

# EXPECTED REPO SPECIALNESS COSTS AND THE TREASURY AUCTION CYCLE

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## ABSTRACT

Repo rates for the most recently issued or "on-the-run" securities often diverge from general repo rates. The purpose of this study is to convey that relatively sizable divergences in repo rates for on-the-run issues are normal repeating events for the Treasury market, rather than evidence of abnormal circumstances. The costs associated with these repo market premia are small for short holding periods and are sometimes offset by gains from declining cash market premia for longer holding periods. Moreover, repo specialness costs seem small when considered against the alternative of not using the repo market.

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## SUMMARY

This paper discusses the relationship between special repo rates and the Treasury auction cycle for the most recently issued ("on-the-run") coupon securities.<sup>1</sup> The range of costs generated by repo specialness for short sellers (frequently hedgers) is discussed both in terms of reasonable expectations and theoretical potential. The additional costs for hedgers depend on the life expectancy of the hedge. For short holding periods specialness costs are low in absolute terms. For longer holding periods gains from declining cash market premia act to offset specialness costs. The paper also concludes that persistent specialness in newly issued securities arises naturally as a function of the market's structure and depth.

### Repo market participants

Repo market participants can be divided into two groups: (1) those funding purchases and sales of cash market securities and (2) those trading directly in the repo market. Cash market participants use the repo market to leverage purchases and sales of Treasury securities, while other market participants speculate on the direction of repo rates themselves. This latter group may also be described as the repo market's self-directed element. Special repo rates result from both cash market pressures and self-directed trading activity.<sup>2</sup>

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<sup>1</sup> The paper will focus on repo specialness for 2-year, 3-year, 5-year, and 10-year coupon securities. The 30-year sector will be excluded because its infrequent issuance and relationship to the zero-coupon market introduce separate technical influences on its specialness.

<sup>2</sup> Those trading repo directly are often called "matched-book" traders.

## **What is repo specialness?**

A repurchase agreement or repo transaction can be thought of as a two-sided transaction in which one party lends money and the other party lends a security. When the parties to a repo transaction are indifferent with respect to the security lent, the interest rate on the transaction is tied to general market interest rates, based on the term of the repo. When the focus of the transaction is the security lent, the repo rate frequently falls below general market rates prevailing for the term of the loan, because the party demanding specific collateral is the provider of funds and willingly accepts a lower return on those funds in return for a specific piece of collateral. Repo rates below general interest rates for a given term are called "special" repo rates. The amount of specialness is simply measured as the spread between general and specific repo rates.

## **Impact on Cash Market**

The spread between low repo rates and general repo rates is the price paid by those borrowing particular collateral and reflects the relative scarcity of the security involved. Scarcity value in the repo market is frequently reflected in cash market prices.<sup>3</sup> That is, the cash market price of a security with repo market scarcity value likely will be higher relative to an equivalent or nearly equivalent security without repo market scarcity value.<sup>4</sup> The presence of scarcity value, however, does not determine the overall direction of cash market prices. Securities with scarcity value in the repo market may rise or fall in price in the cash market.

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<sup>3</sup> See Duffie (1993) for discussion of theoretical relationship between overnight repo specialness and cash market prices, and Fisher and Gilles (1995) for analysis of the term structure of special repo rates.

<sup>4</sup> Other important factors that account for relative price differences between two closely substitutable Treasury securities include the shape of the yield curve and the liquidity premium for "on-the-run" issues.

For on-the-run securities, cash market premia tend to evaporate as the issue goes off-the-run, because trading activity shifts to the newest issue in anticipation of improved liquidity. Fading or declining cash market premia may also be partially understood as reflecting the fleeting nature of repo specialness in any particular issue.

## **RELATIONSHIP BETWEEN AUCTION CYCLE AND REPO RATES**

Data from the repo market shows a strong relationship between repo specialness and the Treasury auction cycle: the most recently issued or "on-the-run" coupon issue becomes increasingly special, on average, until around the announcement of the next issue. For the market sectors considered here, the 2-year and 5-year are on a monthly auction cycle, and the 3-year and 10-year are on a quarterly cycle. Despite differences in maturity and issuance size there are strong cyclical patterns for all four and nearly identical patterns for the quarterly and monthly pairs.

### **A Word About the Data**

The dataset used contains information on special overnight repo rates for certain issues as collected by the Market Surveillance department of the Federal Reserve Bank of New York from June, 1992 through January, 1995. The available data includes 31 monthly cycles for the 2-year note and the 5-year note, 11 quarterly cycles for the 3-year note and 10 quarterly cycles for the 10-year note. Three of the 10 cycles for the 10-year note represent reopened issues.

Chart 1 shows average specialness for the monthly auction cycle (2-year notes and 5-year notes). Chart 2 shows this same average specialness for the quarterly cycle (3-year notes,

standard 10-year notes and reopened 10-year notes). Both monthly and quarterly cycles begin on issue day and end on the subsequent issue day. Chart 3 shows the average cumulative or holding period cost for the monthly cycle issues, and Chart 4 shows the average cumulative cost for the quarterly cycle issues.

### **Treasury Market Dynamics**

In Treasury cash market trading the most recently issued coupon (the "on-the-run" issue) typically trades most frequently, providing market participants with the greatest source of liquidity. Some investors have a preference for as much liquidity as possible and tend to maintain positions in the most recently issued securities, by regularly rolling into new issues. To accommodate such investor rolls, dealers tend to sell when-issued securities short and buy off-the-run issues as part of the wholesale distribution process. This process tends to relieve repo market pressure in the newly off-the-run security and begin building pressure in the new on-the-run security. The constant demand for liquidity by some market participants makes this a repeating cycle.

### **Comparison of Monthly and Quarterly Cycles**

Average specialness for both monthly and quarterly cycles increases as the newly issued security ages. This increase in scarcity value as the issue ages occurs because the proportion of the issue available to the collateral market progressively diminishes as it is acquired by non-leveraged purchasers (or final demand). The coincident reduction in collateral supply and

increased tendency for specialness does not seem surprising, indeed it seems quite intuitive or natural.

An additional notable feature of the specialness pattern across all four coupon sectors is that average specialness peaks around the announcement date of the next issue then declines rapidly. This result also seems to reflect natural forces as market activity naturally shifts to the new issue because it is more liquid and, based on the well established auction cycle pattern, is expected to be much less special over the near-term.

A close comparison of the quarterly issuance cycles (3-year and 10-year) to the monthly issuance cycles (2-year and 5-year) reveals another difference. For the monthly cycle, specialness increases smoothly over the life of the new security and peaks near the announcement of the next issue. For the quarterly cycle, specialness increases over the cycle, but has two noticeable peaks. The first peak occurs approximately half-way through (30-35 days before the next issue date) and the second peak occurs near the end of the cycle, around the announcement of the next issue (like the monthly cycle).

The first peak in the quarterly cycle coincides with quarter-ends and may not arise solely from issue-specific pressures. General repo rates consistently increased at quarter-end over the period. Such increases in the general repo rate seem to result from a decreased willingness among market participants to lend funds, as many prefer to reduce the size of their balance sheets on statement dates.

Finally, the persistence of the specialness pattern in the context of the Treasury auction cycle can be seen from reviewing the reopened 10-year issues. Chart 2 shows the average specialness curves for both reopened and new issue 10-year securities. The size of reopened

issues is approximately double the size of non-reopened issues. Although the larger issue size of reopenings lowers average specialness, it does not change the pattern -- rising specialness over the life of the issue, mid-cycle pressures coinciding with quarter-ends, with specialness reaching its peak just before the announcement of the next issue.

### REPO SPECIALNESS: COST MAGNITUDE

At first glance it seems surprising that a wide array of government, corporate, mortgage and swap market participants sell cash market Treasury securities short against other exposures, despite the foreseeable added costs associated with persistent specialness. However, upon closer inspection specialness costs may be lower than they first appear. Moreover, the beneficial properties of liquidity and leverage provided by on-the-run Treasuries and the repo market also help explain why the observed specialness in the repo market has failed to deter broad participation.

Table 1  
Potential Specialness Cost (basis points)

Spread to General Collateral	Special Duration:			
	Overnight	7 days	30 days	90 days
25	0.1	0.5	2.1	6.3
50	0.1	1.0	4.2	12.5
100	0.3	1.9	8.3	25.0
200	0.6	3.9	16.7	50.0
400	1.1	7.8	33.3	100.0



Table 1, above, lists the marginal cost<sup>5</sup> for potential levels of repo specialness across a range of holding periods. For example, for an overnight holding period repo specialness of 400 basis points results in a marginal cost of about 1 basis point for a short seller (hedger). Table 1 seems to show that for holding periods under a week potential specialness costs are quite small. Consider an underwriter of investment grade corporate bonds, who expects to earn between 25 and 75 basis points in underwriting fees. Even if repo specialness was 400 basis points for a week, it would cost the corporate bond underwriter less than 8 basis points. Such a cost is still easily absorbed by the underwriter's fee structure.

### **Observed Average Specialness**

Table 2, next page, shows average specialness by sector from our data. The final column, "cumulative cycle cost", can be interpreted as the average expected specialness cost for a participant that maintains an open short position for the entire cycle. Other than for non-reopened or standard 10-year securities these costs range from 2-5 basis points per month, on average. For standard 10-year securities the average expected specialness cost is over twice as much or 12 basis points per month, on average.

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<sup>5</sup> For overnight term, the marginal cost of repo specialness is stated as a percent of the dollar value of the repo loan, and was calculated as the repo spread divided by 360. For longer terms, the repo market weekend convention of multiplying rather than compounding is used. Calculating the dollar value of a repo loan requires accounting for accrued interest and includes a margin or haircut, ranging from 0 to 5 percent.

Table 2  
**Observed Specialness Spread**

Sector	Issuance Cycle	Recent Issue Size (billions)	Number of Cycles Observed	Average Spread (basis points)	Cumulative Cycle Cost (basis points)	Cost Per Month (basis points)
2-Year	Monthly	17	31	27	2	2
3-Year	Quarterly	15	11	41	10	3
5-Year	Monthly	11	31	58	5	5
10-Year No Reopenings	Quarterly	12	7	143	35	12
10-Year Reopenings	Quarterly	23	3	62	15	5

Charts 3 and 4 graph the summary information from Table 2. Chart 3 shows the cumulative costs over the cycle for the 2-year and 5-year notes and Chart 4 shows the cumulative cost for the 3-year and the 10-year sectors, with 10-year separated between reopened and standard issues. Again, this comparison shows that specialness cost for the standard 10-year issues is substantially larger, on average, than for other sectors. The high average specialness cost of the 10-year appears to occur late in the cycle, and is noticeably less severe for reopened issues.

## **Propensity of Cash Market Premia to Compensate for Specialness Costs<sup>6</sup>**

On-the-run Treasury securities typically trade at a small premium relative to comparable issues until the issuance of the next security in that sector, at which time the premium usually declines or dissipates. Such a pattern in cash market premia may, in part, be seen as the market's capitalization of expected repo specialness over the on-the-run period. Expected repo specialness results in a small premium in the cash market, because owners of a special issue "earn" the repo spread (i.e., they may finance their securities at the lower "special" repo rate).

The tendency for the cash market premia to decline after the announcement of the next issue provides an opportunity for short sellers, who establish hedges at the beginning of the cycle and unwind them after the announcement of the next issue, to capture the premia. Thus, for some short sellers, repo specialness costs are offset by the collection of the cash market premia associated with the auction cycle.

### **Specialness cost relative to the alternatives**

The alternatives to borrowing a security in the repo market are (1) covering a short position, or (2) not hedging an existing exposure. Borrowing a security allows participants to maintain or establish hedges (short positions). The relatively small additional cost associated with specialness must be viewed in the context of these alternatives. Table 3, below, compares the expected average cost of specialness to the price exposure of the cash

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<sup>6</sup> The author would like to thank Christian Gilles, of the Board of Governors, for pointing out that changes in cash market premia sometimes alleviate repo specialness costs.

market securities across sectors. Price risk can be viewed as a proxy for the potential cost of not hedging.

Table 3  
**Cost/Benefit Comparison for Specialness**

Basis Points				
Sector	Average Monthly Special Cost	Daily Price Exposure	Weekly Price Exposure	Corporate Bond Underwriter Fee
2-Year	2	28	69	25
3-Year	3	42	99	35
5-Year	5	72	154	50
10-Year No Reopenings	12	117	241	62.5
10-Year Reopenings	5	117	241	62.5

Note: Price exposures based on data from second quarter of 1994, assuming a confidence interval of 2 standard deviations.

Table 3 shows that average monthly specialness cost is small relative to both daily and weekly price risk faced by hedgers, as well as to underwriting fees earned by corporate bond underwriters.

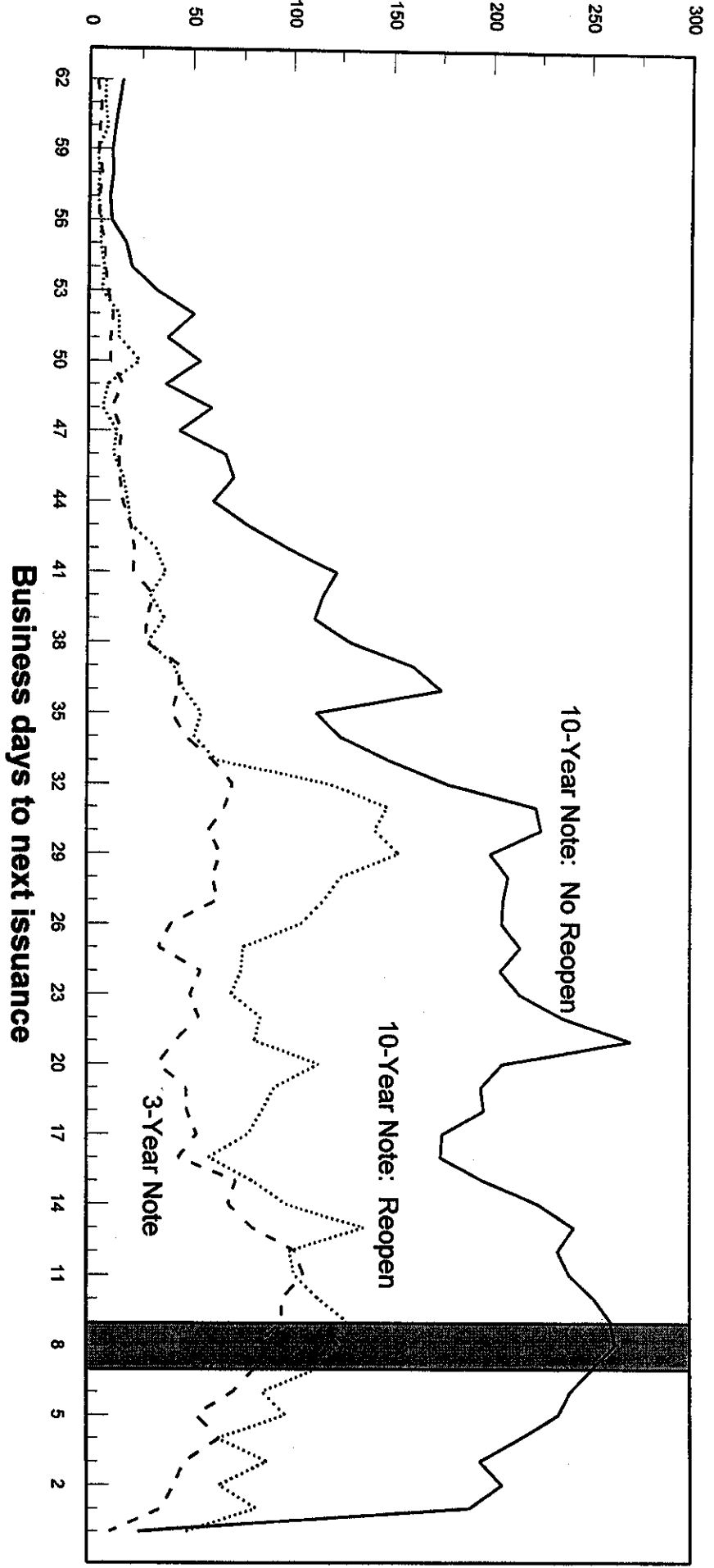
## References

- Duffie, Darrell, 1993, "Special Repo Rates," Working Paper, Stanford University.
- Fisher, Mark, and Christian Gilles (1995) "The Term Structure of Repo Spreads," Working Paper, Board of Governors.
- Fisher, Mark, Douglas Nychka and David Zervos (1995) "Fitting the Term Structure of Interest Rates with Smoothing Splines," Working Paper, Board of Governors.

# Three and Ten-Year Notes Quarterly Auction Cycle

## Average Spread from General Collateral for Overnight RP Rates

Basis points



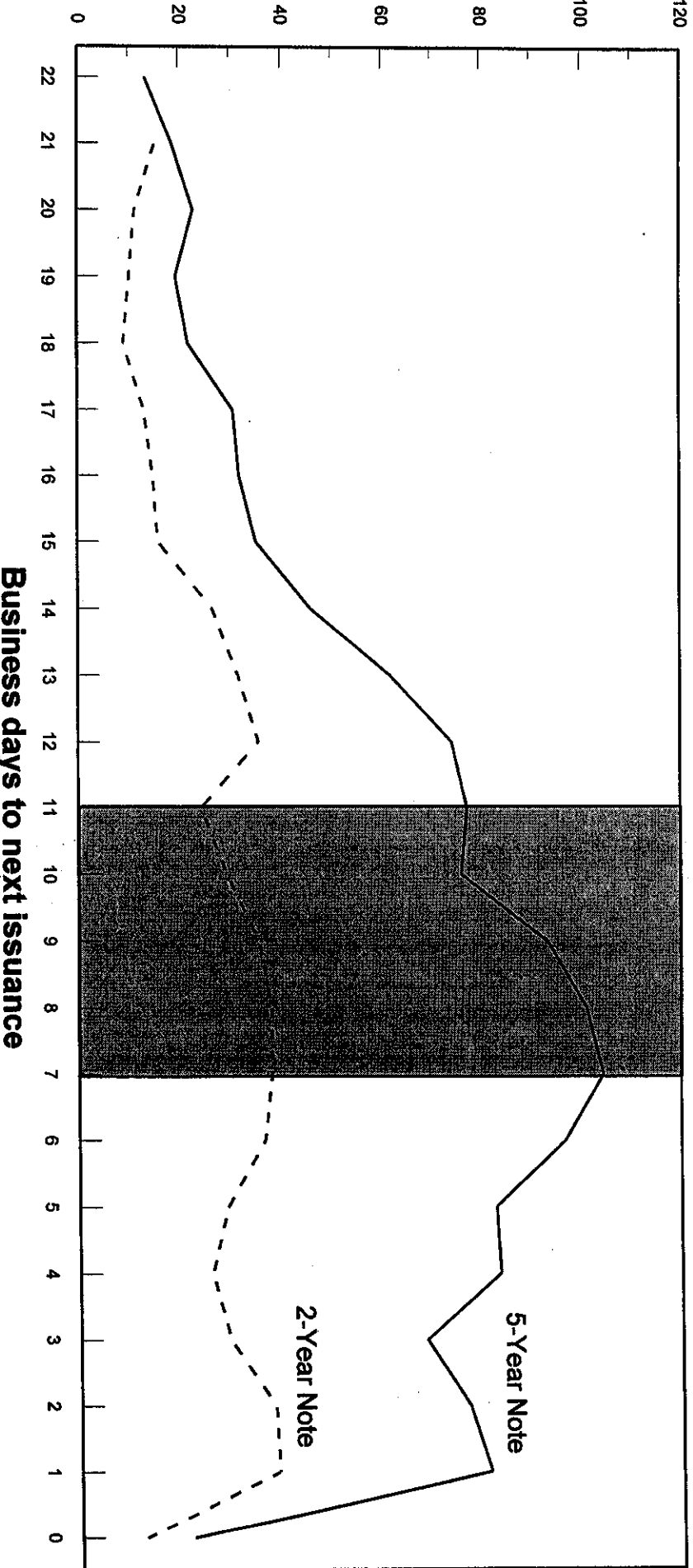
Source: Market Surveillance 6/12/92 to 1/25/95.  
Cycle defined as issue date to next issue date.  
Shaded area marks announcement days for next issuance.

# Two and Five-Year Notes

## Monthly Auction Cycle

### Average Spread from General Collateral for Overnight RP Rates

Basis points



Source: Market Surveillance, 6/12/92 to 1/25/95.

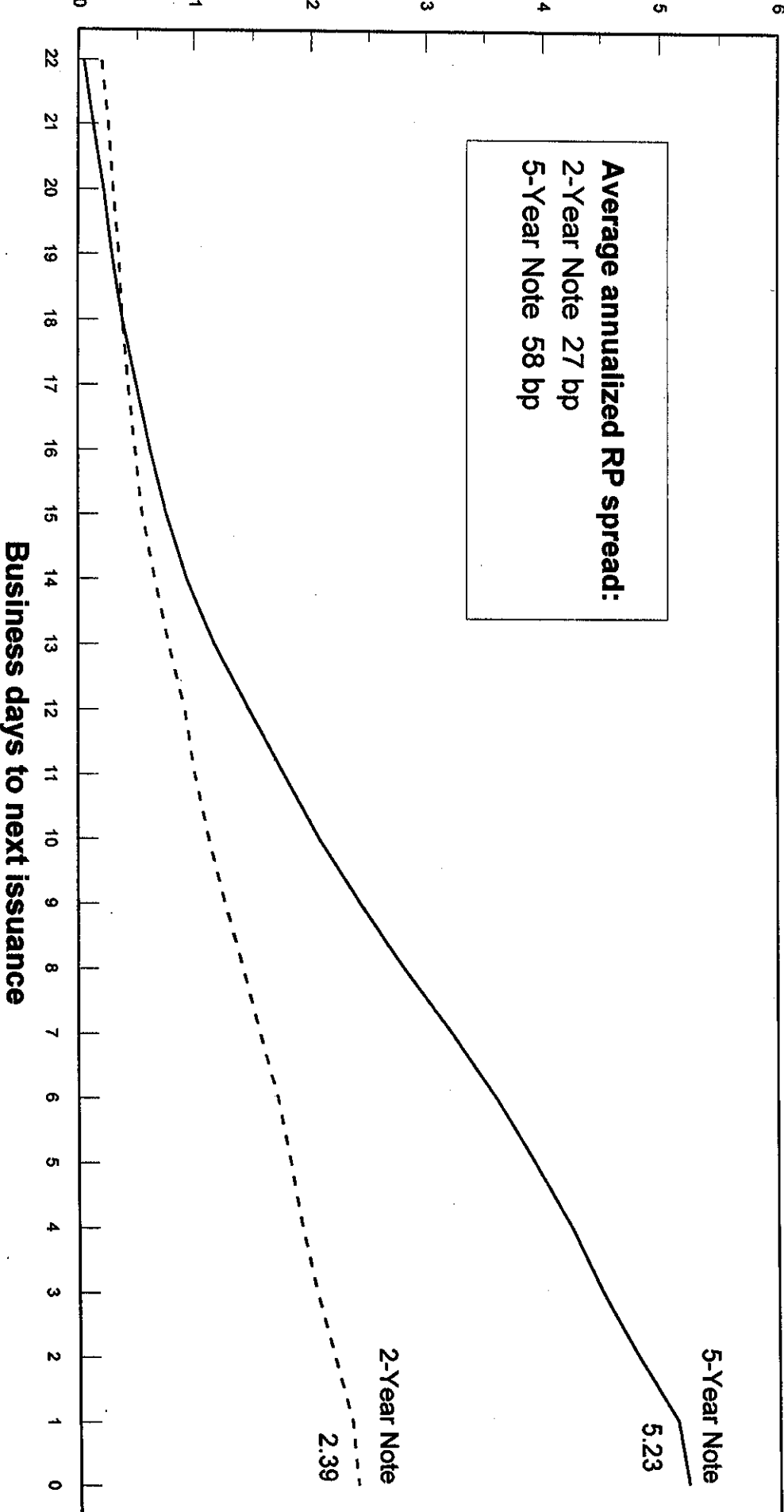
Cycle defined as issue date to next issue date.

Shaded area marks announcement days for next issuance.

# Monthly Holding Period Cost of RP Specialness

## Over Average Auction Cycle

Basis points



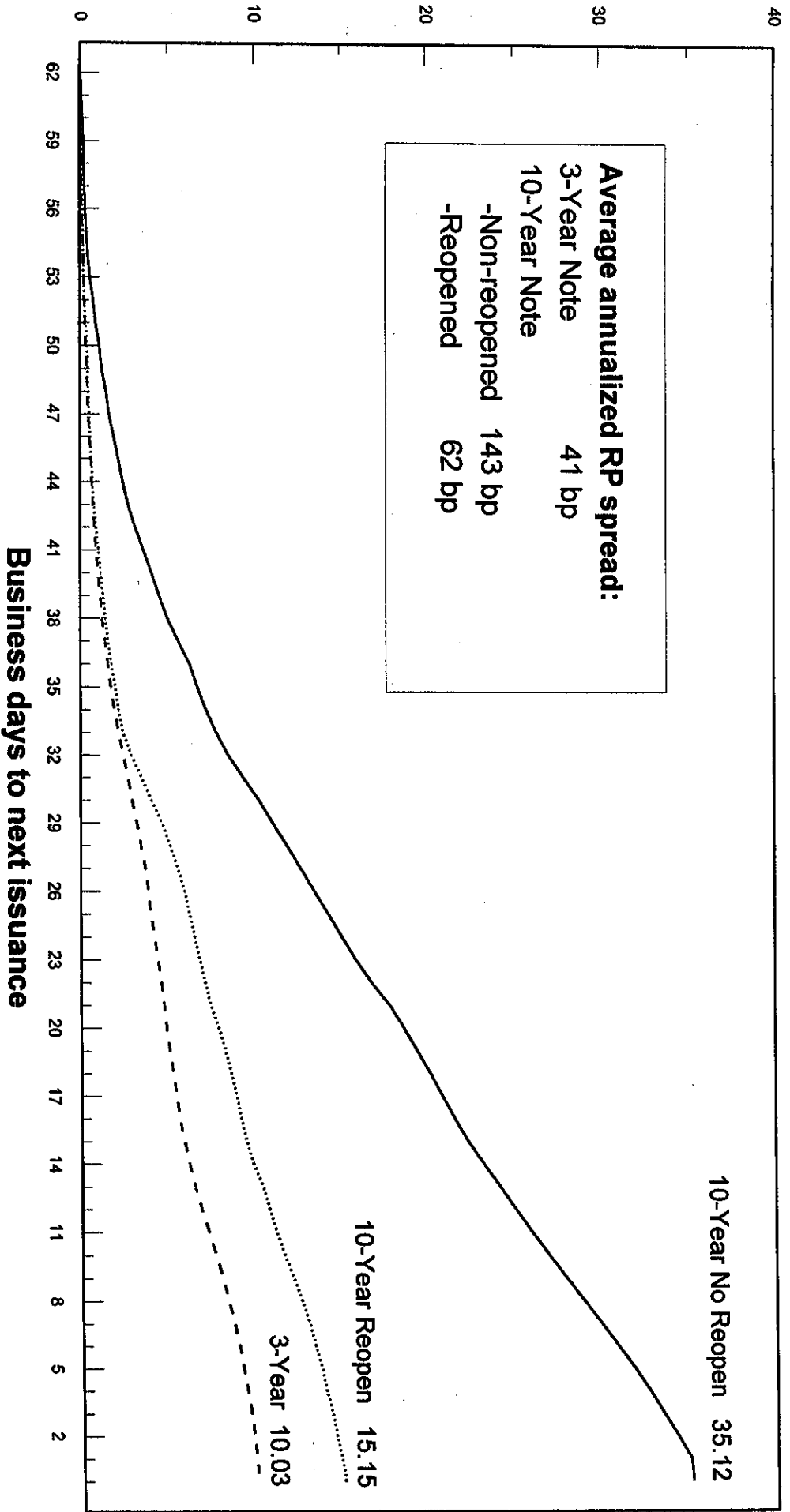
Source: Market Surveillance, 6/12/92 to 1/25/95.



# Quarterly Holding Period Cost of RP Specialness

Over Average Auction Cycle

Basis points



Source: Market Surveillance, 6/12/92 to 1/25/95.