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# THE BEHAVIOR OF THE BANK REPURCHASE AGREEMENT MARKET: 1981 -1983

by

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ABSTRACT

This paper investigates the bank repurchase agreement (repo) market over the period 1981 to 1983. Individual bank repo rates were, on average, 220 basis points less than the closely related federal funds rate. The effects of the Drysdale Securities, Penn Square, and Lombard-Wall failures were investigated. Although no immediate effect was found, repo rates did increase 100 basis points relative to the federal funds rate approximately six months after the first such incident and immediately following the October, 1982 change in monetary policy.

## I. INTRODUCTION

The repurchase agreement (repo) market is one of the most important markets to the banking industry. It acts as a major source of short-term funds for banks as well as a vehicle for managing their liability positions and obtaining liquidity. Use of this market has increased. Outstanding repos of all commercial banks has grown approximately twenty percent annually since 1969 with over $50 billion of commercial bank repos outstanding today.

Repos are the acquisitions of immediately available funds through the sale of securities, usually government securities, with a simultaneous agreement to repurchase them at a later date. Maturities are usually for one day but may be as long as several months. Commercial banks and government securities dealers are the primary borrowers in the repo market. Since the transactions are secured, usually by government securities, the market attracts a wide array of lenders. This is in contrast to the closely related federal funds market which involves only commercial banks and other financial institutions and whose borrowings are normally unsecured.

In this paper the bank repo market is examined over the period May, 1981 to March, 1983. Unsecured borrowing via the federal funds market required an approximately 220 basis point premium over the secured borrowing rate in the repo market. Moreover, repo rates were found to increase approximately 100 basis points relative to the federal funds rate. This increase was probably due to events which occurred during this period.

## II. THE PERIOD 1981 - 1983

The period of study extends from May, 1981 through March, 1983. A number of important events occurred during this period, and a brief discussion of each

follows:

| | |
|---|---|
| May 18, 1982 | Drysdale Securities default |
| July 5, 1982 | Penn Square Bank failure |
| August 12, 1982 | Lombard-Wall bankruptcy |
| October, 1982 | Monetary policy change |

Drysdale Government Securities, Inc. was a small New York-based securities dealer. On May 18, 1982, Chase Manhattan Bank, which had been handling and processing securities transactions on behalf of Drysdale, announced that Drysdale was unable to pay $160 million in accured interest due on its repo agreements with various large brokerage houses on Wall Street. Although Chase stated that it was not liable for any claims filed, on the following day it announced that it would pay the interest owed and liquidate Drysdale's position, estimated to be approximately $4 billion.

In July, 1982, Penn Square Bank of Oklahoma City, a bank with over $525 million in total assets, was declared insolvent. Having received much publicity and given the significant financial ties of Penn Square with some money-center banks via large loan participations, this event may have led to a loss of public confidence in the banking industry and affected the bank repo market in particular.

Shortly thereafter, in August, 1982, Lombard-Wall Money Markets, Inc. filed for bankruptcy protection. This was the third government securities dealer to fail since May, 1982. This event may have been even more significant than others before because a federal judge barred those holding repo agreements with Lombard-Wall from immediately selling the securities backing the agreements. Investor interest in the repo market reportedly declined dramatically after these incidents.

Finally, in October, 1982, a significant change in the Federal Reserve's monetary policy took place. The adoption of a borrowed reserves operating procedure replaced the previous nonborrowed reserves procedure implemented in October, 1979. Moreover, there was a deemphasis of M1 as a money target. It is not clear what effect this policy change would have on the bank repo market, but the federal funds rate became less volatile after October, 1982, see Roley [1986].

Although there have been many studies investigating the federal funds market, see for example, Dyl and Hoffmeister [1985] and Vogt and Hanna (1984), the bank repo market has been largely ignored, probably due to lack of sufficient data. This paper investigates this market by examining daily repo rate quotations from each of the five largest banks in Chicago. The banks are Continental Illinois, First Chicago, Harris Bank, Northern Trust, and American National, and will periodically be referred to as Banks 1 through 5. These quotations were given at 9:00 a.m. each morning and were compared to the federal funds ask rates also quoted each morning.

## III. COMPARISON TO THE FEDERAL FUNDS MARKET

The federal funds market is similar and closely related to the bank repo market. Both primarily involve transactions for one business day. In both markets, commercial banks can acquire funds not subject to reserve requirements. Transactions in both markets are settled in what are known as "immedi-

ately available funds." Moreover, both are a major source of overnight money for large commercial banks. However, a major distinction between the two markets is that repos are secured by government securities whereas federal funds are normally an unsecured form of borrowing. Thus, one would expect to pay a premium in the federal funds market. The daily spreads between the repo rate quotations for each bank and mean federal funds quotations are pre- sented in Table 1. Spreads are also presented for the periods separated by the events discussed in Section II. The premium paid in the federal funds market was approximately 220 basis points over the whole period, however, this premium declined 100 basis points during the last quarter of the period. The premium was generally smaller for the money-center banks than for the large regionals indicating a higher repo rate for the money-center banks. This may not necessarily be an indication of higher perceived default risk by investors but only a result of the money-center banks more actively pursuing this market as a source of funding. Volume data, however, is not available and this assertion cannot be confirmed.

In order to assess the impact of each of the major events during this period, mean spreads and their standard deviations were calculated over each period partitioned by the events. Utilizing the results from Welch [1937], a t statistic was employed to test whether there were significant changes in the spread between the federal funds rate and each bank repo rate after each event discussed previously.

The mean changes in spreads along with their t-statistics are reported in Table 2. There was a slight upward movement in the spreads immediately following the Drysdale default, while with the exception of bank 4, there was no significant change immediately following the Penn Square and Lombard-Wall failures. However, after the monetary policy change, there was a highly significant drop in the spread of between 130 and 150 basis points.

These results can be explained as follows. After the Drysdale Securities default, repo investors may have turned to banks as an alternative leading to a subsequent drop in the repo rate relative to the federal funds rate. The Penn Square and Lombard-Wall failures appear to have had no effect with the exception of Bank 4. Bank 4, however, is believed to have dropped out of the market over the short intervals before and after the Penn Square bankruptcy. Their rates were arbitrarily 200 to 300 basis points less than competitors which would lead to the confusing results. The period following the monetary policy changeled to an unquestionable decline in the spread. Eighty percent of the decline was due to a decline in the federal funds rates, while twenty percent was due to an increase in the repo rates. Whether this decline was due to the immediate effects of the monetary policy change or a lagged-effect from the repo market failures or a combination of both cannot be determined. However, there was a negative effect on the repo market relative to the federal funds market. There is no reason to believe that the monetary policy change should have had an effect; rather, it may be that repo rates should have declined after the change in policy and better economic conditions. Instead, no adjustment occurred and the reported effect took place bydefault. Of particular interest is the fact that Continental Illinois, which had bought over $1 billion of loans from Penn Square, was not significantly affected in the bank repo market immediately following the Penn Square failure.

The close association between the federal funds market and the bank repo market is evident by looking at the linear correlation coefficient between the

two time-series. The average correlation coefficient was estimated to be .951. Thus, it is reasonable to assume that a linear relationship exists between the federal funds rate and the bank repo rates. This relationship was investigated by regressing the federal funds rate series on each bank repo rate series over the whole period of study. The results are reported in Table 3. Serial correlation in the residuals was corrected using the Durbin method and the resulting Durbin-Watson (DW) statistics are reported. In all cases, the estimated parameters are highly significant, and much of the variability in the federal funds rate can be expalined by the behavior of the repo rates.

The results confirm our expectation of the strong structural relationship between the federal funds rate and the bank repo rate. However, it is natural to question when and if the failures which occurred impacted the bank repo market. To answer this question, separate regressions were run over the whole period and various sub- periods beginning in May, 1981. A Chow statistic was employed to test whether the coefficients of the two sub-period regressions changed.

The null hypothesis is that the slope and intercept coefficients are equal for both regressions. Different sub-periods were investigated and Chow statistics were calculated and compared to critical Chow statistics. The maximum likelihood of a change would be for the period exhibiting the largest relative change. The results of this analysis indicate that the maximum likelihood for an adjustment occurs on December 3, 1982 for all five banks. However, the adjustment is significant only for the three large regional banks in this study and not for the two money-center banks. These results confirm those found previously in that a significant change occurred after the October, 1982 change in monetary policy.

## IV. SUMMARY AND CONCLUSIONS

This paper has investigated the behavior of individual bank repo rates pver tje [eropd 1081 to 1983. Unsecured borrowing via the federal funds market required a premium of approximately 220 basis points over the secured borrowing in the bank repo market. The effects of the Drysdale Securities default, the Penn Square Bank and Lombard-Wall failures, and the monetary policy change in October, 1982 on the bank repo market were investigated. Although the failures had no immediate effects on the bank repo market, repo rates were found to increase approximately 100 basis points relative to the federal funds rate six months after the Drysdale Securities default. With over $50 billion of commercial bank repos outstanding this translates into a $.5 billion increase in annual interest expenses for the banking industry. This is onlyan upper limit since some banks appear not to have been affected. In particular, only the large regional banks and not the money-center banks analyzed in this study were significantly affected. It is hoped that this paper provides some insight into the behavior of a virtually unexplored market over an extremely interesting period of study.

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TABLE 1

SPREADS*

(Basis Points)

| Period/Bank | 1 | 2 | 3 | 4 | 5 | Average |
|---|---|---|---|---|---|---|
| 5/18/81 - 3/25/82 | 174 | 168 | 294 | 262 | 203 | 220 |
| 5/18/81 - 5/18/82 | 197 | 156 | 336 | 270 | 216 | 235 |
| 5/19/82 - 7/5/82 | 231 | 203 | 277 | 561 | 236 | 302 |
| 7/6/82 - 8/12/82 | 221 | 214 | 297 | 336 | 231 | 260 |
| 8/13/82 - 10/15/82 | 227 | 263 | 325 | 274 | 250 | 268 |
| 10/16/82 - 3/25/82 | 75 | 133 | 191 | 139 | 138 | 135 |

*Federal Funds rate - Bank Repo rate

TABLE 2

CHANGE IN SPREADS
(Basis Points)

| | Bank | | | | |
|---|---|---|---|---|---|
| Event | 1 | 2 | 3 | 4 | 5 |
| Drysdale | | | | | |
| Net Change | 34 | 47 | -59 | 291 | 67 |
| t | 2.52* | 2.82* | -3.54** | .74 | 1.43 |
| Penn Square | | | | | |
| Net Change | -10 | 11 | 20 | -225 | -42 |
| t | -.53 | .51 | 1.14 | -7.15** | -.27 |
| Lombard-Wall | | | | | |
| Net Change | 6 | 49 | 28 | - 62 | 8 |
| t | .31 | 2.51* | 1.74 | -2.49* | 1.14 |
| Monetary Policy | | | | | |
| Net Change | -152 | -130 | -134 | -134 | -133 |
| t | -330.20** | -9.67** | -9.51** | -8.24** | -8.78** |

* significant at .05 level
** significant at .01 level

TABLE 3

REGRESSIONS: FEDERAL FUNDS RATE ON BANK REPO RATES
(MAY 1981 TO MARCH 1983)

| Bank | Intercept | Slope | $R^2$ | Durbin-Watson |
|---|---|---|---|---|
| 1 | .026<br>(7.22) | .927<br>(31.66) | .69 | 2.15 |
| 2 | .040<br>(13.03) | .795<br>(31.76) | .69 | 2.07 |
| 3 | .055<br>(10.40) | .743<br>(15.62) | .35 | 2.13 |
| 4 | .102<br>(20.11) | .263<br>(8.24) | .13 | 2.19 |
| 5 | .023<br>(8.01) | .975<br>(39.28) | .77 | 2.12 |

t-statistics are given in parentheses


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