Benefits from Lending Relationships in Public Debt Markets: Empirical Evidence from the Commercial Paper Market

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Abstract

There is a large and growing body of literature on the benefits of established lending relationships with banks, which is an intermediated debt market. We extend that literature by testing for benefits from direct lending relationships in the commercial paper market, which is a public debt market. Diamond (1991) suggests that firms access public debt markets when they have enough reputation to no longer require the close monitoring of banks. Using daily rate data for dealer-placed and directly-placed commercial paper; we find evidence consistent with the existence of benefits from direct lending relationships in this public debt market.

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1. Introduction

The recent meltdown of the sub-prime mortgage market has brought attention to the money markets with specific discussions related to the primary characteristics of the money market: low credit risk and high liquidity. Front page articles in the Wall Street Journal have discussed how investors have fled commercial paper for the default-free safety of Treasury bills as the Federal Reserve pumped billions of dollars of additional liquidity in the market and how Countrywide Financial Corporation (a large nationwide mortgage lender) had to draw on its bank lines of credit because it was unable to raise the necessary funds in the commercial paper market. These articles raise the question of how does a borrower in the commercial paper market maintain access to credit during liquidity squeezes?

Diamond (1989) says that borrowers develop reputation through repeated successful debt transactions with a bank that allows successful borrowers to reduce their loan rate over time. Diamond (1989) spawned a body of empirical literature on the value of lending relationships with the following being representative examples. Petersen and Rajan (1994) find that an ongoing relationship with a lender increases the amount of debt available to the borrower. Berger and Udell (1995) find that lending relationships reduce the rate charged to the borrower on a line of credit and reduce the need for collateral to support the line. Blackwell and Winters (1997) also find that lending relationships reduce the rate charged on lines of credit and reduce the monitoring efforts of the lender.

Diamond (1991) extends Diamond (1989) and says that borrowers that develop sufficient reputation through successful transactions with a bank can leave the intermediated market and borrow directly in the public debt markets. Diamond (1991) does not discuss whether firms that borrow in the

public debt markets can benefit from developing borrower/lender relationships in these markets. That is, can a borrower in a public debt market increase its access to debt and/or decrease its interest rate on debt by developing a direct relationship with a lender? We examine this question by testing for the benefits of direct borrower/lender relationships in the public debt market for commercial paper.

1.1. Experimental Setting and Testable Implications

In this paper we examine whether firms that have sufficiently good credit quality to access the public debt markets can benefit from developing direct borrower/lender relationships in public markets. We conduct our analysis in the commercial paper market. Accordingly, in this sub-section we detail why the commercial paper market is an appropriate experimental setting for our analysis.

First, borrowers in the commercial paper have two ways to issue their paper (borrow). One way is "dealer-placed" commercial paper which is commercial paper issued by a borrowing firm and matched with an investor by a financial intermediary (the dealer). The second way is "directly-placed" commercial paper which is commercial paper issued by a borrowing firm directly to the investor without the assistance of a financial intermediary. Thus, we have a market where borrowers can work directly with lenders and develop relationships or can work through dealers and remain at arm's length from the lenders.

Second, we require an experimental setting where the potential benefits of borrower/lender relationships have an opportunity to work. Typically, this is accomplished with firm level data. For example, Blackwell and Winters (1997) use the number of years a borrower has been with a bank as a proxy for the quality of the relationship and Athavale and Edmister (2004) examine a time series of loan agreements between specific borrowers and their bank. We do not have firm level data. Instead, we have market data for dealer-placed and directly-placed commercial paper, so for our empirical

analysis we need market level events where the benefits of borrower/lender relationships have an opportunity to work and the commercial paper market regularly has such events.

Kane and Malkiel (1965) examine borrower/lender relationships and show that banks benefit in both the short-run and long-run from granting the loan requests of their established customers (Kane and Malkiel refer to these customers as L* customers). They develop their analysis in an environment of constrained debt availability accompanied with rising interest and suggest that lenders benefit in this environment from accommodating loan requests from L* customers.[1] Griffiths and Winters (2005) find that one-month commercial paper rates increase at the year-end in a pattern that they suggest is consistent with a year-end liquidity squeeze. Thus, the commercial paper market has a regular event associated with constrained debt availability where the benefits of borrower/lender relationships have an opportunity to work.

Specifically, Griffiths and Winters (2005) find a year-end effect in the commercial paper rates that is consistent with a preferred habitat for liquidity.[2] A preferred habitat for liquidity means that investors have strong maturity preferences in their investments so that the investments repay the investors (lenders) in time to meet investors' cash obligations. The year-end rate pattern identified by Griffiths and Winters (2005) for 30-day commercial paper is that (1) rates increase at the turn-of-December, (2) rates remain abnormally high across the month of December, and (3) rates return to normal across the turn-of-the-year with the rate decline beginning before the last trading day of the year. This rate pattern suggests that commercial paper lenders have a preferred habitat for paper that matures toward the end of December and will only lend across the turn-of-the-year at abnormally high rates. Thus, there is a regular year-end "squeeze" in the commercial paper market where lenders

[1] Kane and Malkiel (1965) focus on loan requests from bank customers with deposit relationship. There is not a deposit relationship in the commercial paper market.

[2] Note, Musto (1997) also finds a year-end rate increase in the commercial paper market and suggests risk-shifting window dressing as the explanation. Griffiths and Winters (2005) show that the year-end rate change pattern in commercial paper is not consistent with risk-shifting window dressing.

withdraw from some maturity dates and instead hold their cash to meet their own year-end cash obligations and this squeeze is accompanied by rising interest rates.

During a liquidity squeeze lenders will accommodate some borrowers, but not all, and then generally at higher rates, so the question is whether or not lenders will preference regular borrowers with established relationships and there is good reason to believe that lenders would (see, Kane and Malkiel (1965) above). Stigum (1990) notes that the largest group of lenders in the commercial paper market is money funds which account for about 40% of the market. In addition, Stigum states that the vast majority of borrowers in directly-placed commercial paper are finance companies with average outstandings of $6.7 billion. Money funds (the lenders) benefit from the ongoing demand of the finance companies (the borrowers) which allows the money funds to quickly and continually place funds and avoid holding idle cash. Avoiding idle cash is vitally important to money funds in generating the returns needed to compete for investors' dollars. One benefit finance companies can reasonably expect for regularly absorbing cash from money fund is to have access to funds during the year-end liquidity squeeze as an accommodation in their direct relationship with lenders.

Thus, the commercial paper market provides an appropriate experimental setting for analyzing the potential benefits of direct lender/borrower relationships in the public debt markets. Therefore, if borrowers benefit from direct relationships in the commercial paper market then during the year-end liquidity squeeze the direct borrowers should have access to more credit and/or access to lower rates then other borrowers. We only have access to rate data, so we cannot directly test whether direct borrowers have access to more credit. However, if direct borrowers have access to more credit then the duration of the year-end liquidity squeeze should be shorter for direct borrowers than other borrowers. In addition, when rates increase at the year-end we expect to find smaller rate increases for direct borrowers than for other borrowers.

1.2. Summary of Results

We begin our analysis by determining if dealer-placed commercial paper has higher rates than directly-placed commercial paper and if both exhibit year-end rate increases. Dealer-placed commercial paper rates represent an 'all in' cost of borrowing, while directly-placed commercial paper rates do not represent the 'all in' cost of funds.[3] Accordingly, we expect that directly-placed paper will carry a lower interest rate than dealer-placed paper, ceteris paribus. We find that the average daily rate for dealer-placed commercial paper is economically higher than the average daily rate for directly-placed commercial paper for both 30-day commercial paper (10 basis point spread) and 90-day commercial paper (18 basis point spread). In addition, we find that the spread between dealer-placed and directly-placed commercial paper increases dramatically in December in both maturities while rates on both increase relative to the three-month T-bill yield. These results suggest that the empirical environment we need to test for the benefits of borrower/lender relationships in public debt markets is present in our date.

Having identified the existence of the year-end squeeze in our data, we now test for benefits from direct borrower/lender relationships in this public debt market. We find that the year-end rate increase from the liquidity squeeze is smaller in magnitude and shorter in duration in directly-placed commercial paper than in dealer-placed commercial paper. The smaller size and shorter duration of the squeeze in the directly-placed commercial paper market is consistent with the previously discussed benefits of relationship lending with banks. That is, the borrowers with good relationships with their lenders have more access to debt at lower interest rates than other borrowers.

[3] The rate on directly-placed commercial paper is not an 'all in' cost of funds because it does not include the overhead costs of running a directly placed commercial paper program. Stigum (1990) notes that these costs are substantial and require a program that averages in excess of $1 billion to make directly-placed commercial paper cost effective.

2. Important Institutional Features of the Commercial Paper Market

We are confident that readers understand the commercial paper market on a conceptual level. However, we are concerned that readers may lack the institutional knowledge of the commercial paper market necessary to provide context for our analysis. Accordingly, in this section we digress from the discussion of our analysis of the commercial paper to provide institutional details about the commercial paper that we believe will provide useful context for our analysis.

We begin with the dollar size of the market. Figure 1 shows that in early 1984 there was about $200 billion in commercial paper which increased steadily across our sample period to a level of about $750 billion in 1997.[4] The annualized rate of growth across this period is over 11%. These numbers suggest that the commercial paper market is a large market based on dollars outstanding and that it grew at a significant rate across our sample period.

Commercial paper (CP) is available in initial maturities from overnight up to 270 days of initial maturity. However, the major of the CP is issued with an initial maturity of 30 days or less. Approximately 85% of commercial paper issuers issue their CP through dealers. The other 15% directly issue their CP. Traditionally, the direct issuers of commercial paper were large corporations and financial institutions with significant levels of outstanding CP.

Two primary reasons exist for the use of dealers. First is the substantial cost of establishing the systems and hiring the people needed to directly place CP. Second is the time required to develop the relationships necessary to the success of a direct placement CP program. Obviously, the CP issuer that issues through a dealer hires the dealer because the dealer has the systems, people, and relationships in place to successful place CP. The issuer pays the dealer about 5 basis points on the amount of the issue for placing the CP.

[4] Earlier we noted that money funds account for about 40% of the lending in the commercial paper market. At 40%, money funds would be lending $80 billion at the beginning of our sample and $300 billion by the end of the sample period.

There are two primary disadvantages to using dealers to place CP. The first disadvantage is that the issuer is a price taker in the dealer-placed market. The dealer surveys the market each morning and then offers the price to the issuer. The second disadvantage of using a dealer to place the paper is that the issuer has no idea who holds their CP. This creates concentration risk for the issuer which exposes the issuer to adverse effects from a credit market event.

Stigum notes that in the late 1980s (the middle of our sample period) that 43% of the CP outstanding was placed directly. At the time the direct issuers of CP were about 20 to 25 firms, such as GMAC and Ford Credit. Stigum Table 22-1 (p.1060) lists the 17 largest direct issuers of CP and provides their CP rating and dollars outstanding. Fourteen of the 17 largest direct issuers of CP were rated A-1,P-1 which is the top credit rating for CP and is similar to the AA-rating discussed by the Fed for the data on dealer-placed CP rates. The three companies not receiving an A-1,P-1 rating were Beneficial Corp, Chrysler Financial, and John Deere Credit.

Finally, the effective annual interest rate on CP is calculated as follows:

Discount = Discount rate * Face * (days to maturity/360)

Usable funds = Face – Discount

$$\text{Effective annual rate} = \frac{\text{Discount} + \text{Dealer Fee} + \text{Backup Fee}}{\text{Usable Funds}} * \frac{365}{\text{Days to Maturity}}$$

Directly-placed CP does not pay a dealer fee. Also, directly-placed CP rates are not an all-in cost of CP because it does not include the cost of systems and people to run a direct placement program. These costs are substantial. Stigum notes that to make direct placement economically feasible the issuer would need to average at least $1 billion in outstandings. However, Stigum also notes that for the large issuers this can be a benefit because one large issuer calculates the cost of their direct placement program at 1 basis point. Another issuer of directly-placed paper suggests that if your direct costs are 5 to 6 basis points the issuer is likely better off going through dealers than issuing

directly. The Backup Fee is for the back-up line of credit that investors require on CP. Dealer-placed paper typically carries 100% back-up to ensure the availability of credit. Some of the large direct placers of CP do not carry 100% back-up such as GMAC.

3. Data

Our sample includes 3,647 average daily commercial paper rates for both 30-day and 90-day commercial paper from January 10, 1983 through August 29, 1997. During this time period, commercial paper rates were collected by the Federal Reserve and reported under one of two classifications, namely *directly-placed* commercial paper and *dealer-placed* commercial paper.

We chose to start our sample in 1983 to avoid that unusually volatile period in interest rates of October 1979 through October 1982 when the Federal Reserve experimented with targeting M1. We capped our sample at August 29, 1997 due to a change in the way commercial paper rates were being reported. Prior to August 29, 1997, the Federal Reserve collected commercial paper rates via survey. The Federal Reserve would survey a sample of firms who have the resources to place commercial paper issues directly with investors, average these daily rates, and then report these as directly-placed commercial paper rates with the appropriate maturity. Similarly, the Federal Reserve would survey a sample of dealers that employed brokers to place commercial paper issues on behalf of firms that either did not have (or did not want to dedicate the resources to) a department responsible for placing commercial paper with an investor. The Federal Reserve would also average these daily rates and report them as dealer-placed commercial paper rates with the appropriate maturity.

Starting on September 1, 1997 the Federal Reserve changed its collection and reporting procedures for commercial paper rates.[5] Rather than obtain the commercial paper rates via survey, the Federal Reserve turned over the stewardship of collecting daily rates to the Depository Trust Company (DTC) of New York City. The DTC is a national clearinghouse for the settlement of securities trades and performs this function for nearly all domestic commercial paper activity. The commercial paper rates would be collected through the day's activity, averaged, and then electronically submitted to the Federal Reserve for reporting. The benefits include more accurate reporting, and savings of costs incurred in conducting the surveys. However, DTC classifies commercial paper rates by financial and non-financial rather than dealer and direct. Since there is cross-over between the two classifications, it was necessary to cap the sample as of the last day that the Federal Reserve conducted the surveys to make the comparisons needed between dealer-placed and directly-placed commercial paper.

3.1. Sample Descriptive Statistics

Table 1 reports basic descriptive statistics for the data used in the analysis. The table is divided into three panels to provide different views of the data. Panel A provides average rates for each series of commercial paper data and for three-month T-bills yields. We include three-month T-bills here to provide a reference point for the commercial paper rates and because we use the three-month T-bill yield as a proxy for the general level of short-term interest. The average three-month T-bill yield across the sample period is 6.099%. Surprisingly, we find that the average T-bill yield in December is lower than the average rate for the other eleven months, which supports the need to control for the

[5] In May of 1997, the Federal Reserve issued a memo explaining the changes in which the commercial paper rates would be collected. "A Change in the Source of Commercial Paper Data Published by the Federal Reserve System," May 12, 1997, http://www.federalreserve.gov/releases/H15/cp.htm

general level of interest rates in later analysis.[6] The average rates for both 30-day dealer-placed and directly-placed commercial paper increase in December as does the rate on 90-day dealer commercial paper, which is consistent with the year-end preferred habitat in commercial paper identified by Griffiths and Winters (2005). The decrease in the average rate for directly-placed commercial paper in December is unexpected. However, the decrease clearly shows that the lenders in this segment of the market are willing to accommodate the needs of their borrowers at the year-end while rates are increasing in the other segments. This decrease is consistent with benefits for direct lending relationships in the commercial paper market. Panel B provide average rates by month for the four commercial paper time series and are included to show that December rates are different from the other months.

Panel C provides commercial paper spreads with the spread calculated as dealer-placed commercial paper minus directly-placed commercial paper. We find that, on average, the rate on 30-day dealer-placed commercial paper is about 10 basis points higher than the rate on 30-day directly-placed commercial paper. However, in December this spread increases to over 23 basis points. In 90 day commercial paper the average spread is 18 basis points, but again the spread increases dramatically in December to almost 30 basis points. We draw two insights from these spreads. First, in section 2 we noted that an issuer of directly-placed paper suggested that if your direct costs are 5 to 6 basis points the issuer is likely better off going through dealers than issuing directly. Our average spreads of 10 basis points on 30 day commercial paper and 18 basis points on 90-day commercial paper are consistent with this observation. Second, because the dealer rate is above the directly-placed rate these increases are consistent with the value of lender/borrower relationships, and suggest that these relationships have value even in the short-term public debt markets.

[6] The lower December yield is surprising because both Musto (1997) and Griffiths and Winters (2005) analyze three-month T-bill yields for a year-end effect and both find no effect.

3.2. Methods of Analysis

Griffiths and Winters (2005) discuss that their methods allow for identifying the size and timing of the year-end effect in commercial paper. Since, we also testing for the size and time of a year-end effect in commercial paper we apply their methods for in our analysis. Their methods include regression analysis on daily rate (spread) changes and the calculation of daily average spread differences across the month of December. We discuss both methods in this section.

Our regression model is:

$$R_t = a_0 + a_1 M_1 \cdots + a_{10} M_{10} + a_{11} NOVEND + a_{12} DECBEG + a_{13} YEND + a_{14} YBEG + \varepsilon_t \quad (1)$$

where:

R_t = the first difference in the daily spread from day *t-1* to day *t*,

M_i = a 0/1 dummy that equals 1 for trading days -2 to +4 relative to the turn-of-the-month for months i=1 (Jan/Feb) to 10 (Oct/Nov) and 0 otherwise,

NOVEND = 0/1 dummy variable that equals 1 for the last two trading days of November and 0 otherwise,

DECBEG = 0/1 dummy variable that equals 1 for the first four trading days of December and 0 otherwise,

YEND = 0/1 dummy variable that equals 1 for the last two trading days of December and 0 otherwise,

YBEG = 0/1 dummy variable that equals 1 for the first four trading days of January and 0 otherwise.

We estimate the model using OLS.

The regression model is designed to capture spread changes at the turn-of-the-year and the turn-of-December. However, to support a preferred habitat for liquidity at the year-end spreads should remain high across December, so additional analysis is needed. In particular, we analyze daily spread differences from trading days -25 to +5 relative to the year-end where the spread difference on each

day is calculated as the average daily spread for that day minus the average daily spread for all days not in the year-end timeframe of trading days -25 to +5. This daily analysis allows us to examine the duration of the year-end effect.

4. Results

4.1. Regression Analysis of 30-day Commercial Paper

We begin our analysis with the rates on 30-day commercial paper. This is our primary analysis because Griffiths and Winters (1997) find strong evidence of a year-end preferred habitat for liquidity in 1-week, 2-week, 3-week and 1-month repos but not in two and three month repos and Griffiths and Winters (2005) find strong evidence of a year-end preferred habitat for liquidity across several different one-month money market securities. Later we discuss the 90-day commercial paper rates in terms of supporting evidence for our analysis on 30-day commercial paper.

Table 2 provides results from three different estimations of our regression model. The first estimation is for 30-day dealer-placed commercial paper. In this estimation the dependent variable is the first difference in the daily spread between the 30-day dealer-placed commercial paper rate and the three-month T-bill yield. We use the T-bill yield in the dependent variable to control for changes in the general level of short-term interest rates, which allows us to isolate time-specific rate changes in commercial paper. The second estimation is for 30-day directly-placed commercial paper and the dependent variable is defined in the same manner as the first estimation. The third estimation captures the difference between dealer-placed and directly-placed commercial paper, so the dependent variable is the first difference in the spread between dealer-placed and directly-placed commercial paper.

The focus of our regression analysis is on the turn-of-December variables (*NOVEND* and *DECBEG*) and the turn-of-the-year variables (*YEND* and *YBEG*) and to analyze the benefits of direct borrower/lender relationship requires a two part analysis. First, we need to determine if a year-end preferred habitat for liquidity (a liquidity squeeze) exists in our data. Griffiths and Winters (1997 and 2005) suggest that positive parameter estimates on *NOVEND* and *DECBEG* followed by negative parameter estimates on *YEND* and *YBEG* is consistent with a year-end preferred habitat for liquidity. Second, if relationships alter the affect of the year-end liquidity squeeze in these markets then the size of the effect should vary between dealer-placed and directly-placed commercial paper with less of a squeeze in the relationship based market of directly-placed commercial paper.

The parameter estimates for the dummy variables not at the year-end are all insignificant suggesting that 30-day dealer-placed rates do not change in a persistent manner at these calendar times. However, at the turn-of-December both *NOVEND* and *DECBEG* are significant and positive at better than the 1% level and at the turn-of-the-year variables both *YEND* and *YBEG* are significant and negative at better than the 1% level. This combination of parameter estimates is consistent with a preferred habitat for liquidity in the 30-day dealer-placed commercial paper market. The pattern of parameter estimates on the 30-day directly-placed commercial paper is quite similar to the dealer-placed paper. That is, the dummy variables not at the year-end are all insignificant followed by significantly positive parameter estimates at the turn-of-December and significantly negative parameter estimates at the turn-of-the-year. Again, these results are consistent with a preferred habitat for liquidity at the year-end.

The third set of results in Table 2 are for the spread between 30-day dealer-placed and 30-day directly-placed commercial paper and are designed to determine if the relationships developed through directly-placed commercial paper significantly reduce the rate impact of the year-end liquidity squeeze

for the borrowers in the directly-placed market. If the relationships in the directly-placed market reduce the affects of the year-end squeeze, we would expect positive parameter estimates on *NOVEND* and *DECBEG* followed by negative parameter estimates on *YEND* and *YBEG*. We find that *NOVEND, DECBEG,* and *YEND* are insignificant, while *YBEG* is negative and significant at better than the 1% level. The insignificant parameter estimates on *NOVEND, DECBEG,* and *YEND* appear to suggest that lack of a relationship effect. However, the significant spread decline of about 7 basis points over the first four trading days of the new-year suggest that something is happening here that we may not have fully captured in our regression model. To address this possibility and to take a more complete look at the month of December and the turn-of-the-year we now turn to the daily spread analysis for trading days -25 to +5 relative to the year-end.

4.2. Daily Spread Analysis at the Year-End in 30-Day Commercial Paper

Our regression results are consistent with a year-end preferred habitat for liquidity. However, to fully support a preferred habitat at the year-end in 30-day commercial paper the rate increase at the turn-of-December must persist across the month. The daily spread analysis allows us to determine if this occurs. It will also provide a day-by-day look at the spread between dealer-placed and directly-placed commercial paper to determine if a relationship effect exists in directly placed commercial paper.

Table 3 presents three sets of daily spreads for trading days -25 to + 5 relative to the year-end. As with the regressions the first two sets of results use T-bill yields to control for the general level of short-term interest rates while the third sets is the spread between dealer and directly placed commercial paper. The first set of results in Table 3 is for 30-day dealer-placed commercial paper. To calculate the spread difference we begin by finding the spread between 30-day dealer-placed

commercial paper and the three-month T-bill yield for each day in our sample. Then for each trading day from -25 to +5 relative to the year-end we calculate the average daily spread for that trading day. Finally, the spread difference for each day reported in Table 3 is the average daily spread just calculated minus the average daily spread for all trading days *not* in the year-end period. The second set of spread differences is for directly-placed commercial paper and is calculated in the same manner. The third set of results is for the spread between dealer-placed and directly-placed commercial paper, so it uses the spread between the different types of commercial paper instead of a spread relative to T-bills and the spread differences are calculated in the same manner. We discuss each in turn below.

The first column of spread differences in Table 3 are for 30-day dealer-placed commercial paper relative to three-month T-bills and the pattern across the days is consistent with a preferred habitat for liquidity at the year-end. That is, there is a substantial spread increase at the turn-of-December, followed by abnormally large and positive spreads across December, and finally, spreads return to normal levels across the turn-of-the year with the decline beginning before the end-of-the-year.

To clarify our position in the previous sentence, we need to provide some additional details. First, the month of December has either 21, 22, or 23 weekdays, so after adjusting for the Christmas holiday, the month of December has either 20, 21 or 22 business days. Thus, the dramatic spread increase on trading day -21 is generally consistent with the spread increase occurring on the first business day of December, which is consistent with the regression results reported in Table 2. Also, note that we are examining a 30-day instrument and not a one-month instrument, so investors buying 30-day commercial paper on the last trading day of November would be buying securities that mature on December 30. Commercial paper maturing on December 30 provides liquidity before the end-of-the-year because commercial paper trades settle in immediately available funds. Second, we state,

without the support of statistical tests, that spreads across the month of December are abnormally high. The reason we can make the statement is that the spread differences across December are economically significant. Stigum (1990, p. 446) notes that money market investors consider 10 to 20 basis points an attractive arbitrage opportunity and for our results the smallest daily spread difference during December is 22 basis points. Finally, we remind the reader that a spread difference of zero on any of these trading days means that the average spread on that trading day equals the average spread on all the trading days not at the year-end. Column 1 shows that by trading day +3 the spread difference is down to about 1 basis point, so spreads have returned to normal levels.

The second column of spread differences in Table 3 are for 30-day directly-placed commercial paper relative to three-month T-bills and the pattern across the days is consistent with a preferred habitat for liquidity at the year-end. Again, we find there is a substantial spread increase at the turn-of-December, followed by abnormally large and positive spreads across December, and finally, spreads return to normal levels across the turn-of-the year with the decline beginning before the end-of-the-year. So, the results in columns 1 and 2 of Table 3 suggest the existence of a preferred habitat for liquidity in both 30-day dealer-placed and 30-day directly-placed commercial paper. Now the remaining issue is whether developing a direct relationship reduces the impact of the year-end liquidity squeeze for the borrowers in directly placed 30-day commercial paper.

The third column presents the spread differences for the spread between 30-day dealer-placed and 30-day directly-placed commercial paper. If both are affected in the same manner at the year-end liquidity squeeze then the spread difference should be zero. However, if having a direct relationship provides a benefit then rates on directly-placed commercial paper should increase less at the year-end, then given that we defined the spread is dealer minus direct we should see positive spread differences at the year-end. We find that spreads between dealer-placed and directly-placed 30-day commercial

paper increase at the turn-of-December; followed, in general, by abnormally large and positive spreads across December; and finally, spreads return to normal levels across the turn-of-the year with the decline beginning before the end-of-the-year. That is, during the year-end liquidity squeeze in the 30-day commercial paper market, the rates on dealer-placed commercial paper increase significantly more than the rates on directly-placed commercial paper. This suggests that benefits exist in the 30-day commercial paper market from developing direct relationships with lenders.

Figure 1 plots the spread differences from columns 1 and 2 of Table 3 and provides a clear picture of the benefits of direct relationships in this market. First, Figure 1 shows that for every day in December the average rate for dealer-placed paper has increased more than for directly-placed paper. Second, the spread decline in directly-placed commercial paper begins four days earlier (day -7 vs. day -3) than in dealer-placed commercial paper. This suggests that lenders were willing to re-enter the directly-placed market and service their established customer earlier than lenders in the dealer-placed market. Again, this provides support for benefits from direct relationships between borrowers and lenders in the commercial paper market. That is, we show that the year-end rate increase for borrowers with direct lending relationships is smaller and of shorter duration than the year-end rate increase for borrowers that work through intermediaries.

4.3. Regression Analysis of 90-day Commercial Paper

The results on the 30-day commercial paper show (1) that a preferred habitat for liquidity exists in both dealer-placed and directly-placed commercial paper and (2) that benefits for directly lending relationships exist in the commercial paper. These results are the primary results for this paper because of the established literature on the preferred habitat for liquidity in 30-day money

market securities. However, in this section we extend our analysis to the 90-day commercial paper market to determine if corroborating evidence exists in the 90-day market.

Our analysis of 90-day commercial paper focuses on regression analysis and to do this we use a regression model similar to equation (1). The modified model is:

$$R_t = a_0 + a_1 M_1 \cdots + a_8 M_8 + a_9 SEPEND + a_{10} OCTBEG + a_{11} M_{10} + a_{12} M_{11} + a_{13} YEND + a_{14} YBEG + \varepsilon_t \quad (2)$$

where:

R_t = the first difference in the daily spread from day *t-1* to day *t*,

M_i = a 0/1 dummy that equals 1 for trading days -2 to +4 relative to the turn-of-the-month for months i=1 (Jan/Feb) to 8 (Aug/Sept), 10 (Oct/Nov), and 11 (Nov/Dec) and 0 otherwise,

SEPEND = 0/1 dummy variable that equals 1 for the last two trading days of September and 0 otherwise,

OCTBEG = 0/1 dummy variable that equals 1 for the first four trading days of October and 0 otherwise,

YEND = 0/1 dummy variable that equals 1 for the last two trading days of December and 0 otherwise,

YBEG = 0/1 dummy variable that equals 1 for the first four trading days of January and 0 otherwise.

Again, we estimate the model using OLS.

If a preferred habitat for liquidity at year-end exists on 90-day commercial paper, then we would expect rates to increase across the turn-of-October and decline across the turn-of-the-year with the decline beginning before the year-end. That is, we would expect that the parameter estimates at the turn-of-October would be positive (*SEPEND > 0* and *OCTBEG > 0*) and that the parameter estimate at the turn-of-the-year would be negative (*YEND < 0* and *YBEG < 0*). Again, we estimate three regressions with the first on the spread between 90-day dealer-placed commercial paper and three-month T-bills, the second between 90-day directly-placed commercial paper and three-month T-

bills, and third between 90-day dealer-placed and 90-day directly-placed commercial paper. The results of the regressions are reported in Table 4.

The first set of results reported in Table 4 is for 90-day dealer-placed commercial paper. We find a positive (at the 10% level) parameter estimate for *SEPEND* and negative (at better than the 1% level) parameter estimates for *YEND* and *YBEG*. This combination of parameter estimates is consistent with a year-end preferred habitat for liquidity in the dealer-placed market. The second set of results is for 90-day directly-placed commercial paper and none of the parameter estimates for *SEPEND, OCTBEG, YEND,* and *YBEG* are different from zero, which suggests no evidence of a preferred habitat for liquidity in the 90-day directly-placed market. Finally, the third set of results is for the spread between 90-day dealer-placed and 90-day directly-placed commercial paper. Here, the results are mixed with $SEPEND = 0$, $OCTBEG = 0$, $YEND < 0$, and $YBEG < 0$. However, these results are similar to the dealer/direct spread regression results for 30-day commercial paper and we found that the regression on this spread in 30-day commercial paper did not fully capture the dynamics of the year-end effect in this spread.

Finding evidence of a year-end preferred habitat for liquidity in the 90-day dealer-placed commercial paper but not in the 90-directly-placed commercial paper is consistent with a benefit for direct lending relationships in the 90-day market. That is, in the last quarter of the year dealer-placed paper trades at an increased spread over three-month T-bills while directly-placed paper does not. Accordingly, we feel that these results provide corroborating evidence for our results in 30-day commercial paper.

5. Conclusion

Previous empirical literature has identified benefits for direct lending relationships with banks. Diamond (1989) suggests these benefits are derived from the borrower developing a positive reputation with the lender. Diamond (1991) suggests that some borrowers develop sufficient reputation to move beyond the intermediated bank lending market to public debt markets, such as commercial paper. Griffiths and Winters (2005) identify a year-end preferred habitat for liquidity in the commercial paper market. In addition, the commercial paper market is segmented into dealer-placed (intermediated) commercial paper and directly-placed commercial paper, which provides a natural experimental setting for us to examine whether direct lending relationships have value for businesses with sufficient reputation to access the public debt markets.

We begin by showing that both 30-day dealer-placed and 30-day directly-placed have year-end spread patterns consistent with a preferred habitat for liquidity. That is, when money market investors increase their demand for liquidity, borrowers in both the dealer and direct commercial paper markets pay higher rates. However, further analysis shows that the rate increases in the direct market are smaller and of shorter duration than the increases in the dealer market suggesting that benefits exist from direct lending relationships in the commercial paper market. Additional, we find corroborating evidence for the benefits of direct lending relationships in the market for 90-day commercial paper.

In summary, our research question is whether benefits exist from direct borrower/lender relationships in public debt where by definition borrowers have sufficient credit reputations to overcome the need for intermediated (bank) debt. Our results suggest that benefits to borrowers do exist from direct borrower/lender relationships in the public commercial paper in the form of smaller and shorter rate increases during the year-end liquidity squeeze in the commercial paper market.

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Table 1. This table presents means and standard deviations (in parentheses) for average annualized rates of 30-day and 90-day commercial paper that is placed directly or by a dealer, and average 3-month Treasury bill yields for the period January 10, 1983 through August 29, 1997.

	30-day Dealer		30-day Direct	90-day Dealer	90-day Direct	3-month t-bill	
Panel A							
Average daily annualized rate:	6.627		6.529	6.641	6.462	6.099	
	(2.030)		(2.029)	(2.008)	(1.936)	(1.901)	
Average daily January - November annualized rate:	6.611		6.524	6.641	6.471	6.112	
	(2.036)		(2.039)	(2.016)	(1.946)	(1.909)	
Average daily December annualized rate:	6.819	*b*	6.585	6.652	6.356	5.950	*c*
	(1.953)		(1.913)	(1.922)	(1.815)	(1.803)	

Panel B

Average monthly rates:

January	6.498	*x*	6.409	*z*	6.504	*z*	6.347		6.027	
	(1.900)		(1.896)		(1.887)		(1.831)		(1.811)	
February	6.513	*x*	6.437	*z*	6.517		6.378		6.093	*z*
	(1.951)		(1.956)		(1.947)		(1.885)		(1.895)	
March	6.647	*z*	6.555		6.667		6.504	*z*	6.199	*x*
	(2.062)		(2.062)		(2.053)		(1.992)		(1.975)	
April	6.595	*y*	6.509		6.620		6.480		6.086	*z*
	(2.025)		(2.038)		(2.003)		(1.974)		(1.904)	
May	6.641	*z*	6.554		6.689		6.530	*z*	6.138	*y*
	(1.974)		(1.972)		(1.972)		(1.906)		(1.843)	
June	6.686		6.597		6.701		6.516	*z*	6.108	*z*
	(2.042)		(2.045)		(2.019)		(1.923)		(1.867)	
July	6.561	*y*	6.479		6.583		6.408		6.057	
	(2.057)		(2.062)		(2.037)		(1.939)		(1.894)	
August	6.677		6.593		6.689		6.505	*z*	6.204	*x*
	(2.170)		(2.179)		(2.153)		(2.048)		(2.034)	
September	6.693		6.607		6.689		6.491		6.138	*y*
	(2.208)		(2.212)		(2.187)		(2.119)	*z*	(2.054)	
October	6.641	*z*	6.557		6.726		6.540	*y*	6.094	*z*
	(2.058)		(2.056)		(2.023)		(1.970)		(1.928)	
November	6.543	*x*	6.445		6.650		6.465		6.072	
	(1.930)		(1.927)		(1.857)		(1.794)		(1.783)	
December	6.819		6.585		6.652		6.356		5.950	
	(1.953)		(1.913)		(1.922)		(1.815)		(1.803)	

	Mean		Standard Deviation	
Panel C				
Average daily spread:*				
30-day commercial paper	0.099		(0.106)	
90-day commercial paper	0.180		(0.135)	
Average daily spread for January - November:*				
30-day commercial paper	0.087		(0.072)	
90-day commercial paper	0.170		(0.121)	
Average daily spread for December:*				
30-day commercial paper	0.234	*a*	(0.247)	*a*
90-day commercial paper	0.296	*a*	(0.212)	*a*

a,b December statistics are significantly different from January-November statistics at the 1, and 5% levels respectively.

x,y,z Monthly statistics are significantly different from December statistics at the 1, 5, and 10% levels respectively.

Significance in t-statistics is computed for a one-tailed mean test. The significance of the difference in variance is computed by evaluating the resulting F-statistic.

* For each day in the entire sample, the annualized dealer rate was compared to the annualized direct rate. The resulting annualized daily spread was averaged over the entire sample, January - November, and December for comparison purposes. A positive daily spread represents that on average, the dealer rate is in excess of the direct rate for the period specified.

Table 2 - This table represents the relative change in 30-day commercial paper rates. The data series runs from January 10, 1983 through August 29, 1997. The dependent variable of the first regression is the first difference of the daily commercial paper rates for 30-day *dealer-placed* commercial paper over the 3-month t-bill rate. The dependent variable of the second regression is the first difference of the daily commercial paper rates for 30-day *directly-placed* commercial paper over the 3-month t-bill rate. The dependent variable of the third regression is the first difference of the daily spread between the dealer and direct annualized rates. The regression model is:

$$R_t = a_0 + a_1 M_1 \cdots + a_{10} M_{10} + a_{11} NOVEND + a_{12} DECBEG + a_{13} YEND + a_{14} YBEG + \varepsilon_t$$

Where: M_i = a 0/1 dummy variable that equals 1 for trading days -2 through +4 surrounding the calendar month end with *i*= 1(Jan/Feb) … 10(Oct/Nov) and zero otherwise; NOVEND = a 0/1 dummy variable that equals 1 for the last two trading days of November and zero otherwise; DECBEG = a 0/1 dummy variable that equals 1 for the first four trading days of December and zero otherwise; YEND = a 0/1 dummy variable that equals 1 for the last two trading days of the year and zero otherwise; YBEG = a 0/1 dummy variable that equals 1 for the first four trading days of the year and zero otherwise.

Variable	Dealer-Placed Paper		Directly-Placed Paper		Dealer30 - Direct30	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
int.	0.001	0.508	(0.001)	0.619	0.002	0.223
M1	(0.012)	0.154	(0.005)	0.649	(0.007)	0.413
M2	0.003	0.718	0.008	0.439	(0.005)	0.568
M3	0.002	0.818	0.008	0.477	(0.006)	0.535
M4	0.003	0.748	0.009	0.391	(0.006)	0.480
M5	0.009	0.287	0.011	0.291	(0.002)	0.814
M6	(0.003)	0.703	(0.006)	0.561	0.003	0.747
M7	0.007	0.445	0.009	0.421	(0.002)	0.823
M8	0.003	0.698	0.005	0.649	(0.002)	0.867
M9	(0.004)	0.669	0.014	0.215	(0.017)	0.061
M10	(0.010)	0.253	(0.016)	0.142	0.006	0.519
NOVEND	0.039	0.009	0.043	0.021	(0.004)	0.794
DECBEG	0.062	0.000	0.052	0.000	0.010	0.377
YEND	(0.065)	0.000	(0.049)	0.009	(0.016)	0.305
YBEG	(0.113)	0.000	(0.042)	0.002	(0.071)	0.000
F-stat	12.67	0.000	3.27	0.000	3.300	0.000
Adj R-sq	0.043	-	0.009	-	0.009	-

Table 3. This table presents the difference in the average rates for each trading day (-25 through +5) over the average rates for all other trading days in the year. Columns (1) and (2) are the annualized average daily spreads for 30-day dealer- and directly-placed commercial paper over the average daily 3-month T-bill yield. Column (3) is the annualized average daily spreads for 30-day dealer-placed commercial paper over 30-day directly-placed commercial paper.

	(1)	(2)	(3)
Trading Day	30-day Dealer Difference	30-day Direct Difference	30-day Spread
-25	(0.0628)	(0.1064)	0.0436
-24	(0.0664)	(0.0928)	0.0264
-23	(0.0242)	(0.0728)	0.0486
-22	(0.0214)	(0.0807)	0.0593
-21	0.2200	0.0936	0.1264
-20	0.2408	0.1115	0.1293
-19	0.2858	0.1622	0.1236
-18	0.2486	0.1943	0.0543
-17	0.2243	0.1693	0.0550
-16	0.2493	0.1965	0.0529
-15	0.2665	0.2279	0.0386
-14	0.2636	0.1779	0.0857
-13	0.2829	0.2058	0.0772
-12	0.3086	0.2529	0.0557
-11	0.3458	0.2358	0.1100
-10	0.3786	0.2515	0.1272
-9	0.4000	0.2708	0.1293
-8	0.4358	0.2729	0.1629
-7	0.4679	0.3229	0.1450
-6	0.4922	0.3050	0.1872
-5	0.5136	0.2808	0.2329
-4	0.5686	0.2779	0.2907
-3	0.5808	0.2643	0.3164
-2	0.5658	0.2258	0.3400
-1	0.4522	0.1643	0.2879
1	0.0858	0.1208	(0.0350)
2	0.0322	0.0193	0.0129
3	0.0122	0.0072	0.0050
4	0.0058	(0.0071)	0.0129
5	(0.0321)	(0.0614)	0.0293

Table 4 - This table represents the relative change in 90-day commerical paper rates. The data series runs from January 10, 1983 through August 29, 1997. The dependent variable of the first regression is the first difference of the daily commercial paper rates for 90-day *dealer-placed* commercial paper over the 3-month t-bill rate. The dependent variable of the second regression is the first difference of the daily commercial paper rates for 90-day *directly-placed* commercial paper over the 3-month t-bill rate. The dependent variable of the third regression is the first difference of the daily spread between the dealer and direct annualized rates. The regression model is:

$$R_t = a_0 + a_1 M_1 \cdots + a_8 M_8 + a_9 SEPEND + a_{10} OCTBEG + a_{11} M_{10} + a_{12} M_{11} + a_{13} YEND + a_{14} YBEG + \varepsilon_t$$

Where: M_i = a 0/1 dummy variable that equals 1 for trading days -2 through +4 surrounding the calendar month end with *i*= 1(Jan/Feb) … 11(Nov/Dec) and zero otherwise; SEPEND = a 0/1 dummy variable that equals 1 for the last two trading days of September and zero otherwise; OCTBEG = a 0/1 dummy variable that equals 1 for the first four trading days of October and zero otherwise; YEND = a 0/1 dummy variable that equals 1 for the last two trading days of the year and zero otherwise; YBEG = a 0/1 dummy variable that equals 1 for the first four trading days of the year and zero otherwise.

Variable	Dealer-Placed Paper		Directly-Placed Paper		Dealer90 - Direct90	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
int.	0.001	0.423	0.000	0.920	0.001	0.472
M1	(0.014)	0.064	(0.008)	0.384	(0.006)	0.396
M2	(0.000)	0.955	0.001	0.905	(0.001)	0.832
M3	0.003	0.703	0.009	0.313	(0.006)	0.378
M4	0.001	0.853	0.006	0.494	(0.005)	0.500
M5	0.003	0.637	(0.001)	0.886	0.005	0.496
M6	(0.003)	0.686	(0.009)	0.313	0.006	0.392
M7	0.004	0.563	0.004	0.693	0.001	0.915
M8	0.003	0.691	0.002	0.851	0.001	0.856
SEPEND	0.022	0.090	0.008	0.592	0.014	0.266
OCTBEG	(0.001)	0.922	0.009	0.405	(0.010)	0.245
M10	(0.013)	0.082	(0.018)	0.044	0.005	0.464
M11	0.010	0.194	0.009	0.319	0.001	0.917
YEND	(0.053)	0.000	(0.006)	0.691	(0.047)	0.000
YBEG	(0.046)	0.000	(0.010)	0.389	(0.036)	0.000
F-stat	3.78	0.000	0.77	0.705	2.660	0.001
Adj R-sq	0.011	-	(0.001)	-	0.006	-

Figure 1 Dollar Outstandings ($ billion) in the Commercial Paper Market from 1984 through 1997

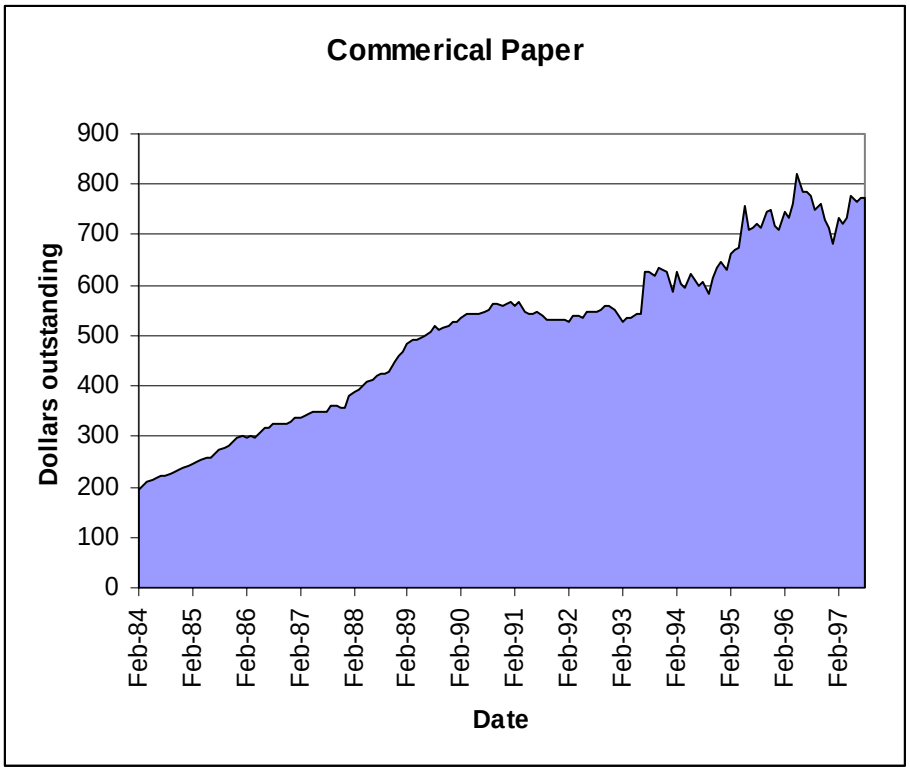

Figure 2. Difference in the average daily spread of 30-day dealer and directly placed commercial paper over the average daily 3-month T-bill yield for trading days -25 through +5 over the average daily spread of 30-day dealer and directly placed commercial paper over the average daily 3-month T-bill yield rate for all other trading days for the time period January 10, 1983 through August 29, 1997. Day -1 is the last trading day of the year, and day +1 is the first trading day of the new year.