediate, congested, and lagging—according to their current level of development and the presence of ingredients for further development.

Intermediate regions are positioned for further economic development because most ingredients for development are in place. Congested regions are less positioned for further development because additional growth may cause costly bottlenecks in transportation and production.

Lagging regions are not positioned for economic development because they lack many necessary development ingredients.

This framework should be viewed only as a rough guide for infrastructure policy because some locations may be difficult to classify. The economic development potential—and the classification—of a region can change rapidly due to circumstances beyond the control of state and local policymakers. For example, the oil price collapse in the mid-1980s quickly caused several congested or intermediate regions in the Southwest to become lagging regions. Moreover, the channels through which infrastructure influences economic development are common to all three types of regions, even though they are likely more effective in some regions than in others. For example, infrastructure construction provides jobs wherever it occurs, but the resulting increase in local incomes varies considerably from place to place.

Intermediate regions. Infrastructure investment has the greatest likelihood of significantly improving development prospects in intermediate regions. Intermediate regions may lack sufficient infrastructure but have the potential to grow and become more developed because other important development ingredients—a trained labor force, financial capital, and proximity to raw materials and markets—are in place. Furthermore, additional growth in intermediate regions can be expected to raise the level of development without generating congestion costs such as materials bottlenecks, heavy traffic, or air pollution that might offset the benefits of higher development. For these reasons, infrastructure can stimulate economic development more in these regions than in congested or lagging regions.

Infrastructure can contribute to regional economic development in intermediate regions in two ways. First, infrastructure—or the services it provides—enters directly into the production process of local business firms, making

other production inputs more productive and permitting the firms to produce their intended output at lower cost. For example, additional electricity and water can be used directly by business firms' production processes. Roads can make workers more productive by reducing transportation time. And telecommunications can make workers more productive by facilitating interaction with customers. In addition to improving the productivity of existing firms, the presence of infrastructure may encourage new firms to move into an area.

The second way infrastructure contributes to regional economic development is through the impact of the initial public expenditure. When state and local governments spend money to construct infrastructure, they generate income in the local area. For example, when a highway is built, local incomes increase as residents are hired to build the road or as construction workers spend money in the area. The increase in personal income is largest if local workers and firms are employed and if the funding comes from federal grants rather than from local fees and taxes.¹⁰

Infrastructure policy in intermediate areas can be a key development tool because infrastructure can cause the area to grow and become more developed. Nevertheless, policymakers must still choose how to enhance infrastructure with the highest benefits relative to the budgetary costs. In Denver, for example, policymakers have chosen to build a new airport instead of continuing to refurbish and expand the old one. Because many other ingredients for development are in place in Denver, new transportation infrastructure might contribute to economic development both by making businesses more productive and by boosting income in the area during the project's construction.

Congested regions. Expanding infrastructure can improve development prospects in congested regions, but not as much as in intermediate regions. Congested regions are highly developed with all or most of the important development

ingredients in place. Although infrastructure investment may boost economic development in these regions, increased growth is likely to cause increases in population and congestion that offset the benefits from development. For example, heavier traffic in congested areas can lead to difficulty in transporting workers or materials, and air pollution can lead to more costly production methods. Hansen (1965) points to London, Paris, and the northeastern seaboard of the United States as examples of regions with significant congestion problems.

As in intermediate regions, infrastructure can contribute to economic development in congested regions by making firms more productive or by raising local incomes during construction. Many apparently congested urban places have continued to grow because new infrastructure investments, such as expanded subway systems, have offset some of their congestion problems. Nevertheless, remaining congestion tends to limit the development benefits of expanding infrastructure.

For expansion of infrastructure to be a successful development strategy, the expected benefits of the infrastructure must be large enough to outweigh the additional congestion costs caused by the new economic activity. Because congested regions grow mostly due to external influences, such as an increase in national demand for a product or service produced in the region, infrastructure policy is less likely to be used as an economic development tool than to accommodate the growth already occurring. In Boston, for example, a major highway construction project is being built to accommodate rapid growth from the 1980s. And in Seattle, policymakers currently faced with accelerating growth must decide whether recent improvements to its transit system will be adequate to sustain growth in the 1990s.

Lagging regions. Expanding infrastructure is not likely to improve the economic development prospects of lagging regions. Lagging

regions are underdeveloped regions with few ingredients for development in place. These regions are likely to be rural areas with stagnant or declining industries. New infrastructure is less likely to boost economic development in lagging regions than in intermediate or congested regions because few other characteristics are present to attract new economic activity. Some lagging regions actually face disinvestment in infrastructure because their declining economies cannot afford to maintain the infrastructure already in place.

Infrastructure policy should generally not be used as an economic development tool in lagging areas. Building infrastructure probably cannot overcome an unskilled labor force, inadequate raw materials, or long distances to markets. Therefore, policymakers in lagging regions should focus their attention on delivering needed infrastructure services at lowest cost. Take, for example, lagging rural counties faced with deteriorating roads. Several such counties may be able to reduce the costs of road services and other public services by consolidating portions of their governments. Lagging regions also might benefit from policies that address the regions' lack of fundamental development ingredients. For example, improved education might make more skilled labor available.¹¹

Investing in public infrastructure will stimulate economic development in some communities, but not in others. Building roads, for example, will support economic activity by moving people to jobs and products to consumers. But building more roads cannot guarantee economic development in all communities. The linkage between infrastructure and economic development clearly depends on the individual location in question. Intermediate communities are most likely to benefit from building infrastructure. Lagging communities, on the other hand, cannot expect to develop simply by building infrastructure without adding other development ingredients.

III. Guidelines for Providing Infrastructure Services

The three broad classes of regions described above may help policymakers tailor an infrastructure policy to the characteristics of their specific location. However, such an approach may still have uncertain effects. Thus, state and local policymakers in all locations must carefully decide how and where to spend economic development funds.

Whatever the development prospects, state and local governments can limit spending on new infrastructure by finding ways to enhance the delivery of services from existing infrastructure. Consumers and businesses are typically more concerned with the infrastructure services they receive than with the facilities themselves. In other words, consumers and businesses view public infrastructure as the electricity they use, not as the power plant that produces it. In intermediate regions and some congested regions, where building new infrastructure can improve development prospects, improving the delivery of infrastructure services may be cheaper than constructing new facilities. And in lagging regions, where new infrastructure is unlikely to spur development, improving the delivery of infrastructure services can relieve budget pressures. In short, state and local policymakers can stretch limited budgets by focusing on the services infrastructure provides rather than on the infrastructure facilities themselves.

This section discusses some alternatives available to state and local policymakers for shifting the emphasis of infrastructure policy from building new facilities to managing the services of existing facilities. Service-oriented policy alternatives include reducing the demand for services, making standards for service delivery more flexible, and improving infrastructure maintenance.¹²

Demand management

The demands placed on infrastructure can be managed so a lower capacity is necessary. One approach is to price services correctly. For example, prices can smooth extreme fluctuations in electricity demand. Some utilities raise prices for customers who use electricity during hours of peak demand. The Tennessee Valley Authority, on the other hand, offers lower prices during periods of peak electricity use to industrial customers who agree to possible service interruptions. With proper pricing, state and local governments can avoid increasing the infrastructure's capacity to accommodate periods of peak demand.

Another way local governments can use prices to manage demand is by pricing hazardous waste disposal, sewage treatment, and trash collection to accurately reflect the long-term costs of delivering the services. For example, prices—in the form of taxes—can be placed on the production or sale of materials that cause difficult disposal problems, such as plastic bags. Businesses will then identify production processes that will generate a lower need for disposal facilities.¹³

Flexible standards

Sometimes the infrastructure policy options of local governments are limited by restrictions placed on infrastructure facilities or services by higher levels of government. More flexible restrictions would allow local policymakers more latitude in developing infrastructure policy. These restrictions, often called standards, are meant to protect the environment or public safety. For example, federal and state governments often set limitations on the amount of pollutants that can remain in treated water. Government agencies also regulate construction of power generation facilities—especially nuclear reactors. These kinds of standards can be set to

protect the environment and population, but always with a recognition of the costs involved.

Standards set by federal and state governments frequently become mandates for local governments and thus determine the demand and cost for the services. However, such standards should be flexible enough to allow local governments to achieve the intended goals of the standards at lowest cost. For example, Los Angeles might attempt to meet federal air quality standards by building fewer highways and improving public transportation services. Denver might approach the same challenge by improving the delivery of gas and electric heat and banning wood-burning stoves.

The federal government also has set standards in the past without providing financing assistance to local governments. For example, the 1987 Clean Water Act will eliminate federal sewer grants by 1990, but the Environmental Protection Agency is imposing stricter standards for waste treatment. Where services are mandated, providing a means to finance the service could help local governments achieve the intended goals of standards. However, combining financing with standards does not guarantee the goals will be met.

Grant and loan programs for local governments often impose strict infrastructure standards local communities often find onerous. Local governments often forego federal grants rather than bear the additional costs imposed by standards. Again, grant and loan programs should be created with the maximum flexibility for identifying low-cost solutions for delivering services.

Maintenance

Maintenance of existing infrastructure should receive more attention. Maintenance often can extend the life of infrastructure and generally is a more cost-effective means for providing future services than building new infrastructure or undertaking major renovations. Pagano (1989)

argues the "primary cause of the infrastructure decay" is not inadequate capital investment, but inadequate maintenance spending. Maintenance can preserve the everyday usefulness of certain types of infrastructure. For example, maintenance can help lower operating costs or raise the level of service on highways "roughed up" through normal use. In this case the maintenance could be combined with a demand management strategy that imposed the maintenance cost on the heaviest users through user fees.

Infrastructure maintenance is frequently ignored, despite its cost-effectiveness. Delaying maintenance is politically more expedient than raising taxes or foregoing other services. Also, many maintenance expenditures, with exceptions such as potholes, may not be immediately visible to the public. Political leaders, therefore, may tend to seek more observable spending patterns that involve building new facilities instead of maintaining old ones. Maintenance may even be discouraged by federal and state assistance programs that help finance construction and major renovations, but not maintenance.

Public information and intergovernmental assistance programs hold the potential to increase the attractiveness of maintenance as an infrastructure policy. As local populations become increasingly informed about the benefits of maintenance, they provide a built-in incentive for policymakers to pay more attention to maintenance. Moreover, intergovernmental assistance programs could encourage maintenance. Unfortunately, loan and grant programs frequently only finance major renovations or new projects, giving communities the incentive to forego maintenance until major repairs can be financed through an assistance program.

In summary, several options are available to state and local policymakers who want to reduce the need to build new infrastructure and enhance the delivery of services from existing infrastructure. Infrastructure policies of this kind cannot be expected to boost economic develop-

ment in many places, but if carefully carried out, they can ease budget pressures and help deliver infrastructure services more efficiently.

IV. Conclusions

Aging highways, outdated water supply systems, and overcrowded airports are casting doubts about the quality of the nation's infrastructure. State and local policymakers are focusing attention on this issue as the 1990s begin. Yet an even more pressing issue for state and local policymakers is whether expanding infrastructure in specific locations can bring renewed prosperity to ailing local economies or sustain growth in healthy local economies. While there

is little doubt infrastructure is vital to economic growth, the economic benefits of building new infrastructure facilities are uncertain.

Given the uncertainty surrounding the use of public infrastructure as a development tool, policymakers should carefully identify the locations most likely to benefit from infrastructure expansion and explore new ways to deliver the services required by their regions. Intermediate-type regions, where other economic development ingredients are in place, will probably benefit most from enhanced infrastructure. But all regions, even lagging regions that stand little chance of raising their level of economic development, can find more effective ways to spend their limited development budgets.

Endnotes

¹ This definition is consistent with one used by the National Council on Public Works Improvement (1986). Although investment in physical capital related to education and in human capital is not included in this article's definition of public infrastructure, these investments are part of a broader definition of infrastructure. See Smith, Drabenstott, and Gibson 1987 for an expanded discussion of the role of higher education in economic development. Private firms sometimes provide infrastructure investments, especially in electric power and telecommunications facilities, but the relative importance of private infrastructure investment varies across states.

² Although gas, electric, and transit utilities are part of this article's definition of public infrastructure, they are omitted from the data presented in all tables and charts because these categories of public capital spending are highly volatile over time and vary considerably from state to state.

³ Aschauer (1989), for example, finds highways to be among the most important public capital investments in improving the productivity of private capital. Helms (1985) demonstrates a significant positive relationship between state highway expenditures and state personal income growth.

⁴ The "Other" category shown in Chart 2 increased from 25 percent in 1964 to 37 percent in 1987. This category

includes spending on police and fire protection, parks and recreation, housing and community development, and sanitation other than sewerage.

⁵ Low infrastructure spending, however, does not necessarily mean a state has neglected its infrastructure needs. The greater emphasis on infrastructure spending in some states may simply reflect fundamental differences in population and geography. For example, states with greater land area generally spend more on building highways. Differences in land area, population, climate, existing infrastructure, and other important characteristics influence how states deliver the infrastructure services required by consumers and businesses.

⁶ Aschauer (1989) suggests the national economy is more productive when public infrastructure is available to private production. Garcia-Mila and McGuire (1987), Mera (1973), and Costa, Ellson, and Martin (1987) demonstrate significant positive effects of public infrastructure and economic activity using various measures of infrastructure and regional economic activity. Eberts (1988) reviews these studies and provides additional evidence of a positive relationship using estimates of public infrastructure in a sample of metropolitan areas. All of these regional studies use a production function framework. The measures of output and capital stock differ among studies, as do the regions

and industries examined.

⁷ Studies showing public infrastructure is positively related to national or regional economic activity do not guarantee the same relationship exists for individual locations. Even the relationships between infrastructure and economic activity in metropolitan areas cannot be extended to other locations. Eberts (1988) finds substantial variation in the effects of public capital on output across his sample of 38 metropolitan areas.

⁸ Hansen (1965) lists factors considered to be conducive to regional growth. Economic development ingredients can also be identified in studies of business location reviewed by Wasylenko (1985). Methodological differences among location studies lead to differences in the measured effects of individual factors. A survey conducted by Schmenner (1982) also identifies factors important to business location decisions.

⁹ See Giese and Testa 1989 for a discussion of the role of

technology in regional development.

¹⁰ The effect of infrastructure on economic development depends partly on how the infrastructure is financed. State and local governments have several alternatives, such as federal government assistance, taxes, user fees, or long-term debt, and the choice of financing method can change the user's cost of infrastructure services. See Fox 1988 for more discussion of infrastructure financing.

¹¹ For a discussion of the problems facing several lagging locations in a group of western states, see McCormick and Turque 1989.

¹² See Bell 1989 for means of effectively managing existing infrastructure as applied to Tennessee.

¹³ An alternative to using prices to manage demand is using incentives. For example, to limit the waste disposal requirements of an area, local governments can pay businesses and consumers to recycle waste.

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