
Why Has the Nonfinancial Commercial Paper Market Shrunk Recently?

By Pu Shen

The total volume of nonfinancial commercial paper outstanding peaked in the fall of 2000 and has declined rapidly ever since. By September 2002, the market had shrunk more than 50 percent. Relative to historical patterns, both the magnitude and the timing of the decline are unusual. The decline is the largest on record, and the market started to shrink before the recent recession began. In the past, the volume of commercial paper outstanding tended to increase during the early stages of recessions.

Commercial paper is an important source of external funding for corporate borrowers and has become increasingly popular over the years. In 1966, the volume of nonfinancial commercial paper outstanding was typically less than 0.5 percent of bank loans to commercial and industrial borrowers. Since then, growth in the commercial paper market has averaged more than 20 percent per year, compared to an average rate of only 7 percent for bank commercial and industrial loans. And despite the recent dramatic decline, the volume of commercial paper outstanding in September 2002 was still about one-sixth of bank commercial and industrial loans.

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This article investigates the factors contributing to the dramatic decline in the commercial paper market and assesses whether the recent shrinkage is likely to continue. The article begins by documenting the recent sharp decline in the volume of nonfinancial commercial paper outstanding and contrasts this development with historical experience. The second section considers the factors that may have reduced the supply of credit in the commercial paper market, and the third section discusses the factors that may have reduced the demand. The article concludes that declines in both supply and demand have contributed to the shrinkage of the market. Looking forward, although the demand factors are waning, the supply factors are likely to persist in the near term and keep the commercial paper market under pressure.

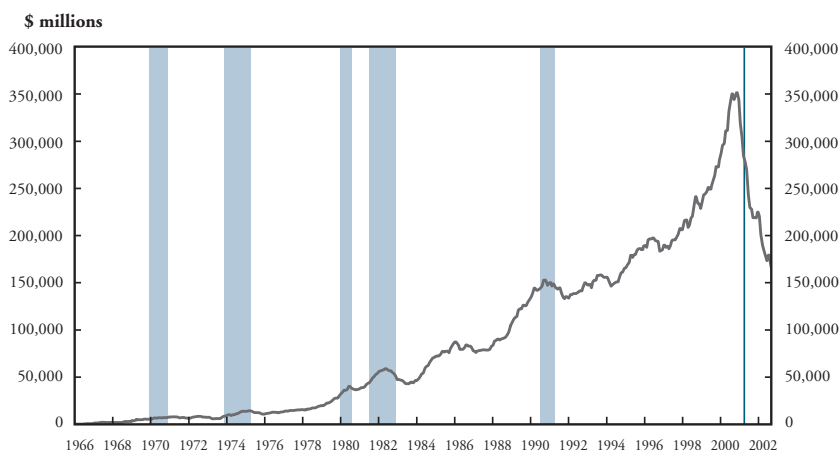
I. THE SHRINKING COMMERCIAL PAPER MARKET

Nonfinancial commercial paper is short-term unsecured debt issued by nonfinancial corporations, typically large industrial or service firms and utility companies. Financial commercial paper, in contrast, is issued by financial companies, such as banks. This article focuses on nonfinancial commercial paper. For simplicity, nonfinancial commercial paper is referred to only as “commercial paper,” and the commercial paper market is referred to as “the market.” Appendix 1 provides an overview of the commercial paper market.

Commercial paper represents an important source of short-term funding for firms with very high credit ratings because it is one of the cheapest sources of external funding available. For example, the interest rate paid on 30-day commercial paper is usually comparable to the federal funds rate. The market, however, has shrunk considerably in the past two years. At its peak in November 2000, the total volume of commercial paper outstanding was about \$351 billion. By September 2002, the volume outstanding had dropped more than 50 percent, to about \$159 billion, its lowest level in almost eight years (Chart 1).¹ This unusual decline is the largest on record. In the previous five episodes of recession-related market shrinkage, the largest reduction in volume outstanding was about 27 percent.

Chart 1

VOLUME OF NONFINANCIAL COMMERCIAL PAPER OUTSTANDING



Note: Shaded bars indicate recessionary periods as defined by the NBER Business Cycle Dating Committee. For the most recent recession, only the start date is indicated.

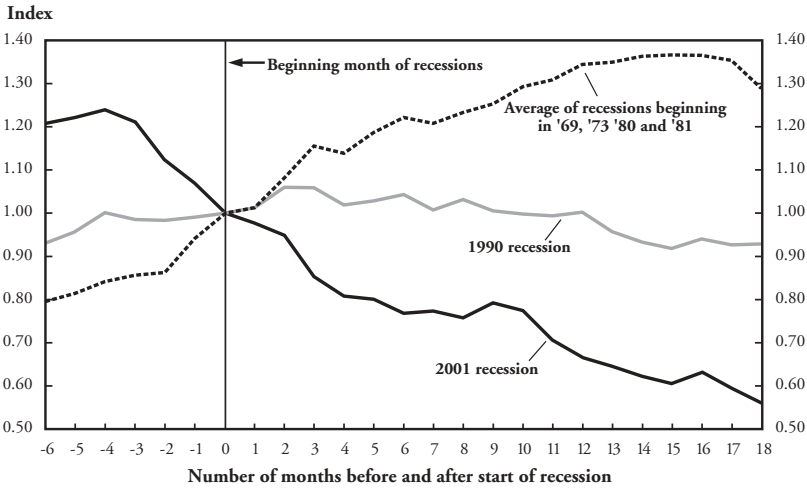
Sources: NBER and Depository Trust Company

This dramatic decline reversed a period of rapid growth in the issuance of nonfinancial commercial paper. After a few years of hesitant growth coming out of the recession of 1990, the commercial paper market grew robustly in the late 1990s. For the four years before its peak in 2000, the volume of commercial paper outstanding grew an average of about 18 percent per year, compared to an average yearly decline of roughly 35 percent over the last 22 months.

In addition to declining so rapidly, the timing of the current market's decline has also been unusual. Historically, commercial paper borrowing has usually expanded in the early stages of a recession and only started to decline when the economy was well-into recession. Chart 2 plots the volume of commercial paper outstanding around recessions, from six months before to 18 months after the start of each recession. The volume outstanding in the first month of each recession is normalized to 1 so that the changes during different recessions can be compared. The dashed line shows the average volume of commercial

Chart 2

NORMALIZED COMMERCIAL PAPER VOLUME AROUND THE START OF RECESSIONS



Sources: NBER, Depository Trust Company and author's calculations

paper outstanding across the four recessions that occurred from 1969 to 1981. The grey line is the volume of commercial paper around the 1990 recession. The solid black line is the volume for the recent recession.

The current shrinkage differs dramatically from historical patterns. For each of the pre-1990 recessions, the commercial paper market grew substantially in the early stages of the recession and typically started to shrink about 12 months into the recession. During the 1990 recession, the pattern was similar, but the magnitudes of both the early growth and later decline were smaller. The market continued to grow after the recession started, just as in the past, but the growth was relatively weak and short-lived. In sharp contrast, the rapid shrinkage in the current market started four months *before* the onset of the recent recession.

What caused the market to shrink so rapidly and so early? The factors that may have contributed to the recent shrinkage can be separated into two groups: those affecting the *supply* of credit in the commercial paper market and those affecting the *demand* for credit in

the market. The next section focuses on the factors that may have reduced the supply. The following section focuses on factors that may have reduced the demand.

II. FACTORS REDUCING THE SUPPLY OF CREDIT

Generally, the supply of funding for commercial paper depends on investors' willingness to participate in the market. This willingness can be lessened by two factors. One is the actual or perceived deterioration of the creditworthiness of borrowers who were previously considered to be of the highest quality. This factor usually causes a reduction in credit supply only in the commercial paper market. The other factor is a general reduction in investors' tolerance for risk. This factor works universally in all credit markets: A general reduction in investors' tolerance for risk means that for any given yield and credit quality, investors are willing to supply fewer funds, thus reducing the supply of credit. Both factors contributed to the recent shrinkage of the market.

Widespread declines in credit quality

In the past two years, the economy has witnessed unusually widespread deterioration in the credit quality of many traditionally high-quality firms. The result has been a reduced supply of credit in the commercial paper market due to a unique feature of the market: It usually accepts only very high-quality commercial paper that bears virtually no risk of default.² Most companies enter the commercial paper market with a top-tier rating. If a company is downgraded from the top tier, the amount of commercial paper it has outstanding typically declines. Often the company eventually exits the market altogether.³ (Appendix 2 provides more details about this feature of the commercial paper market and the "orderly exit" mechanism that comes into play when a company's actual or perceived creditworthiness declines.) With fewer companies issuing commercial paper, many investors simply substitute other safe short-term assets, such as Treasury bills, into their portfolios. As a result, the aggregate supply of credit to the market declines.⁴

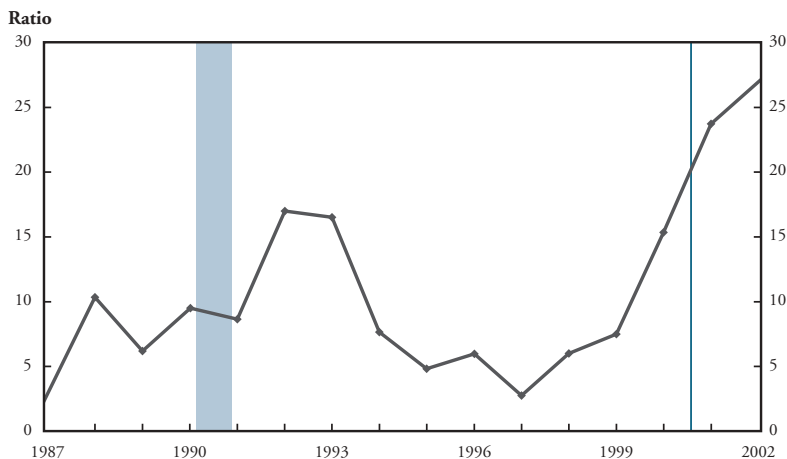
The collapse of the telecommunications industry. An industrywide credit deterioration in the telecommunications industry has left most of the telecom firms unable to borrow in the commercial paper market. Trouble within the telecommunications industry started well before the recent recession and has continued for more than two years. The speed of the credit deterioration in many telecom firms has been unusually rapid. As many telecom firms were heavy users of commercial paper before their recent credit deterioration, the industry's collapse may have contributed both to the unusual timing and to the magnitude of the current decline in commercial paper.

Lucent Technologies was one of the first large telecom companies to see its commercial paper downgraded from top-tier quality. After it was downgraded in October 2000, Lucent found itself unable to roll over the maturing commercial paper and had to rely on alternative financing methods, such as bank loans and longer term corporate bonds. Since Lucent's downgrade, many telecom companies have been forced to find alternatives to commercial paper to finance their operations. AT&T, British Telecom, Corning, Motorola, and Nortel Networks are a few examples of telecom firms that used to enjoy the top-tier commercial paper rating but were downgraded, many repeatedly, in 2001.⁵

Unusually widespread credit deterioration. The recent recession was accompanied by unusually sharp credit deterioration in many corporations—not just those in the telecom industry. This deterioration contributed to the severe shrinkage of the commercial paper market. Chart 3 displays the ratio of the number of firms downgraded to the number of firms upgraded by Standard and Poor's Corporation, for top-tier commercial paper borrowers, from 1987 to 2002. For example, in 2001, 71 commercial paper programs were downgraded and three were upgraded, yielding a ratio close to 24.⁶ This downgrade-to-upgrade ratio was much higher than its previous peak of 17 set in 1992, shortly after the 1990 recession. The pace of credit deterioration worsened further in 2002. Through May 2002, there were 27 downgrades and one upgrade, setting the highest downgrade-to-upgrade ratio on record.

A possible factor contributing to the fast and widespread credit deterioration was the heavy corporate debt burden accumulated in the 1990s. The business expansion that started in the early 1990s was the longest on record since World War II. As the expansion lengthened,

Chart 3

NONFINANCIAL COMMERCIAL PAPER
DOWNGRADE/UPGRADE RATIO

Notes: Data for 2002 is through May 2002. Only firms rated A-1+/A-1 either before or after the rating change are included. Shaded bars indicate recessionary periods. For the most recent recession, only the start date is shown.

Sources: NBER and Standard & Poor's

some corporations might have become overly optimistic and excessively leveraged their balance sheets. Across the nation in the late 1990s, the total nonfinancial corporate debt-to-GDP ratio increased steadily. In 1999, it surpassed the previous record of 43 percent, set in the recession of 1990. Currently, it stands at about 47 percent.⁷ When companies become more leveraged, they become more vulnerable to adverse shocks. As business conditions deteriorated over the past two years, companies found the health of their balance sheets deteriorating sharply.

The reduced supply of credit in the market due to credit deterioration forces borrowers to seek alternative, and usually more expensive, means of financing. Yet, it also provides an incentive for companies to cut their debt burdens and improve their balance sheets. In the long run, these adjustments will improve their credit quality and allow them to borrow again in the commercial paper market, which will be beneficial to their long-term health.

General reduction in risk tolerance

Investors' risk tolerance is usually reduced when their confidence is shaken. As investors in commercial paper are willing to take only minimum risk with their holding of commercial paper, even in good times, any reduction in their risk tolerance may lead them to refuse to roll over all but the safest maturing commercial paper. Consequently, when risk tolerance falls, the commercial paper market contracts.

Investor confidence and risk tolerance typically decline during and after periods of financial market turbulence. In particular, financial market turbulence has led to several episodes of shrinkage in the commercial paper market. For example, after Penn Central railroad defaulted on its commercial paper in 1970, many companies found themselves unable to roll over their maturing commercial paper even though their creditworthiness was not affected by the Penn Central default.⁸ More recently, during the financial market crisis in the fall of 1998, the commercial paper market was stressed and its volume fell, even though the crisis mainly involved financial companies, and the nonfinancial firms with the highest credit quality experienced little credit deterioration.⁹

In the past two years, the confidence of the commercial paper investor has been shaken repeatedly, first by the unexpected defaults in early 2001 and more recently by successive corporate scandals. As a result, investors' risk tolerance may have fallen considerably.

The defaults of two California utilities. The California power crisis in the second half of 2000 and early 2001 seriously damaged the financial health and credit worthiness of two large California utility companies: Pacific Gas and Electricity (PG&E) and Southern California Edison (SCE, a unit of Edison International). Although major rating agencies rated these companies' commercial paper programs in the top tier in December 2000, both firms were downgraded repeatedly in January 2001 and soon defaulted on their maturing commercial paper.

This rapid change of fortune for the two California utility companies and their subsequent defaults might have served as a wake-up call for investors in the commercial paper market and led to a reassessment of risk elsewhere in the market. From the default of Columbia Gas System in June 1991 to the end of 2000, the U.S. nonfinancial com-

mercial paper market had not experienced a single default. Consequently, investors might have become overly optimistic and complacent in the late 1990s, fueling the rapid growth in commercial paper during that period. The defaults of the two utilities in themselves were already big shocks to investors. Even more shocking was the fact that these were the first ever defaults in the U.S. market by companies that, only one month before defaulting, had been rated top tier.¹⁰ As a result, their defaults may have led many investors to believe that the risk of default might have been understated. Investors may have lost some confidence in the rating agencies' ability to assess accurately the creditworthiness of commercial paper borrowers and thus reduced their supply of credit to the market.

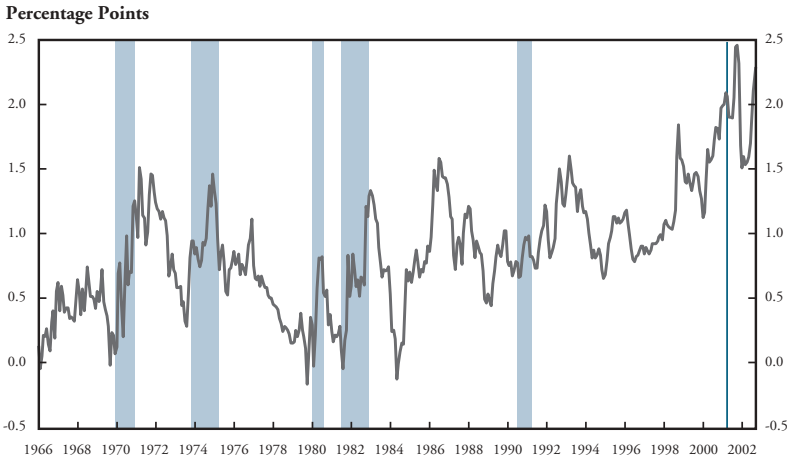
Corporate scandals. More recently, successive corporate scandals have caused a "crisis of confidence" and may have reduced many investors' tolerance for risk. Recurrent corporate scandals have shown there is serious weakness in both corporate governance and financial market operations. Investor confidence in the reliability of the corporate accounting reports and in the fairness and transparency of financial markets has been badly shaken. Consequently, companies with questionable accounting practices and companies with complex balance sheets (which make it easier to mislead investors with "creative" accounting methods) have been hit particularly hard. Many of them are finding that the commercial paper market has become unreceptive.

The experience of Tyco International is a case in point. While Tyco appeared to have adequate cash flow and sufficient short-term liquidity, the company's operating and financial health had been difficult to understand due to its complexity. Early in 2002, when questions regarding the corporate governance of the company intensified, Tyco found itself suddenly facing skeptical investors who refused to roll over its \$4.5 billion of maturing commercial paper. The company was forced to make an "orderly exit" from the commercial paper market and to use bank loans to pay off its maturing commercial paper at considerably higher costs.¹¹

One measure of investors' risk tolerance is the spread between the interest rates on high-quality corporate bonds and Treasury notes. As investors' risk tolerance declines, they tend to require a higher rate of return for holding just slightly less safe debt, such as the highest-rated

Chart 4

THE YIELD SPREAD BETWEEN Aaa CORPORATE BONDS AND 10-YEAR TREASURY NOTES



Note: Shaded bars indicate recessionary periods as defined by the NBER Business Cycle Dating Committee. For the most recent recession, only the start date is indicated.

Sources: NBER, Moody's Investors Service and U.S. Department of Treasury

corporate bond.¹² Chart 4 shows the interest rate spread between the safest corporate bonds, those that are rated Aaa by Moody's Investors Service, and the 10-year Treasury notes. As is clear from the chart, the spread has been elevated since the start of the recent recession. While it fell soon after the beginning of 2002, it quickly rose again and stood at 2.3 percent in September 2002, compared to its average of only 0.8 percent from 1966 to the beginning of the most recent recession.

When the decline in the supply of credit is caused by a reduction in investors' tolerance for risk, the decline represents a more hostile credit environment for borrowers. Even healthy corporations find themselves facing less receptive investors. Nevertheless, to the extent that much of the reduced risk tolerance is caused by corporate scandals, a firm with good corporate governance and transparent accounting practices can be rewarded with less suspicious investors. In the aggregate, investors' confidence and risk tolerance may not recover until progress from corporate reforms becomes apparent.¹³

III. FACTORS REDUCING THE DEMAND FOR CREDIT

On the demand side, two factors may reduce the need for corporations to borrow in the commercial paper market. One factor is a decline in inventories which reduces companies' short-term financing needs. The other is a switch by firms from borrowing short term in the commercial paper market to borrowing longer term in the bond market.

Reductions in business inventories

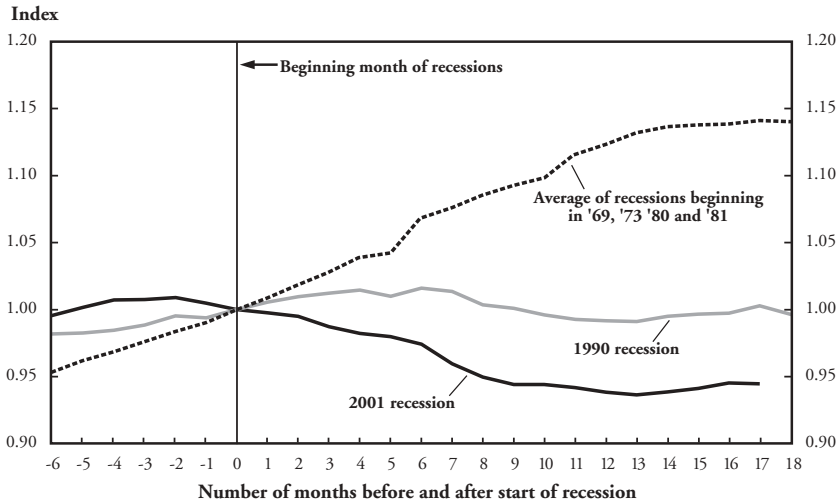
Reductions in business inventories may reduce the need for short-term financing. By SEC regulation, proceeds from the issuance of commercial paper are supposed to be used only to finance "current transactions," such as inventories or accounts receivable. Therefore, when business inventories decline considerably, it is likely that firms' need to issue commercial paper will also decline, resulting in a lower volume of paper outstanding.¹⁴

In the recent recession, companies have been unusually quick to adjust business inventories in response to declining sales. Previously, firms reacted more slowly to sudden drops in sales in the early stages of recessions, and inventory levels increased. For all recessions from 1966 to 1981, inventories continued to rise for almost 12 months on average after the recession started. In the 1990 recession, movements in inventory accumulation followed the similar pattern but the magnitude was smaller and the decline started earlier. But business inventories behaved very differently in the recent recession. Aggregate business inventories started to decline in January 2001, two months before the onset of the recession, and continued to decline for more than a year (Chart 5).¹⁵

Comparing Chart 2 with Chart 5 suggests that the quick adjustment in inventories might have contributed to the contraction in the commercial paper market. The levels of business inventories and the volume of commercial paper outstanding exhibit the same pattern: They both started to decline before the recent recession began. Just as commercial paper has experienced its largest decline on record during the recent recession, so have inventories. Business inventories, however, stabilized early in 2002 and started to increase slightly, suggesting that the effect of reduced credit demand due to inventory reduction is diminishing.

Chart 5

NORMALIZED INVENTORY LEVELS AROUND THE START OF RECESSIONS



Sources: NBER, U.S. Department of Commerce and author's calculations

Large declines in the federal funds rate

The demand for short-term credit such as commercial paper may also fall when firms decide to borrow longer term.¹⁶ Typically in business cycles, as the Federal Open Market Committee (FOMC) reduces the federal funds rate, at some point, corporate debt managers may come to believe that a policy reversal will come soon and that short-term rates will rise. They may therefore decide to replace a portion of their maturing commercial paper with longer term bonds for two reasons. One is to “lock in” the favorable borrowing rate for a longer period than the typical 30-day term of commercial paper. The other is to reduce their uncertainty about funding costs in coming years. Because it is generally more difficult to forecast turning points, uncertainty regarding the future path of short-term interest rates is greater when monetary policy is near a turning point. By switching to longer term borrowing arrangements, firms can reduce this uncertainty.¹⁷

In the most recent recession, the FOMC eased monetary policy aggressively. The FOMC started to lower the federal funds rate at the beginning of 2001, before the recession even started, in contrast to other recessions when the FOMC typically started to ease policy only after a recession had started. The federal funds rate at the beginning of 2001 was 6.5 percent. It was reduced to 4 percent by May and 3.5 percent by August. At that point, some financial analysts speculated that monetary policy was sufficiently stimulative to revive economic growth and thus 3.5 percent might be close to the bottom for the federal funds rate. After the terrorist attacks on September 11, however, the FOMC lowered the federal funds rate another 1.75 percentage points by the end of 2001, bringing it to a then 40-year low of 1.75 percent.¹⁸

There is some evidence that the aggressive easing of monetary policy may have led more firms to switch from commercial paper financing to longer term financing. For example, corporate bond issuance, while down slightly from its unusually high level at the end of 2000, has been relatively robust in the past two years. Recent press reports also suggest that many firms have lengthened their borrowing terms by issuing longer term corporate bonds instead of rolling over commercial paper (Feldheim).¹⁹

IV. CONCLUSION

Will the nonfinancial commercial paper market continue to shrink? It depends on what happens to the factors driving the decline. Both supply and demand factors have been at work. On the supply side, an unusually widespread deterioration of credit quality and investors' decreased tolerance for risk have reduced the supply of credit to the market. These supply factors have shown few signs of abating. On the demand side, the aggressive inventory reduction and the widespread practice of replacing commercial paper with longer term corporate bonds have reduced the demand for credit in the commercial paper market. These demand factors appear to be winding down. Therefore, in the near term, the market is likely to remain at current low levels or even shrink further, but the pace of the shrinkage may moderate somewhat.

APPENDIX 1: AN OVERVIEW OF THE U. S. COMMERCIAL PAPER MARKET

Commercial paper is short-term unsecured senior-level debt issued by a corporation, a municipality, or a foreign government. For high-quality corporate borrowers, it is one of the cheapest sources of external funding available.

The maturity of commercial paper varies from one day to 270 days, with the maximum determined by government regulations. Most commercial paper matures in less than 90 days and the average maturity is about 45 days.²⁰ In the United States, a debt issuer must register the planned issuance with the Securities and Exchange Commission (SEC). Because the registration fee is a fixed percentage of the notional value of the debt issued and a debt issue has to be registered again every time it is rolled over, it is more expensive to issue short-term debt. Commercial paper, however, is exempted from registration, and thus the registration fee, as long as its maturity is no more than 270 days and the proceeds are used for current transactions, such as financing inventories, mergers and acquisitions, or payrolls.

Corporate issuers of commercial paper typically fall into two groups: financial and nonfinancial firms. Financial firms include finance companies, banks or bank holding companies, securities firms, and insurance companies. Nonfinancial commercial paper issuers are typically large industrial and service companies, or utilities, both public and private.

Investors in commercial paper are primarily money market mutual funds, trust funds, insurance companies, pension funds, and large firms with extra cash to invest. By regulation, commercial paper is sold in very large denominations, which puts it beyond the reach of most individual investors. Individual investors nevertheless hold large amounts of commercial paper indirectly through money market mutual funds. In most cases, investors hold commercial paper to maturity because the secondary market for commercial paper is small and fairly illiquid.

Commercial paper has been issued for a long time and has been regulated since the passage of the Securities Act of 1933. But only since the 1960s has it become a meaningful source of funding for nonfinancial corporations. In the 1990s, the volume of nonfinancial commercial

paper outstanding was typically 25 to 40 percent of the outstanding volume issued by financial firms. The share fell to about 14 percent by September 2002 as a result of the dramatic shrinkage of the market for nonfinancial commercial paper.

Commercial paper has been rated by rating agencies since the early 1970s, after the default of the Penn Central railroad in 1970. The three major SEC-designated “Nationally Recognized Statistical Rating Organizations” that regularly provide ratings on commercial paper are Standard and Poor’s Corporation, Moody’s Investors Service, and Fitch Investors Service. The rating assignments of Standard and Poor’s are A-1+, A-1, A-2, A-3, and B. The ratings of Moody’s are P-1 (short for Prime-1), P-2, P-3, and NP (Not Prime). And the ratings of Fitch are F-1+, F-1, F-2, F-3, B, C, and D. For a commercial paper issue to be rated in the top tier, it has to be rated as A-1+ or A-1 by Standard and Poor’s, or P-1 by Moody’s, or F-1+ or F-1 by Fitch.

In practice, it is imperative for a commercial paper issuer to have a backup line of credit, usually from banks with the highest credit ratings. The backup credit line assures investors that adequate funds will be available to repay the commercial paper when it matures. The minimum backup facility is typically 75 percent of the total size of the issuance for top-tier issues and 100 percent for lower rated issues. Backup facilities are only meant to provide emergency assistance for short-term liquidity difficulties, such as a temporary liquidity shortage due to a snowstorm that disrupts check processing. They are not intended to enhance the credit quality of issues. In fact, most of the backup facilities include “material adverse change” clauses that allow the banks to cancel the backup lines if an issuer’s financial health deteriorates considerably.²¹

Asset-backed commercial paper is excluded from the above discussion and from the consideration in the text because it is fundamentally different from traditional commercial paper. It is essentially a passthrough security, typically with accounts receivable as the backup asset that is being passed through, just as an asset-backed mortgage security is a passthrough security with mortgage payments being passed through. Developed by large commercial banks in the 1980s, asset-backed commercial paper has provided inexpensive financing for accounts receivable for companies that are typically unable to issue tradi-

tional commercial paper in the market. In addition to the backup asset, asset-backed commercial paper is usually also supported by credit and liquidity enhancement facilities provided by high-quality commercial banks. Further, the rating of an asset-backed commercial paper program often depends on the adequacy of the enhancement facilities and the credit quality of the banks providing the facilities. Since its inception, asset-backed commercial paper has grown rapidly and its volume outstanding has already surpassed that of nonfinancial commercial paper.

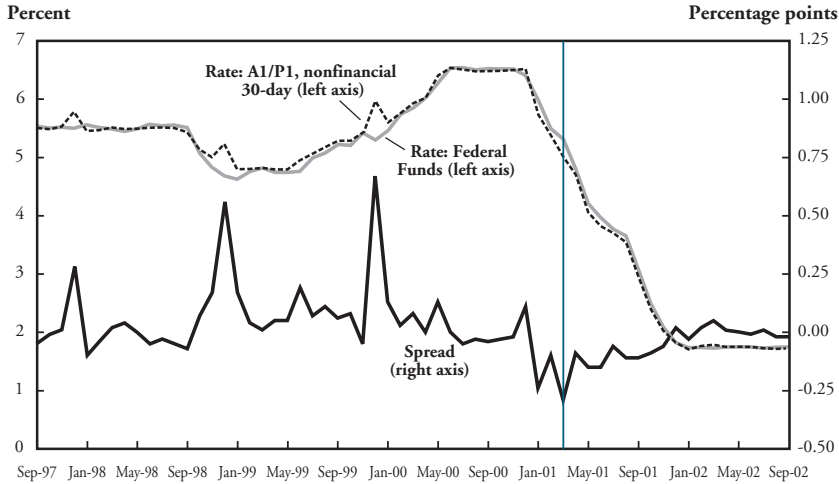
APPENDIX 2: THE QUANTITY RESPONSE OF THE COMMERCIAL PAPER MARKET AND THE “ORDERLY EXIT” MECHANISM

The commercial paper market is generally accessible only to companies with very high credit quality, as only such companies can find buyers for their commercial paper. Investors in the market appear to require commercial paper to have virtually no default risk, or to be “near-riskless” (Calomiris and others). For example, at the beginning of 2000, Moody’s Investors Service rated roughly 89 percent of the global outstanding commercial paper issues in the top tier and a further 10 percent in the second tier. For a commercial paper issue to be rated in the top or second tier, a rating agency has to be convinced that the probability of an issuer’s default is virtually zero.²² Naturally, only commercial paper issued by companies with very high credit quality will meet such a stringent standard.

As a consequence of this insistence on the safety of commercial paper, the market response to credit deterioration is reflected mainly in the quantity (volume outstanding) instead of the price (the interest rate on commercial paper). For example, if an issuer’s credit quality deteriorates and is downgraded from the top tier to the second tier, even though the default risk in its commercial paper is still minuscule, many previous investors may refuse to roll over the issuer’s maturing commercial paper. Consequently, the issuer’s volume of commercial paper outstanding will decline over time as more and more existing commercial paper matures without being replaced by new issues. This is called the “orderly exit” mechanism of the commercial paper market.²³ In comparison, the interest rate on the issuer’s commercial paper might not change materially because investors tend to hold commercial paper to maturity and trading of commercial paper on the secondary market seldom occurs.

In the aggregate, if deterioration in the credit quality of companies in the highest credit tier is widespread, the size of the commercial paper market will decline quickly. The average interest rate on commercial paper, on the other hand, is unlikely to move up or down significantly for two reasons. The rate is unlikely to move up significantly because, after weakened issuers have left the market, the average quality of the

THE YIELD SPREAD BETWEEN THE COMMERCIAL PAPER RATE AND THE FEDERAL FUNDS RATE



Note: The vertical bar indicates the start date of the most recent recession.

Sources: Federal Reserve Board of Governors and author's calculations

remaining commercial paper issuers will probably remain roughly unchanged. The rate is unlikely to move down significantly because, from the perspective of many investors, the near-riskless property of commercial paper makes it comparable to other safe short-term debt, such as Treasury bills. Consequently, the average interest rate on commercial paper is bounded below by the interest rate on Treasuries with similar maturities.²⁴

The Appendix Chart provides evidence that the average interest rate on 30-day commercial paper appears to follow the federal funds rate closely, and the spread between the two rates seems to have little relation to credit quality. The dashed line shows the average interest rate on 30-day commercial paper, the grey solid line shows the federal funds rate (both scaled on the left axis), and the black solid line shows the spread between the two (scaled on the right axis).²⁵ The federal funds rate tends to be lower in economic slowdowns, when corporate credit quality tends to worsen. Therefore, if the interest rate on commercial paper reflected changes in credit quality, its spread with the federal funds rate would rise when the federal funds rate fell. But there is little evidence that this is the

case. In fact, it appears that seasonal fluctuations, such as the rise in the spread occurred regularly at the end of each year, are the dominant determinant of changes in the spread.

Two schools of thought offer explanations for why very high-quality commercial paper dominates the market. One school points to the structure of the market. First, SEC regulations allow money market mutual funds to own only top-tier or second-tier commercial paper. The regulations also restrict a money market mutual fund's holdings of second-tier commercial paper not to exceed 5 percent of the total assets of the fund. These regulations have effectively curtailed the demand for lower quality commercial paper. Second, the credit risk in commercial paper is difficult to manage or hedge because the secondary market is very limited, mainly due to the short and variable maturity of commercial paper. The difficulties in hedging the risk further reduce investors' demand for lower quality commercial paper.

The other school believes that the primary reason only very high-quality commercial paper can be issued is that investors' demand for commercial paper is concentrated on very high quality issues. In other words, the commercial paper market serves to provide a debt instrument that is almost a perfect substitute for money to meet the liquidity management needs of large investors. Only commercial paper issued by very high-quality firms can be considered "near-riskless" and therefore comparable to money. In practice, issuers are usually flexible in tailoring the maturity of their commercial paper to meet investors' needs for liquidity management, which is consistent with this explanation.²⁶ According to this school, the SEC regulations simply codify and formalize the informal practice of the market (Schnure).

ENDNOTES

¹ This decline in nonfinancial commercial paper contrasts sharply with developments in the market for financial commercial paper. The total volume of financial commercial paper also peaked in November 2000 (about \$1.28 trillion) but had declined only about 8 percent by September 2002.

² Calomiris and others discuss this feature of the market.

³ Moody's Investor Service estimated that 80 percent of the commercial paper issues rated by the company were in the top tier in late 2000, and another 17 percent were in the second tier.

⁴ This response is in sharp contrast to the longer term corporate bond market, where a general reduction in borrowers' creditworthiness will mostly be reflected in the increased interest rate that borrowers have to pay to induce investors, with relatively minor impact on the outstanding volume of bonds.

⁵ In addition, Qwest and WorldCom were downgraded from their second-tier rating in 2001 and 2002, which virtually shut them out of the commercial paper market.

⁶ The numbers of downgrades and upgrades in 2001 are from conversations with the research staff at Standard and Poor's Corporation. The number of downgrades shows that the credit deterioration is not confined to the telecom industry.

⁷ In addition to the debt-to-GDP ratio, analysts also use debt-to-asset ratios or debt-to-equity ratios to measure the leverage of companies (Osler and Hong). These alternative measures, however, are heavily influenced by the stock prices of the companies. In the late 1990s, high stock prices masked increases in many companies' leverage ratios.

⁸ Calomiris provides a detailed account of events around the Penn Central default.

⁹ Saidenberg and Strahan investigate the commercial paper market during that period.

¹⁰ Moody's Investor Service, for example, stated in October 2000 that for a 180-day period, the estimated default risk was 0.00 percent for top-tier commercial paper.

¹¹ Press release, Tyco International Ltd., February 4, 2002.

¹² The spread may also increase due to continuous credit deterioration in the corporate sector if market prices react faster than rating agencies' rating changes. Then, if there is a continuous deterioration in credit quality, the average credit quality of borrowers in the Aaa rating may decline, and thus the spread may increase. In this case, the spread becomes a proxy for both supply factors.

¹³ In practice, it is difficult to distinguish a reduction in investors' risk tolerance from a general increase in the *perceived* riskiness of borrowers. For reasons similar to the previous footnote, a general increase in the perceived riskiness of borrowers will also lead to an increase in the spread between the interest rates on high-quality corporate bonds and Treasury notes. To the extent that the increase in the perceived riskiness exceeds the actual increase in the riskiness of borrowers, the effect of the change is the same as a reduction in investors' risk tolerance.

¹⁴ Winters has investigated the linkage between business inventories and nonfinancial commercial paper. Calomiris and others provide empirical evidence that relates the demand for commercial paper to firms' inventories.

¹⁵ The inventory data have been adjusted to smooth seasonal fluctuations.

¹⁶ This practice is called “term-out” in the corporate borrowing market.

¹⁷ Regression analysis confirms that both the federal funds rate and business inventories are significant in explaining the total volume of nonfinancial commercial paper outstanding, and have the expected signs. Specifically, to explain the annual changes in nonfinancial commercial paper outstanding, regressions that include annual rates of changes in the federal funds rate, business inventories, as well as lags of the dependent variable appear to do a decent job with good fit and little residual serial correlation. Both changes in the federal funds rate and business inventories are positively significant in the regression. However, changes in the spread or the levels of the spread do not improve the regression and the coefficients are not significant.

¹⁸ The FOMC lowered the federal funds rate another 0.5 percentage point in November 2002, to 1.25 percent.

¹⁹ In addition, many companies have recently reported in their regulatory filings that they have either “termed-out” their commercial paper or are in the process of doing so.

²⁰ Moody’s Investors Service.

²¹ This paragraph is based on Hahn’s article, which also contains more detailed information about the regulatory and institutional structure of the market.

²² For example, Moody’s Investors Service states that its “objective in assigning short-term ratings is that commercial paper should never default with a Prime rating.” Other major rating agencies appear to have similar criteria because their ratings for commercial paper issues are usually comparable.

²³ Crabbe and Post provide empirical evidence supporting the existence of the mechanism.

²⁴ The interest rate on Treasury bills should be slightly lower than the interest rate on commercial paper because Treasury bills are safer and the interest income they generate is exempt from state income taxes.

²⁵ Data on the average interest rate on 30-day commercial paper are available from 1997 onward. Data collected before 1997 are not based on market prices and therefore are not comparable.

²⁶ Issuers benefit from this arrangement by borrowing funds at low rates.

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