Treasury-Federal Reserve Study of the
U.S. Government Securities Market

MARKET PERFORMANCE AS REFLECTED IN AGGREGATIVE INDICATORS

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CHAPTER I

SUMMARY AND CONCLUSIONS

This study analyzes the aggregative data on the market for U.S. Government securities--such as the volume of trading, dealers' positions, and security prices--during the 1950's and 1960's in an attempt to answer two questions. First, how have these indicators behaved and what explains such behavior? In particular, how was the market affected by Treasury debt management policy and by open market operations of the Federal Reserve and the Treasury? Second, did market performance, as reflected in these indicators, depart further from "the ideal" in the 1960's than in the 1950's?

The analysis focuses on the following market indicators: the daily average volume of trading, the annual rate of turnover of the marketable U.S. debt, the 16th lowest daily volume of trading in each quarter, dealers' daily average positions, the frequency of small and large daily price changes, and the spread between quoted bid and asked prices. Each indicator was selected in part because it measures an essential operational characteristic of the market, in part because it approximates desirable or undesirable attributes of the market, and in part simply because the data were available for both the fifties and sixties and could be develcped in the time originally allotted for the study. Since performance may vary greatly in different segments of the market, the indicators were examined on a quarterly basis for selected

maturity classes of U.S. Government securities--bills, other securities maturing in 1 year or less, securities maturing in 1-5 years, 5-10 years, and after 10 years. Charts I - V present profiles of market performance, as defined by the indicators, for each maturity class.

The established technical definition of an efficient market is one possessing "depth, breadth, and resiliency", with these qualities defined in terms of orders on the dealers' books. The market

> .... possesses depth when there are orders, either actual orders or orders that can be readily uncovered, both above and below the market. The market has breadth when these orders are in volume and come from widely divergent investor groups. It is resilient when new orders pour promptly into the market to take advantage of sharp and unexpected fluctuations in prices.[1]

At the other extreme, in a disorderly declining market, "selling feeds on itself so rapidly and menacingly that it discourages both short covering and the placement of offsetting new orders."[2] In more general terms, it is usually agreed that an adequately functioning U.S. Government securities market would have the capacity to accommodate Treasury financings, Federal Reserve open market operations, and private investment transactions at reasonable speed and cost. Such a market would be characterized by

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[1] From the 1952 report of the Ad Hoc Subcommittee on the Government Securities Market. See, U.S. Congress, Joint Committee on the Economic Report, Subcommittee on Economic Stabilization (Flanders Committee), United States Monetary Policy: Recent Thinking and Experience Hearings, 83rd Cong., 2nd Sess., 1954, p. 265.

[2] Ibid., p. 268. A similar definition applies to a disorderly rising market.

continuity in trading at prices that reflect demand and supply, and would not exhibit extremely sharp daily price movements or very large spreads between bid and asked prices suggesting investor or dealer unwillingness to maintain an active market. Although lack of data on orders on the dealers' books prevents development of statistical indicators directly measuring "depth, breadth, and resiliency", the indicators analyzed in this study do approximate some of these technical characteristics as well as the more general criteria. At least they should signal changes over time in the underlying market characteristics.[1]

The major conclusions of this study are listed below. The reader must be cautioned that there are errors and inconsistencies in the dealer data, as well as statistical problems in the regression analyses. Further analysis of the available data is possible and desirable. Nevertheless, this study is valuable as an empirically documented discussion of the performance of the Government securities market in the fifties and sixties.

1. Market performance, as reflected in the indicators based on trading, showed few signs of secular deterioration from the fifties to the sixties. Only in coupon issues maturing within 1 year was there clear-cut evidence of secular deterioration.[2] For 1-5 and 5-10 year issues all indicators based on trading suggested secular improvement in performance;

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[1] It should be noted that these definitions and the selected indicators reflect activity of both dealers and customers since performance of a dealer market--as distinct from performance of the dealers--depends on the behavior of the customers as well as on the functioning of the dealers.

[2] During most of the 1960's the Treasury discontinued the issuance of certificates.

and for bills and over 10 year issues the indicators offered conflicting evidence. Daily average trading was higher in the sixties in all maturity classes except coupon issues maturing in 1 year or less. The annual rate of turnover of the marketable U.S. debt--a rough adjustment of trading for debt outstanding--was generally greater in the sixties in 1-5 and 5-10 year issues, very slightly lower in bills, and considerably lower in other short-term issues and bonds maturing after 10 years. Moreover, there was no evidence of increased discontinuities in trading--measured by the 16th lowest daily volume of trading in each quarter and by volatility in quarterly data on daily average trading--except in coupon issues maturing within 1 year.

2. In both the fifties and sixties there were sizable short-run fluctuations in the indicators based on trading, and in this sense market performance was subject to periods of deterioration and improvement. The relative variation in trading was greater in 5-10 and over 10 year bonds, implying that short-run variation in market performance was more pronounced in the long-term market. In part these fluctuations reflected cyclical movements in free reserves and interest rates, with trading rising in periods of easy money and falling when credit policy tightened noticeably, and thus causing appropriate counter-cyclical changes in the liquidity of Government securities. Movements in trading also were related to U.S. debt oustanding, Treasury financings, official operations in the market, and tax swapping.

3. Trading was positively associated with the size of Treasury financings throughout the period studied. Thus, to the extent that advance refundings made possible more long-term bond offerings, they contributed to a higher average level of market activity. As maintained by market participants, Treasury financings in long-term bonds also caused a widening of the spread between daily average trading and trading on low days (as measured by trading on the 16th lowest day), but nevertheless the sixties saw a rise in trading on low days that was almost as great as the rise in daily average trading.

4. This study provided no evidence that official transactions in coupon securities caused market activity in the same quarter to dry up. On the contrary, market activity was positively related to official activity in bills, 5-10 year issues, and over 10 year issues, although this association was less evident in the sixties. The stimulative impact in 5-10 and over 10 year bonds was caused by Treasury operations; Federal Reserve operations did not show a significant relationship to trading.

5. Analysis of dealers' positions unearthed little or no evidence of secular deterioration from the fifties to the sixties in the performance of dealers as gauged by their inventory practices. However, this particular study did not enter into the question of whether dealers' profits over the period were sufficient to justify their long-run continuance in business.[1]

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[1] The dealer profit picture was analyzed in William G. Colby, Jr., "Dealer Profits and Capital Availability in the U.S. Government Securities Industry, 1955-1965", Treasury-Federal Reserve Study of the U.S. Government Securities Market, 1967.

The raw data on dealers' daily average net positions show a substantial rise from the fifties to the sixties, in all maturity categories with the exception of coupon issues maturing within 1 year, where trading and debt were also lower, explaining the drop in positions. In intermediate-term issues, those maturing in 1-5 years, however, these data may be misleading and it is possible that such positions were steady or even declined somewhat from the fifties to the sixties. Where positions increased the rise is largely explained by the greater volume of gross new Treasury bill issues and in some cases new coupon issues, the sharply increased stability in day-to-day security prices (and yields), the increased volume of official (Treasury and Federal Reserve) transactions in coupon issues, and the change in reporting basis and number of reporting dealers in mid-1960.

6. Official transactions had a significant influence on dealers' positions in the sixties while in general no such relationship was found in the fifties. In Treasury bills, dealers accommodated large net purchases of official accounts in part by drawing down their positions. The institution of official operations in coupon issues in any size in late 1960-early 1961, generally on the buy side of the market, allegedly increased uncertainty and engendered expectations of a one-way (upward) movement in prices. This study found that for issues due in 5-10 and over 10 years dealers did increase their gross (and net) long positions in response to official purchases. But there was in no sector of the coupon market any evidence of dealer's reduction of gross short positions as a result of System purchases, though in several cases Treasury purchases were associated with declines in gross short positions.

7. Dealers' response to the greater day-to-day stability in security prices (and yields) during the sixties was to increase net long positions rather than withdraw from the market. This rise in positions probably reflected the lessened risk of capital losses as well as an attempt to increase the volume of trading (and hopefully trading profits) in a period when speculative profits were limited.

8. Dealers' position policy was generally destabilizing as far as interest rates were concerned but aided in the attainment of monetary policy targets over quarterly periods, during both the fifties and sixties. In this connection, dealers drew down their positions in response to past increases in interest rates, thus adding further to upward rate pressures. They also decreased their positions in response to current increases in the discount rate and net borrowed reserves.

9. Daily price changes were far smaller in the sixties, especially from mid-1962 through mid-1965, than in the fifties, thus illustrating the increased stability in securities' markets.

10. The published data on spreads between bid and asked prices (or yields) do corroborate statements by dealers that spreads on Treasury bills have declined from the fifties to the sixties. For coupon issues, the data show no change in spreads on maturities of 5 years or less, fluctuation of spreads on 5-10 year issues around the same levels in the sixties as in the fifties, and a generally greater spread on over-10 year

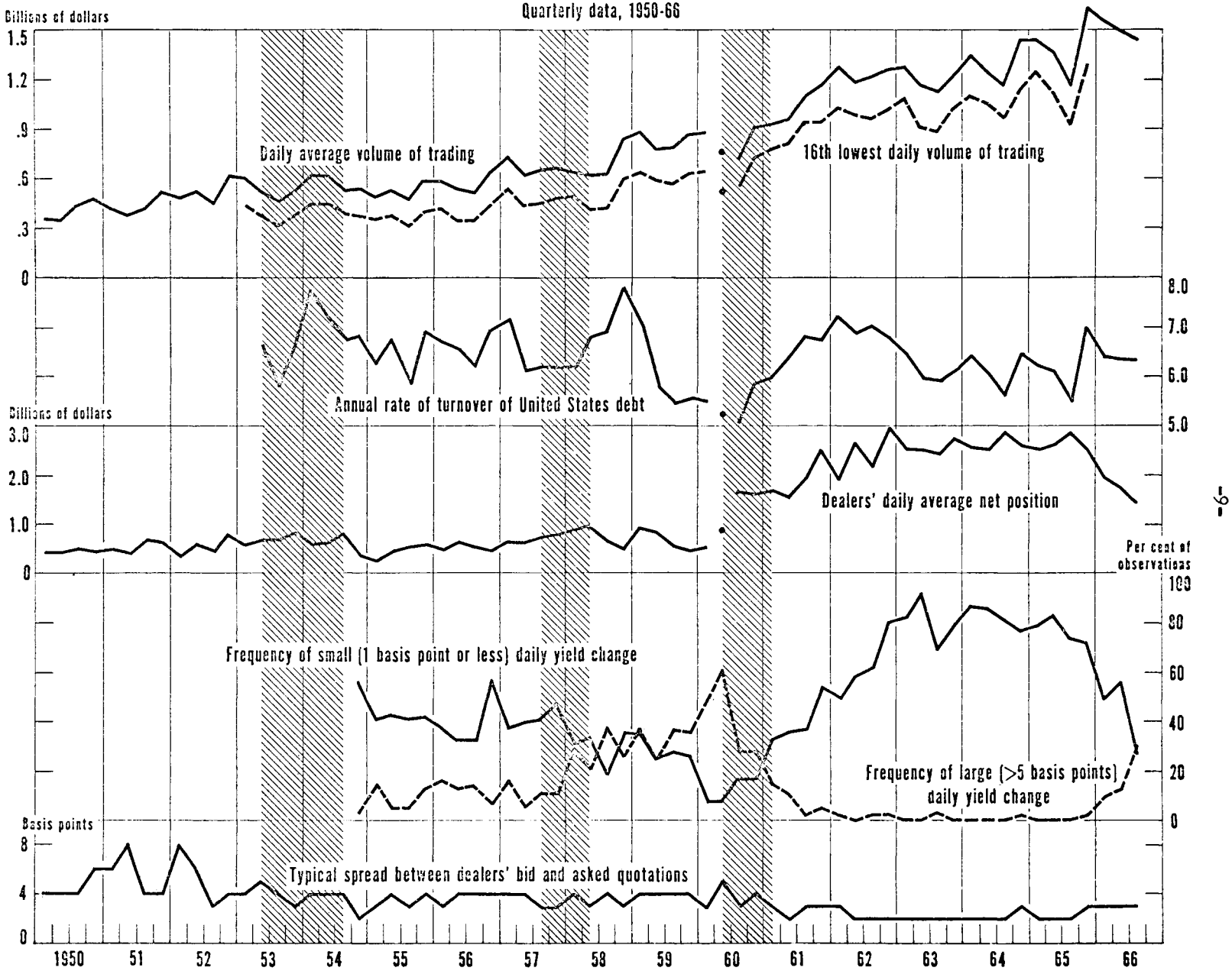
though the spread on these issues has been at the higher level since

1957. These data must be interpreted cautiously, however, for they overstate the size of the spread at which large trades take place and they may also give an inaccurate picture of movements over time in the spreads.

Chart I

PROFILE OF MARKET PERFORMANCE FOR UNITED STATES TREASURY BILLS

Quarterly data, 1950-66

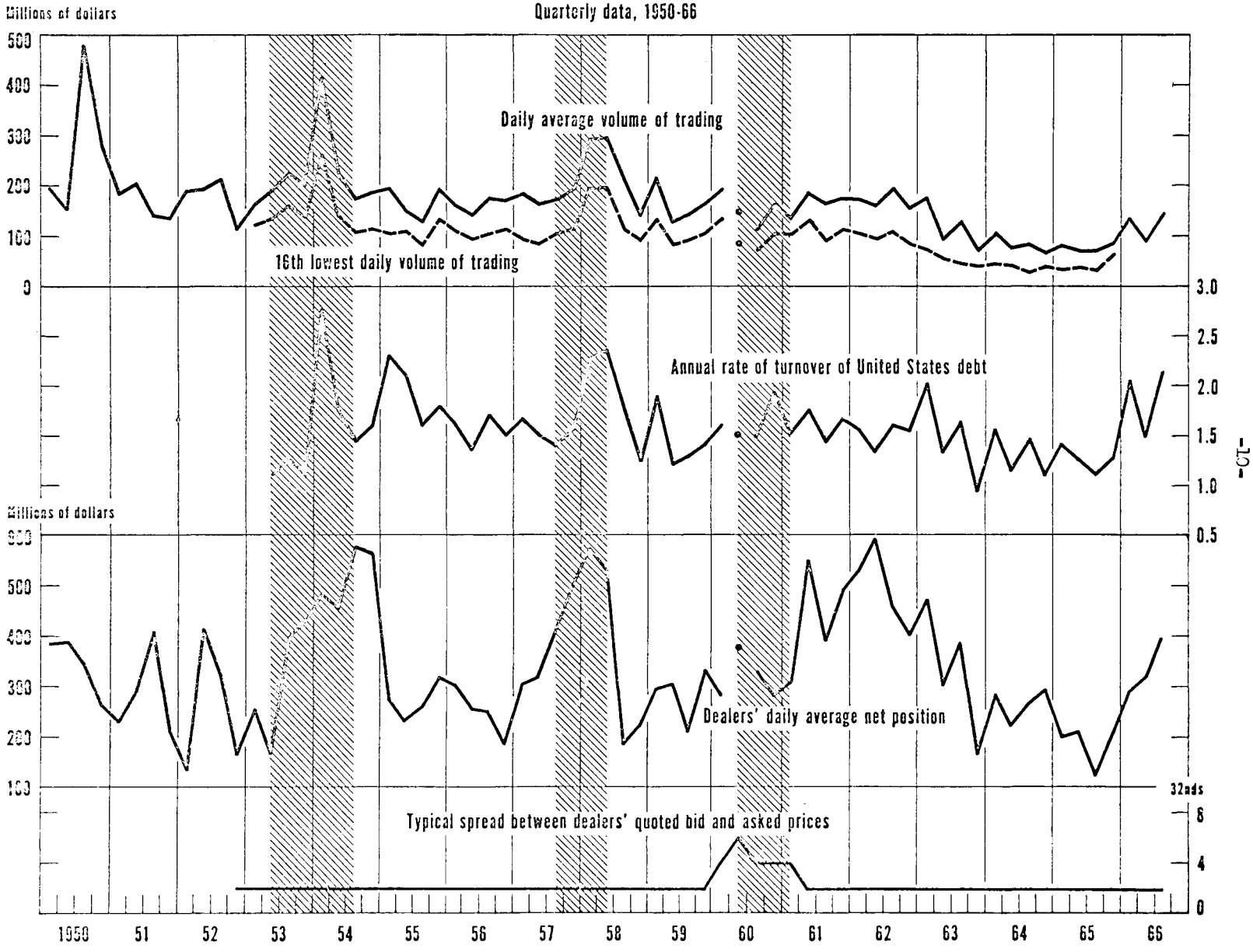


Source: Appendix Tables 1–7.

Chart II

PROFILE OF MARKET PERFORMANCE FOR UNITED STATES GOVERNMENT SECURITIES (OTHER THAN BILLS) MATURING IN 1 YEAR OR LESS

Quarterly data, 1950-66

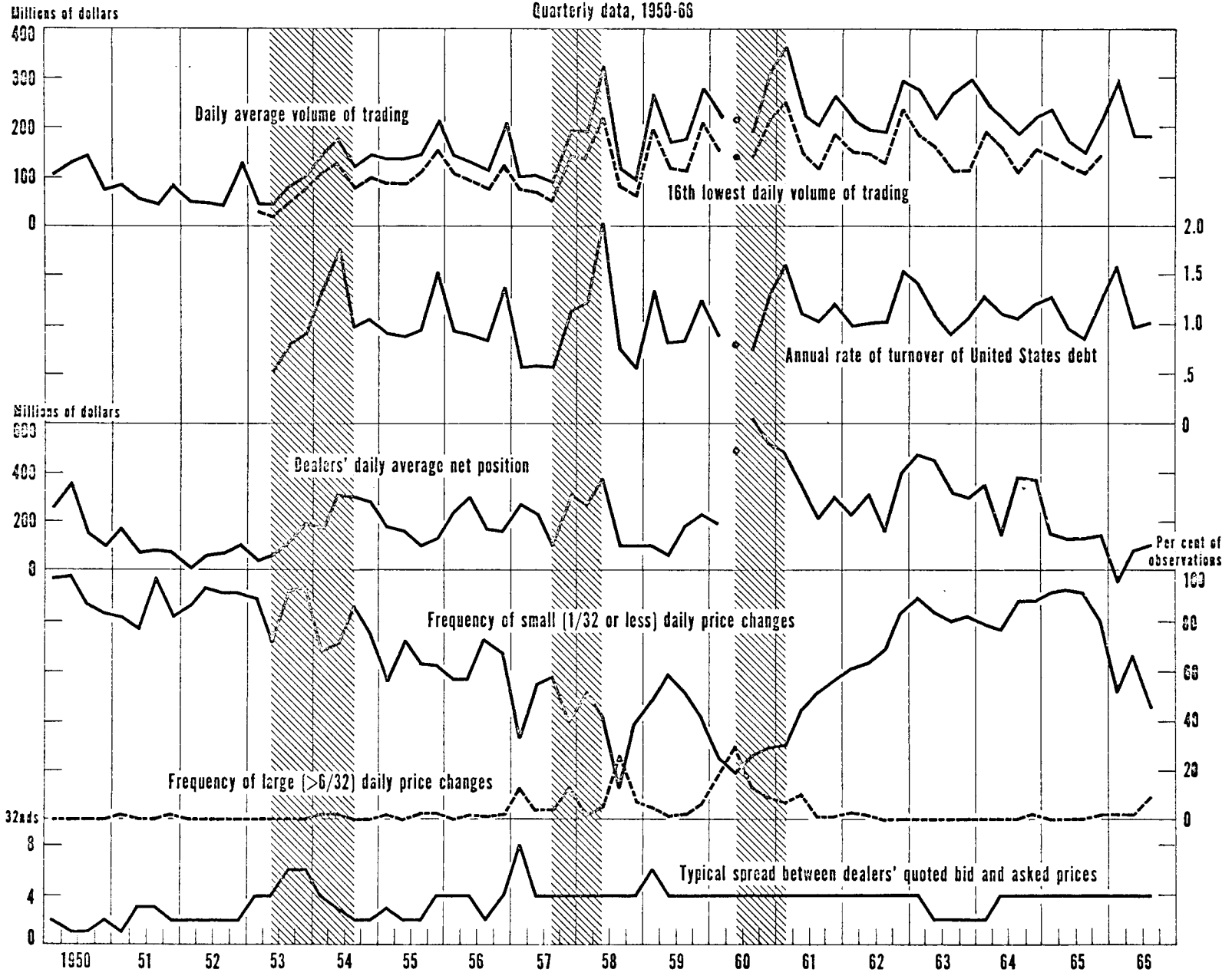


Source: Appendix Tables 1–7.

Chart III

PROFILE OF MARKET PERFORMANCE FOR UNITED STATES GOVERNMENT SECURITIES MATURING IN 1-5 YEARS

Quarterly data, 1950-66

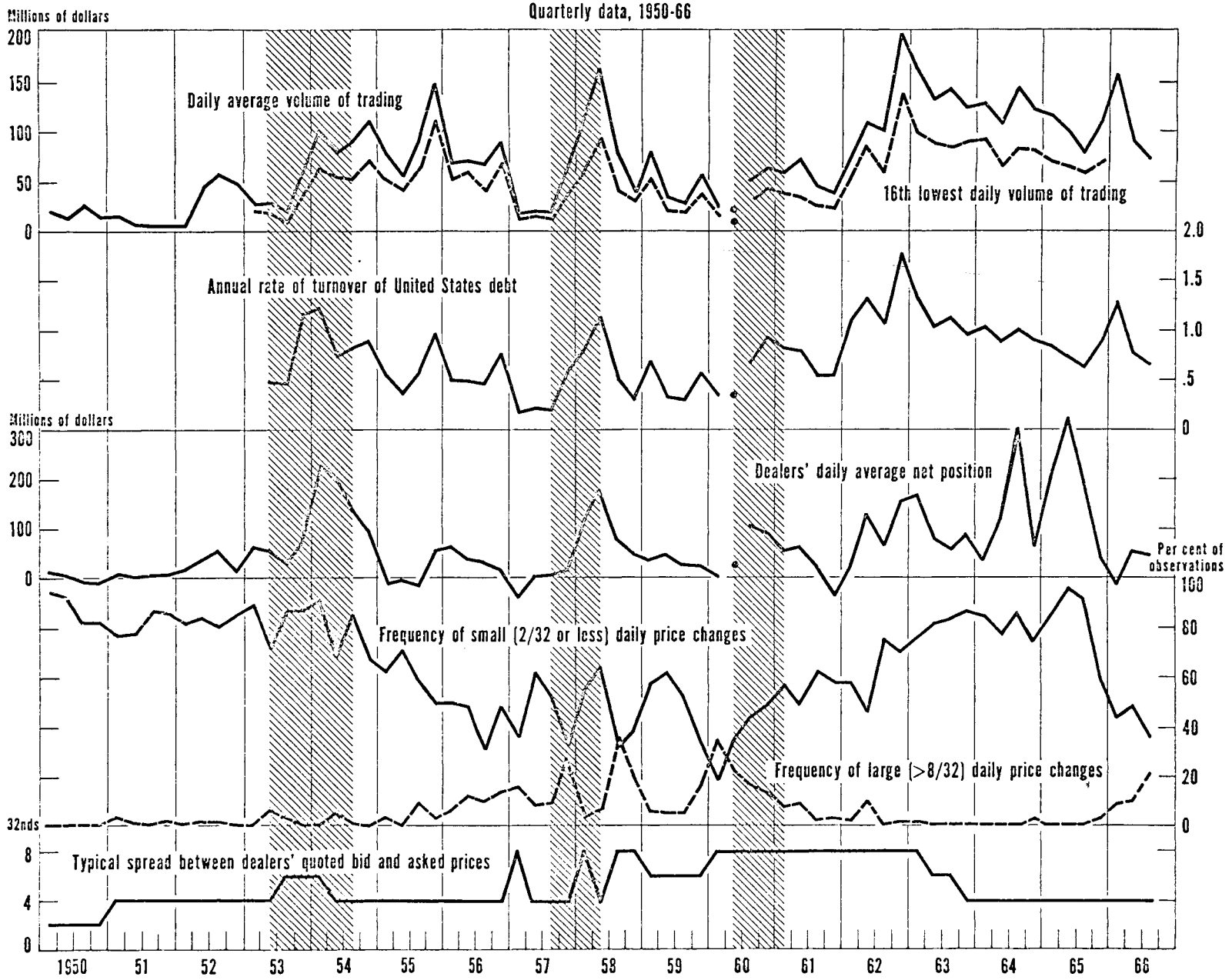


Source: Appendix Tables 1–7.

Chart IV

PROFILE OF MARKET PERFORMANCE FOR UNITED STATES GOVERNMENT SECURITIES MATURING IN 5-10 YEARS

Quarterly data, 1950-66

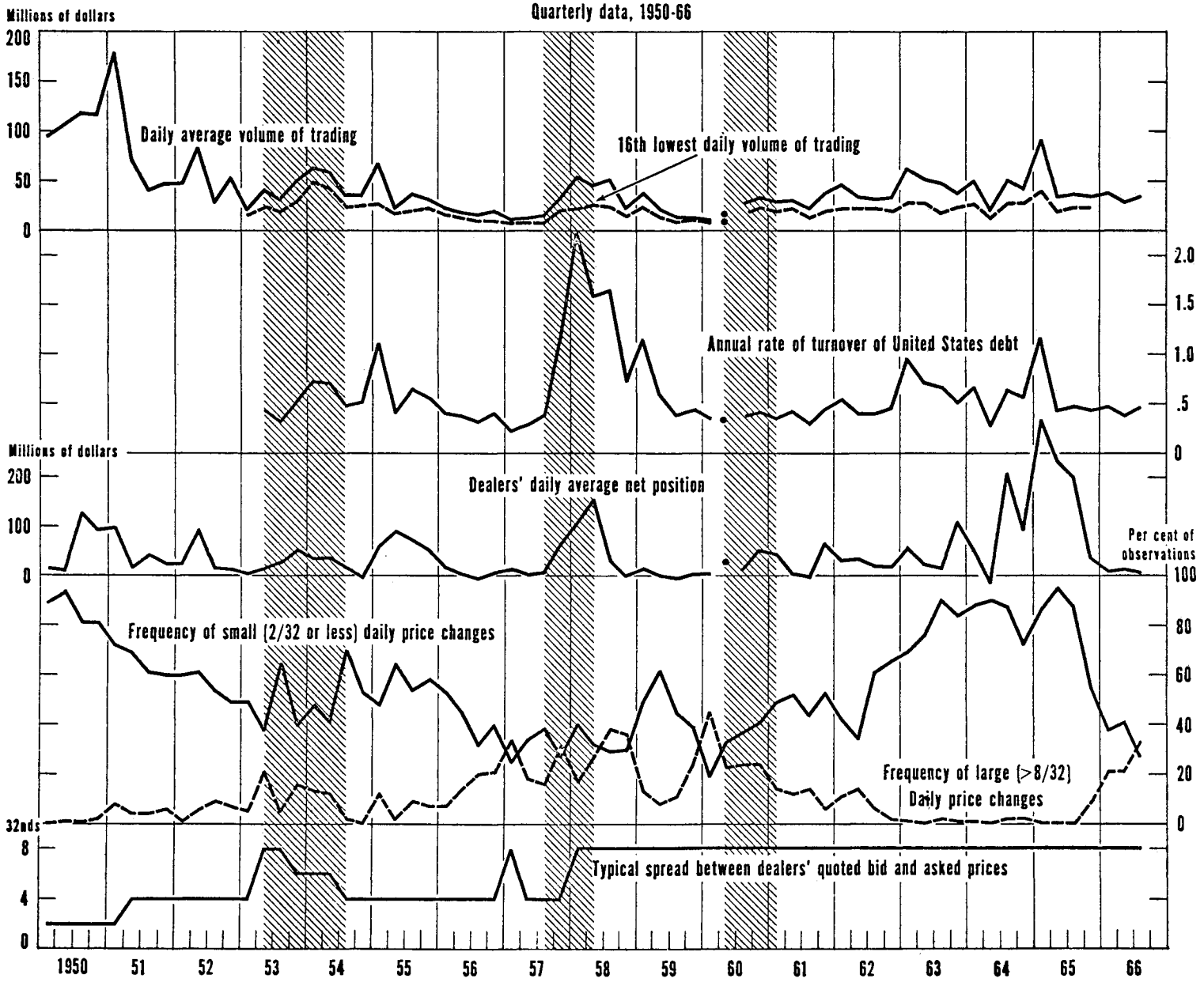


Source: Appendix Tables 1–7.

Chart V

PROFILE OF MARKET PERFORMANCE FOR UNITED STATES GOVERNMENT SECURITIES MATURING AFTER ~~TEN~~ 10 YEARS

Quarterly data, 1950-66



Source: Appendix Tables 1–7.

CHAPTER II

TRADING AND RELATED INDICATORS

A. Comparison of Average Level and Volatility of Trading

The volume of trading is, of course, the outstanding operational characteristic of any securities market, and several indicators of market performance can be developed from the data on trading. The most fundamental of these indicators is the average daily volume of trading. As a first approximation a large and growing trading volume is a desirable market feature, implying that customers are able to carry out necessary transactions. It approximates "breath", since orders from a wide group of investors would probably involve a large volume of actual transactions. Secondly, an ideal market should not be characterized by sharp quarterly variations about the average level of trading, since these fluctuations would imply that the markets were sometimes thin. On both these counts market performance improved from the fifties to the sixties, except in coupon issues maturing within 1 year (see Charts I-V and Text Tables 1 and 2).

Daily average trading in all maturities, except coupon securities maturing within 1 year, fluctuated about higher average levels in the sixties than in the fifties, as Table 1 shows. Trading in bonds maturing after 10 years averaged $32 million a day from the second quarter of 1953 through the first quarter of 1960 against an average of $40 million a day from the third quarter of 1960 through the fourth quarter of 1965. For 5-10 year securities the average daily volume rose from $67 million to $104 million, while for 1-5 year issues it moved from $158 million to $227 million.

Table 1

Average Level of Trading Indicators
in Fifties and in Sixties*

(Dollar figures in millions)

Indicator and period	Maturity Class of U.S. Government Securities				
	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
Daily Average Trading					
50's	634	195	158	67	32
60's	1,196	126	227	104	40
% change	+ 89	- 35	+ 44	+ 55	+ 25
Annual Rate of Turnover of Marketable U.S. Debt					
50's	6.52	1.66	1.01	.59	.68
60's	6.29	1.47	1.14	.95	.52
% change	- 3	- 11	+ 13	+ 61	- 23
16th Lowest Daily Volume of Trading					
50's	450	125	109	44	19
60's	973	72	156	67	23
% change	+ 116	- 42	+ 43	+ 52	+21

*Based on averages of quarterly data for 2'53 - 1'60 and for 3'60 - 4'65 shown in Appendix Tables 1, 2, and 3.

In Treasury bills the secular increase in trading was especially pronounced, with trading in the sixties averaging about $1.2 billion a day, almost twice as much as in the fifties. Only in other securities maturing within 1 year was daily average trading usually lower in the sixties than in the fifties: in this class the average level dropped to $126 million from $195 million.

Table 2, which shows the coefficient of relative variation (i.e., the standard deviation of the quarterly data expressed as a percentage of the mean), implies that daily average trading was less volatile in the sixties than in the fifties, again with the exception of coupon issues maturing within 1 year. This measure of volatility declined about the same amount for intermediate- and long-term issues--from 52 to 38 for bonds maturing after 10 years, from 55 to 38 for 5-10 year bonds, and from 40 to 22 for 1-5 year maturities. The decline in volatility was much smaller for bills, while volatility increased slightly for short-term coupon issues. This Table also shows that the relative variation in trading was far larger in the long-term market (5-10 and after 10-year issues) than in the short and intermediate markets, thus implying that performance in the long-term market was subject to greater cycles of deterioration and improvement than the short-term market.

Table 2

Coefficients of Relative Variation
in Trading Indicators *

(In per cent)

Indicator and Period #	Maturity Class of U. S. Government Securities				
	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
Daily Average Trading					
50's + 60's	36	38	35	52	47
50's	20	30	40	55	52
60's	16	35	22	38	38
Annual Rate of Turnover of Marketable U. S. Debt					
50's + 60's	10	22	29	45	64
50's	9	24	36	48	70
60's	9	18	18	29	39

* Equals the standard deviation of quarterly data in Appendix Tables 1 and 2 divided by the mean.

50's + 60's covers 2'53 - 4'65: 50's cover 2'53 - 1'60: 60's cover 3'60 - 4'65.

B. Statistical Problems

These conclusions of improved performance, however, represent only a first approximation. Both statistical problems and market developments call for further analysis. The primary statistical problem is the change in the statistical series on trading in mid-1960. Unfortunately, the biases thus introduced are in opposite directions, so that the net effect on comparisons of trading in the fifties and sixties is indeterminate.

Theoretically, the average daily volume of trading includes dealers' gross purchases plus their gross sales, but excludes their allotments, maturities and exchanges of Treasury issues as well as securities bought or sold under repurchase agreements. Before mid-1960, however, there were probably many cases where allotments, exchanges, maturities and repurchase agreements were included in trading. Although some errors may exist in later data too, this statistical discrepancy most likely led to overstatement of trading in the fifties compared to the sixties.

A second change in the data involves the maturity classification of securities. Before mid-1960 securities were supposed to be classified by first call date, while afterwards they were classified by final maturity. To the extent that these instructions were followed, trading in securities maturing after 10 years was understated in the

fifties while trading in coupon securities maturing within 1 year was overstated. In the two intermediate maturity classes, debt outstanding in the fifties was sometimes larger when classified by first call and sometimes smaller, making it impossible to specify the direction of the statistical bias.

Another problem with the series on trading is the exclusion of Lanston from the data prior to mid-1960, thus causing some understatement of trading in the fifties. This omission was probably of little importance in the long-term market but sizable in bills and other short-term securities. The number of dealers in the statistical series changed at other times too, but in most of these cases the dealer did not have a large segment of the market in the period before inclusion.

C. Regression Analysis of Trading

More important than statistical problems in analyzing and appraising changes in the daily average volume of trading are related economic developments, such as changes in the volume of Treasury debt outstanding, Treasury financings, Treasury and Federal Reserve operations in the market, interest rate expectations and levels, monetary policy, and tax swapping. Not only are such developments responsible for much of the fluctuation in trading evident in the Profile Charts and the Tables, but they also influence a judgment of the desirability of such changes in trading volume. For example, a somewhat lower volume of trading is not undesirable if the stock in trade declines or if the monetary authorities

are trying to restrain inflation by reducing the liquidity of debt. Similarly, excessively high trading may imply speculation that could have undesirable after-effects on the market.

The effects of many of these economic developments can be seen in the Charts, but in order to statistically confirm and measure their impact on daily average trading over the quarter, multiple regressions were calculated for the entire period (2'53-4'65) and for the fifties (2'53-1'60) and sixties (3'60-4'65) separately.[1] The regressions "explained" a relatively high proportion of the variation in daily average trading, ranging from 96 per cent for bills in the entire period to a low of about 50 per cent for 1-5 year issues in the sixties. Of the fifteen regressions, six explained more than 80 per cent of the variation in trading and only the three involving 1-5 year issues explained less than 60 per cent. In three of the five equations for the entire period, there appears to be serial correlation of the residuals which, among other things, means that the usual tests for significance are invalid. This problem was almost entirely eliminated in the subperiods, however, where only one of the ten regressions showed serial correlation. The problem of the change in the data series on trading also was eliminated by running separate regressions for the subperiods, since the data are consistent within each period. A remaining problem is that several of the explanatory variables--especially those measuring monetary policy and interest rate expectations--are related to each other (multicollinearity), making it impossible to

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[1] See Appendix for a more detailed description of the regression analysis (pages 116-117). Regression results are shown in Tables 9-13.

accurately assess the separate impact of each on trading. Nevertheless, the results do confirm the importance of several groups of economic variables.

1. U.S. Debt Outstanding

The supply of securities available for trading should be one determinant of trading. Marketable U.S. debt held outside the Federal Reserve and the Treasury was used as the measure of the stock of securities in each maturity class except bills where total bills outstanding was selected. This distinction reflects the fact that Federal Reserve and Treasury holdings of coupon issues were not generally available for trading. Their holdings of bills, however, were often sold. Dealer positions might also be considered a measure of the stock of securities available for trading; and there was a relatively high correlation between trading and positions. The causation, however, runs in both directions, since heavy trading encourages--and indeed requires--dealers to hold higher positions. Using positions on the previous day as a measure of the supply for trading on the following day might solve the problem for daily regressions, but with quarterly data the lag is too long to be reasonable. Therefore, dealer positions were not included in the regressions.

As was expected, debt outstanding was found to be one of the most important determinants of the daily average volume of trading in all maturity classes except bonds maturing after 10 years. Debt outstanding was more important in explaining the variation in trading over the entire

period partly because changes in the composition of the debt were larger then. It took a big change in debt to get even a small increase in trading. For the entire period, a $1 billion increase in debt outstanding resulted in an increase of only about $20 million in trading in bills and from $3 to $4 million in the other maturity classes where it was significant. When debt outstanding was significant, the magnitude of the impact on trading was usually larger in the sixties than in the entire period or in the fifties.

A number of major movements in trading visible in the Profile Charts can be partially explained by changes in debt outstanding. These include the sharply higher volume of trading in Treasury bills in the sixties, the decline in trading in coupon securities maturing within 1 year after 1962, and the activity in 5-10 year bonds in 1962-64.

2. Trading by Official Accounts

According to some market participants, trading by the Federal Reserve System and the Treasury, particularly in longer maturities, tends to depress activity by other customers, partly because potential buyers feel price levels are artificiallyhigh and so hesitate to buy. In addition, it is sometimes argued that sellers also delay sales in anticipation of higher prices. On the other hand, dealers at times say that when official accounts are buying sellers seize the opportunity of getting out of a

position they would otherwise continue to hold. There is also some feeling that Treasury purchases of securities during financings improves the atmosphere and so may lead to greater activity.[1]

This study revealed no negative impact of official purchases on trading, and, on the contrary, found some evidence that official transactions led to higher trading. Trading by the System and the Treasury (considered together) had a positive impact on daily average trading in bills and on trading in the two longest maturity classes for the entire period. Moreover, this effect was still significant (at the 5 per cent level) when total trading was adjusted to exclude trading with official accounts. In bills an increase in official transactions of $1 million resulted in an increase of slightly over $2 million in daily average trading (excluding official accounts), in 5-10 year issues the corresponding increase was almost $4 million, and for over 10 year issues almost $2 million. In all these equations, however, positive serial correlation exists, so that there is some doubt about the significance of the results.

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[1] The survey of institutional investors (see Joseph Scherer, "Institutional Investors and the U.S. Government Securities Market", Treasury-Federal Reserve Study of the U.S. Government Securities Market, 1967) provided somewhat contradictory responses on this point. Respondents accounting for 31 per cent of total market activity reported in the survey felt that their ability to conduct transactions decreased because of official operations. Activity of the other respondents was not affected or increased. Unfortunately, no distinction was made between the impact of official operations during Treasury financings and at other times, and no dollar magnitudes for changes were requested.

Separate examination of the fifties and sixties showed less evidence of this positive association between official transactions and daily average trading (excluding official transactions). Significant positive relationships (when other significant variables were held constant) existed for bills in the fifties; and for securities maturing in 5-10 and after 10 years in the fifties but not in the sixties. The correlation in the fifties for longer-term issues reflects substantial official purchases in periods of market crises, such as 1958, and is probably somewhat unreliable because official operations did not occur often. In the case of bills, a significant positive correlation existed before other variables were added in the sixties; but for 5-10 year and over 10 year securities the positive relationship was just below the required significance level both in the simple and multiple correlations in the sixties.

On the possibility that official activity stimulated trading among dealers, thus hiding a lower level of activity by investors, similar regressions were run for the sixties for private trading (excluding trading by official accounts, brokers and dealers).[1] No significant relationships between official activity and private trading were found in these multiple regressions, but there was a significant positive simple correlation coefficient for bonds maturing after 10 years.

Since Treasury purchases of coupon issues were usually concentrated around financings and might be expected to have a more stimulative

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[1] No such data are available for the fifties.

effect than Federal Reserve purchases which occurred at other times, regressions were also calculated with the trading activity of the Treasury and the Federal Reserve treated as separate variables. These regressions showed that the positive impact of official transactions in coupon issues on other trading was a result of Treasury operations. Coefficients for Federal Reserve operations were not significant. In the multiple regressions explaining trading (excluding official trading) significant positive coefficients were found for Treasury operations in 5-10 and over 10 year issues in the entire period and in the fifties. These coefficients were about the same size as the coefficients for Federal Reserve and Treasury operations taken together. In these multiple regressions, Treasury operations also had a significant positive influence in the sixties on private trading (excludes brokers and dealers and official accounts) in bonds maturing after 10 years, with a $1 million increase in Treasury operations leading to a $1.2 million increase in private trading.[1]

Possibly, further refinement of the data, such as separating purchases from sales and using periods shorter than a quarter would have revealed a negative impact of official transactions on trading. But no

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[1] The equation was

$$\text{Trading} = -26.3 + \underset{(.54)}{1.21}\, x_2 + \underset{(1.65)}{6.54}\, x_5 - \underset{(1.96)}{6.60}\, x_7 + \underset{(1.13)}{2.09}\, x_{16}$$

The adjusted R^2 was .638; the D-W ratio was 1.405. The numbers in parentheses are standard errors of the regression coefficients. x_2 is Treasury operations and the other variables are listed in Appendix Table 8.

such negative relationship appeared in an earlier analysis (undertaken for the System Study on the Impact of Official Activity in Coupon Issues) of daily data on both sales and purchases of private customers during Treasury rights financings from March 1961 through July 1964 and on days without financings during a period of relatively heavy official activity, August 22, 1962 through December 31, 1963. This study found that private customers were encouraged to increase their purchases and their sales of 5 - 10 and over 10 year issues by official operations during rights financings. On days without financings official buying of 5 - 10 and over 10 year Governments was associated with higher sales by private customers, while there was no impact on purchases.[1] The stimulation of sales by private customers supports the dealers' contention that official buying leads to dumping by other investors. Another, but less probable, explanation is that official accounts buy securities when they are available--availability presumably being increased by large sales to dealers by private customers. The higher volume of private purchases during financings when official accounts were active suggests that some buyers at least were encouraged, probably by the improved market tone.[2]

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1 Although the relationships between private trading were significant they explained only a very small part of the variation in daily trading. In addition the number of days with large official operations was small.

2 One by-product of this study is a possible way to measure the market's resiliency. Presumably in a resilient market purchases by private customers would increase in response to a precipitous drop in prices while market sales by private customers would rise following an unusually sharp rise in prices. This study tested the relationship of daily private purchases and private sales to the average change in prices on the previous day (for 1 - 5, 5 - 10, and over 10 year Governments) for days without financings from August 22, 1962 - December 31, 1963. The desired positive relationship between sales by private customers and price changes did show up in all maturity classes, but there was no significant relationship between private buying and price changes. Although the task of updating the daily figures would be time consuming, it might be useful to study the relationship of daily private purchases and private sales and price changes on the previous day (possibly testing other lags too) in a period when price changes were larger, as for example, September 1965 - August 1966.

3. Treasury Financings

Treasury financings in coupon issues lead to heavy trading by dealers and customers in rights and new issues and also promote swapping in outstanding issues for a number of days during and after each financing. Even for periods as long as a quarter such heavy trading should cause higher daily average trading--an expectation that was confirmed by the regressions. While new issues of Treasury bills also stimulate trading, no significant relationship was uncovered, possibly because of the use of the net change in bills outstanding instead of a series on gross issues.

Trading in coupon issues due within 1 year was stimulated by the volume of rights (in this maturity class) held by the public--an increase of $1 billion in rights being associated with a $4 million rise in daily average trading for the entire period. Although the volume of rights had an important influence on trading in both the fifties and sixties, the magnitude of the response was far larger in the fifties. An increase of $1 billion in rights led to an $11 million rise in trading in the fifties against only $2 million in the sixties. Possibly this lower coefficient for the sixties was a result of the introduction of prerefundings. Lack of knowledge or the option of continuing to hold the rights may have led to lower trading in rights relative to the amount held by the public in prerefundings.

Trading in 1-5 year issues responded to the volume of new issues sold to the public in the fifties and to the volume of rights in this maturity class held by the public in the sixties. The importance of rights in the sixties obviously reflects the introduction of advance refundings. Neither variable was significant for the period as a whole--in the case of new issues partly because of intercorrelation with debt outstanding.

In longer maturity classes an increase of $1 billion in the volume of new issues sold to the public led to an increase in daily average trading of roughly $4 to $6 million for 5-10 year issues and $12 to $15 million for bonds maturing after 10 years. When this financing occurred in the last month of the quarter, the positive impact on that quarter was more than wiped out for bonds maturing after 10 years, perhaps because some of the heavy trading that normally occurs after a financing was pushed into the next quarter while the lull in trading that usually precedes a financing fell in the current quarter. For 5-10 year bonds the volume of new issues was significant in the fifties but not quite significant in the sixties; but for longer bonds it was significant in both periods, although the timing variable showed up only in the sixties.

In view of the relatively small size of the sample, advance refundings were not considered separately from other financings, so that the differential effect (if any) of the size of various types of financing

on secondary market activity could not be assessed. Nevertheless, since the size of financings in general was positively associated with the level of daily average trading and since a much smaller volume of long-term bonds would probably have been sold in the sixties without advance refundings, they may well have promoted activity in the Government securities market.

4. Monetary Policy and Interest Rate Expectations

The Profile Charts for most maturity classes show that there has been a definite cyclical pattern in daily average trading, with trading rising in recessions and declining, less uniformly, late in expansions. This showed up in the regressions in the form of a significant relationship between trading in all maturity classes and at least one of a group of variables representing the stance of monetary policy and expectations about interest rates and security prices (free reserves, the level of rates, the change in rates in the current quarter, and the change in rates in the previous quarter). Because of the multicollinearity between these variables, however, not much importance can be attached to the particular ones that were significant in any equation.

In general, daily average trading was lower in a climate of tight money, or in other words, when free reserves were low and interest rates high. Such a reaction might be anticipated if good business and tight money were expected to continue, since the outlook for Government bond prices

would be poor and other bonds would often be more attractive on a rate basis while stocks would offer the chance of participating in the business boom. In addition, potential buyers might delay because of the possibility of buying at still lower prices, while sellers might be locked-in by their unwillingness to take established losses, even though greater losses were possible. Moreover, the dealers' unwillingesss to position securities at such times would slow down execution of orders that did appear.

In the fifties, the change in rates in the previous quarter frequently had a negative impact on trading in coupon issues, possibly because a faster rise in rates also led buyers to expect further increases and so discouraged purchases. The change in rates was not important in the sixties, but interest rates were far more stable in the latter period.[1]

A certain degree of such cyclical deterioration and improvement in this aspect of market performance, and hence in the liquidity of Government securities, probably is consistent with a counter-cyclical monetary policy. In inflationary periods the difficulty of finding buyers may slow down sales of Governments by banks or other lenders and thus also reduce the rate of growth in loans. In recessions, on the other hand, any contribution that greater ease in selling securities can make towards financing business recovery would be welcome. Of course, both excessive

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1 It should be noted again that the discussion is based on regressions which did not cover 1966 but ended with the fourth quarter of 1965.

speculative activity in recessions or practically complete disappearance of activity at any price in booms could lead to disorderly markets and financial crises.

5. Tax Swapping

According to many dealers a lower volume of tax swapping by commercial banks caused some deterioration in the market in the sixties. Tax swapping refers to the sale of a security at a loss and the purchase of a similar security at about the same price. This may increase banks' after-tax profits over time, because net capital losses can be deducted from taxable income while capital gains are taxed at the 25 per cent capital gains rate. In the year of the swap, taxes paid will be reduced by roughly 50 per cent of the loss. Taxes paid in the future when the new bond matures and the loss becomes a gain will be larger, but only by roughly 25 per cent of the original loss. So the tax swap will have increased after tax profits by approximately 25 per cent of the loss. Unfortunately, no fully satisfactory proxy for tax swapping was available, but a dummy variable for the fourth quarter of the year, a time when banks frequently concentrate transactions for tax purposes, was included in the regressions. One reason why tax swapping may be heavier in the fourth quarter of the year is that banks may not know until then if the year is suitable for a loss year.

In the 1-5 and 5-10 year maturity classes daily average trading did show a significant rise in the fourth quarter, amounting to about $31 million for 1-5 year issues and $24 million for 5-10 year bonds for the fifties and sixties taken together. Moreover, the size of this seasonal increase or its significance was greater in the fifties than in the sixties, thus tending to support the argument that tax swapping was smaller in the sixties when prices of securities were unusually stable.

6. Number of Dealers

Over the years covered by this study the number of dealers included in the statistics has changed several times. Normally, a change in the number of dealers should not cause a change in customer activity, although total activity would be redistributed among the dealers. In cases where the dealer added had previously been trading, however, the more complete coverage of the market would imply greater activity. In addition, with more dealers, inter-dealer activity, and hence total activity, might well expand. To test this last hypothesis, a series on the number of reporting dealers was included in the regressions, but the results were inconsistent. In longer maturity classes a significant positive relationship did appear, but it is possible that this variable was acting as a measure of trend and did not have significance for the hypothesis being tested.

D. Annual Rate of Turnover of Marketable U.S. Debt

The previous sections clearly established the importance of changes in the available stock of securities or debt outstanding for market activity. In order to help visualize the changes in activity or performance after rough allowance for this important environmental change, a series on the annual rate of turnover of the marketable U.S. debt was developed for each maturity class. It is defined as daily average trading multiplied by 249 (the number of trading days in most years) and then divided by the average debt held by the public (for bills, total debt outstanding). Treasury and Federal Reserve holdings are excluded from debt except in the case of bills because they were not part of the available market supply since these accounts seldom sold such securities in this period. Until the middle of the second quarter of 1960, maturity classifications of the debt are based on first call date, and thereafter on final maturity in order to correspond to reporting instructions on the trading data.

A rise in this indicator, like a rise in daily average trading, implies improved market performance. Such an interpretation, however, assumes that trading should change in the same proportion as debt outstanding in order for market performance to remain unchanged--an assumption that is not necessarily justified. In addition, the statistical problems caused

by the change in the definition of maturity classes (from first call to final maturity) may be magnified in this indicator, especially for bonds maturing after 10 years and coupon securities maturing within 1 year.[1] Therefore, the rate of turnover of the debt should be regarded only as a supplement to daily average trading, not as a superior indicator of performance. Moreover, as was the case with daily average trading, the rate of turnover of debt would be expected to show considerable changes in either direction because of economic developments, and such short-run or cyclical movements are not necessarily undesirable.

These series on the rate of turnover of the debt are shown in the Market Profile Charts (pages 9 - 13) and in Appendix Table 2. As text Table I (page 15) illustrates, the turnover rate for intermediate securities in the sixties (3'60-4'65) fluctuated about an average level that was higher than in the fifties (2'53-1'60). In bills the average level was very slightly lower--the strong upward trend evident in daily average trading in bills was completely eliminated. In coupon securities maturing within 1 year and bonds maturing after 10 years, short-run movements were around a definitely lower level in the sixties.

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1 For bonds maturing after 10 years, debt outstanding, the divisor for the rate of turnover in the fifties, was far smaller than if a final maturity definition had been used (less than half as large). In addition, the dealer data on trading was sometimes mistakenly classified by final maturity in the fifties. Thus, the rate of turnover of the debt in the fifties was overstated. Similarly, rate of turnover for coupon securities maturing within 1 year may have been understated in the fifties. The problem is minor in intermediate maturity classes because average debt outstanding was about the same on both bases.

For long-term securities the decline may have been caused by the overstatement of the turnover rate in the fifties that probably resulted from the statistical problems in the definition of debt maturing after 10 years. In all maturity classes short-run movements were more marked than any trend, and they were also more evident than in trading.

The volatility in the annual rate of turnover of the marketable debt, as well as in the daily average volume of trading, was generally greater in the fifties than in the sixties for all maturity classes, as can be seen in text Table 2 (page 17) which presents the coefficient of relative variation (i.e., the standard deviation of quarterly data expressed as a percentage of the mean). While this might be considered a sign of improved market performance in the sixties, it was a result of underlying economic conditions that have been shown to explain variations in trading and might easily be reversed as the rest of the sixties covers more phases of the business cycle. The Table also shows that the relative variation in turnover as in trading was larger in 5-10 and over 10 year bonds than in shorter maturities, thus implying that performance in the long-term market was subject to periods of greater deterioration and improvement than in the short-term market.

Multiple regression analysis was also used to relate the movements in this indicator to other economic developments. A much smaller part of the movement (usually about 30 to 60 per cent) was explained than for daily

average trading, in part because debt outstanding was incorporated into the indicator itself. Indeed, in the sixties no significant correlation was found for 5-10 year issues.

Much the same sets of variables were important in explaining the rate of turnover as were significant in explaining the daily average volume of trading. The volume of new issues sold to the public again caused higher turnover in intermediate- and longer-term issues, except sometimes when the financing occurred at the end of the quarter; and the volume of rights held by the public led to higher turnover in coupon issues maturing within 1 year and in 1-5 year issues in the sixties. Open market operations of official accounts exerted a positive influence on bills and 5-10 year bonds for the entire period and for the fifties; and for this indicator the positive relationship also held in the sixties for bills and bonds maturing after 10 years. Variables representing monetary policy, interest rate expectations, and tax swapping also had an impact on the turnover rate similar to that on daily average trading.

E. 16th Lowest Daily Volume of Trading

The average daily volume of trading, as well as the annual rate of turnover, may conceal discontinuities in daily trading, especially when the average is pushed up by a few days of heavy trading during a Treasury financing. Some market participants have claimed that advance refundings in the sixties have had just this result in the intermediate-

and long-term markets. They contend that although average trading has held up or increased, trading on days between financings has at times almost completely dried up. To appraise this criticism, special attention was given to days when trading was lowest; and as a market indicator, series were constructed to show the sixteenth lowest daily volume of trading in each quarter.[1] Daily trading would be below this level approximately 25 per cent of the time. Moreover, this indicator would be influenced by days of light trading and, in contrast to the average, would not be influenced by days when trading was heavy, unless, of course, trading was almost always heavy. A decline in this indicator in the sixties would imply greater discontinuities in daily trading and thus a deterioration in market performance, even if the average daily volume of trading increased.

The Profile Charts, however, show that this indicator rose and fell with the average daily volume of trading in all maturity classes. In no maturity class was trading on the 16th lowest day down in the sixties when average daily trading was up (see Table 1, page 15).

In longer maturities, however, the percentage increase was slightly smaller than in average daily trading. Average daily trading in bonds maturing after 10 years rose 25 per cent from the fifties to the sixties, while trading on the sixteenth lowest day rose 21 per cent. In the 5-10 year class the increases were 55 per cent and 52 per cent,

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[1] See Appendix Table 3 and Profile Charts.

respectively. It seems likely that this slightly smaller improvement in trading on the sixteenth lowest day than in daily average trading was at least partly a result of advance refundings since trading was concentrated during refundings and drawn away from other days. This is indicated in the Charts by the failure of trading on the sixteenth lowest day to rise proportionately with average daily trading at most peaks, as it would have if the higher average level had been evenly distributed throughout the quarter. Further consuderation reveals that frequently those peaks in trading were caused at least partly by Treasury financings.

For bonds maturing after 10 years, the only peaks in daily average trading where trading on the 16th lowest day rose as much as (actually relatively more than) the average were those in the 1953-54 and 1960-61 recessions when no Treasury financings took place in this maturity class. At other peaks in daily average trading, all of them associated with Treasury financings, the percentage rise in the daily average was greater than that in trading on the 16th lowest day. These impressions were confirmed by simple correlation coefficients between new issues sold to the public in Treasury financings and the ratio of trading on the 16th lowest day to daily average trading of -.666 in the fifties and -.561 in the sixties.[1]

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[1] Incidentally, in the sixties there was a correlation of -.412 between official transactions and this ratio, implying that official transactions also led to a wider spread between trading on peak days and trading on low days.

In the 5-10 year maturity class the impact of financings on the relationship between daily average trading and trading on the sixteenth lowest day is less obvious because there were more financings; and peaks in trading volume cannot be attributed as clearly to financings. Nevertheless, the ratio of trading on the sixteenth lowest day to daily average trading for 5-10 year bonds was low or falling from mid-1962 through 1963, in the third quarter of 1964, and early 1958--all periods of high trading and a large volume of Treasury financing.

To the extent that more long-term financings were accomplished in the sixties because of the advance refunding technique than in the fifties or than would otherwise have been possible, advance refundings can be said to have caused a larger difference between average daily trading and trading on the 16th lowest day. But as noted earlier this wider spread occurred at a time when both daily average trading and trading on the 16th lowest day were increasing sharply. Thus the rise in daily average trading, in part caused by financings, did not mask a disappearance of markets between financings; and although trading declined between financings in the sixties, even this level of inter-financing trading was substantially larger than in the fifties.

CHAPTER III

DEALERS' POSITIONS

A. Introduction

A primary characteristic of the U.S. Government securities market is the existence of dealers who take positions in securities in the process of accommodating buy and sell orders of investors, that is, in the process of making markets. While position-taking is not a necessary condition for the existence of a market--the simple bringing of buyers and sellers together is sufficient--it is clear that the quality of a market for securities is improved by functioning dealers. For the private investor it means a more liquid and a more marketable asset, one that can be bought (or sold) with little, if any, delay and that can be traded in large amounts with little price concession. Moreover, the sizable operations of the U.S. Treasury and the Federal Reserve might be precluded were there not dealers to underwrite Treasury financings and System sales as well as to enable System purchases.

Any deterioration in the willingness of dealers to operate should thus be viewed as a deterioration in the state of the market for U.S. Government securities. While the most direct way of studying this aspect of market performance would be through an analysis of the size of buy and sell commitments dealers make, together with the prices at which

they are made, and of the lag between dealer commitments and investor buy (or sell) orders, such data do not exist. Data on dealers' positions do exist, however, and the dealers' willingness to make commitments is closely related to positions. A large gross long position (the outright purchase and ownership of securities) indicates a willingness to buy while a large gross short position (securities borrowed in order to make a sale) implies a willingness to sell.

Net positions are gross long less gross short positions, and their size reflects primarily the extent to which dealers hedge gross long positions by selling short. If in fact short sales exceed securities owned outright, net positions will be negative. Therefore a decline in net positions need not necessarily imply decreased dealer willingness to make buy and sell commitments. Such a decline, for example, might result from rises in both gross long and gross short positions, but with gross short positions rising by a larger absolute amount. However, as a practical matter fluctuations in net positions often parallel those in gross long positions, since gross long positions, and changes in them, are usually much larger than gross short positions.

A rapid glance at movements in dealers' daily average net positions since the early 1950's, presented in the Profile Charts (pages 9-13) and in Appendix Table 4, underlines their two main characteristics: short-run volatility and a higher average level in the 1960's

as compared with the 1950's. In all market sectors, except for coupon issues due within 1 year, net positions rose quite sharply from the fifties to the sixties. As shown in Table 3, in the sixties dealers held daily net positions averaging $268 million in 1-5 year issues, one-third higher than in the fifties; of $98 million in 5-10 year issues, a three-quarter per cent rise from the fifties; and of $67 million in over-10 year issues, a 116 per cent increase over the fifties. In Treasury bills, dealers' daily net positions averaged $2.3 billion during the sixties, compared with only $.6 billion in the fifties.

Table 3

AVERAGE LEVEL OF DAILY NET POSITIONS*
(Dollar figures in millions)

	U.S. Government Securities Maturing:				
	Within 1 Year		1 - 5	5 - 10	After 10
	Bills	Other	Years	Years	Years
50's	603	343	201	55	31
60's	2,308	341	268	98	67
% Change	+ 283	- 1	+ 33	+78	+116

*Based on averages of quarterly data for 1'54 - 1'60 and for 4'60 - 3'66 shown in Appendix Table 4.

Data on gross positions were not practically available for the fifties. During the sixties, dealers' gross positions have fluctuated sharply, as shown in Appendix Tables 4a and 4b and in the following

Charts VI-VIII. By 1966 gross short positions were, in all maturity areas, at higher levels than in late 1960 while gross long positions were higher in some maturity areas and lower in others.

Apart from the obvious notation that dealers do indeed carry positions of some size, conclusions about shifts in dealers' willingness to take positions can in no case be drawn from such a simple inspection of the data. The sharp rise in net positions from the fifites to the sixites does not in and of itself indicate improved performance nor does the decline in some gross long positions over the sixties necessarily indicate a deterioration in dealers' performance. In the first place, the data on dealers' positions are not consistent from the fifties to the sixties, accounting for a large part of the rise in bill positions, and possibly for some of the rise in other maturity areas. More will be said of this data inconsistency later.

But over and above data problems, dealers will alter the size of their positions in an attempt to improve their earnings, and these explicable position movements should be viewed not as basic shifts in the performance of the dealer function but as the sine qua non for the maintenance of that function. For example, an inability to hedge, and indeed cut, long positions as security prices fall would result in such a severe impairment of earnings that a dealer firm could not long remain in business.

CHART VI: DEALERS' DAILY AVERAGE GROSS POSITIONS

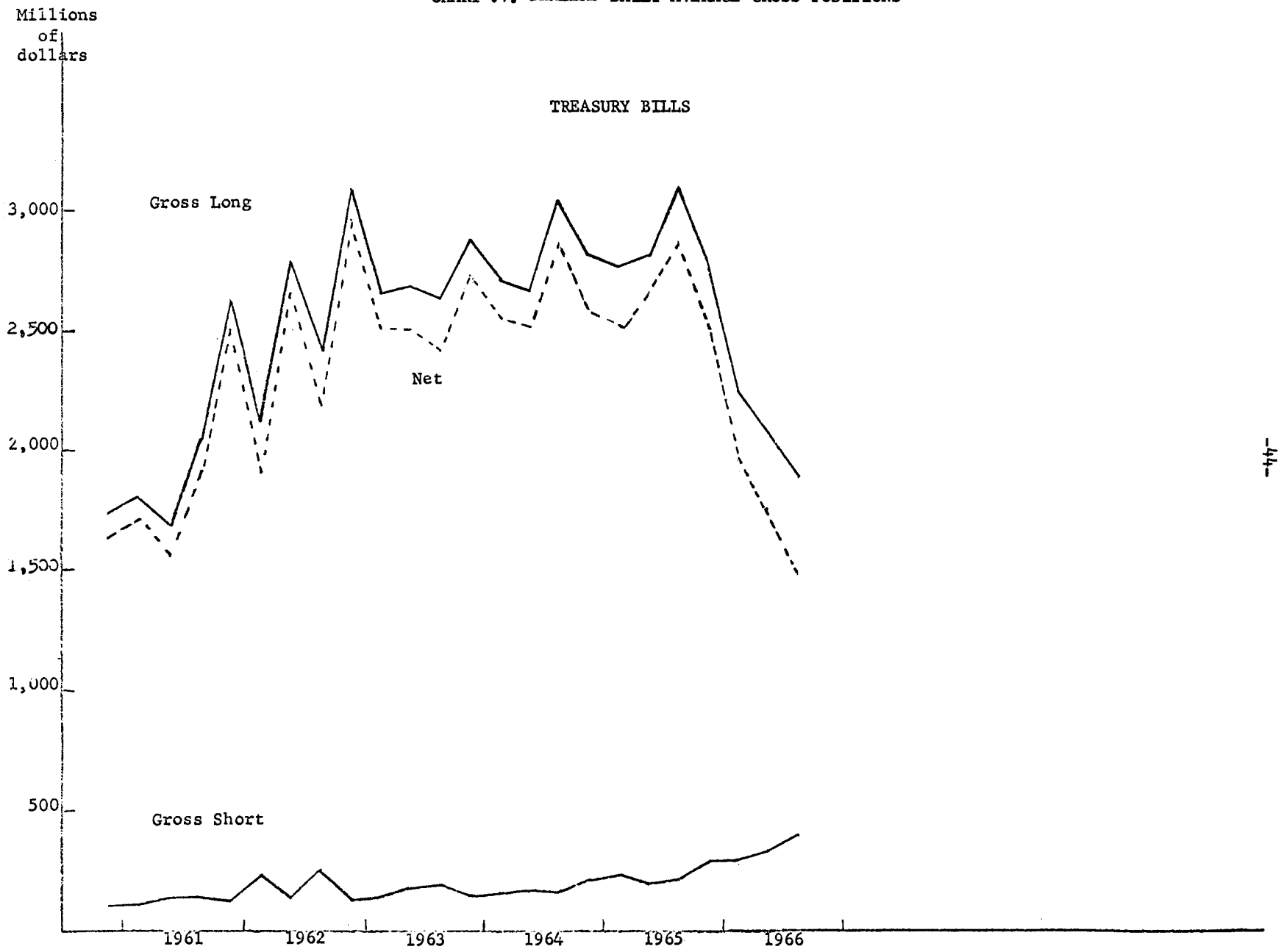


CHART VII: DEALERS' DAILY AVERAGE GROSS POSITIONS

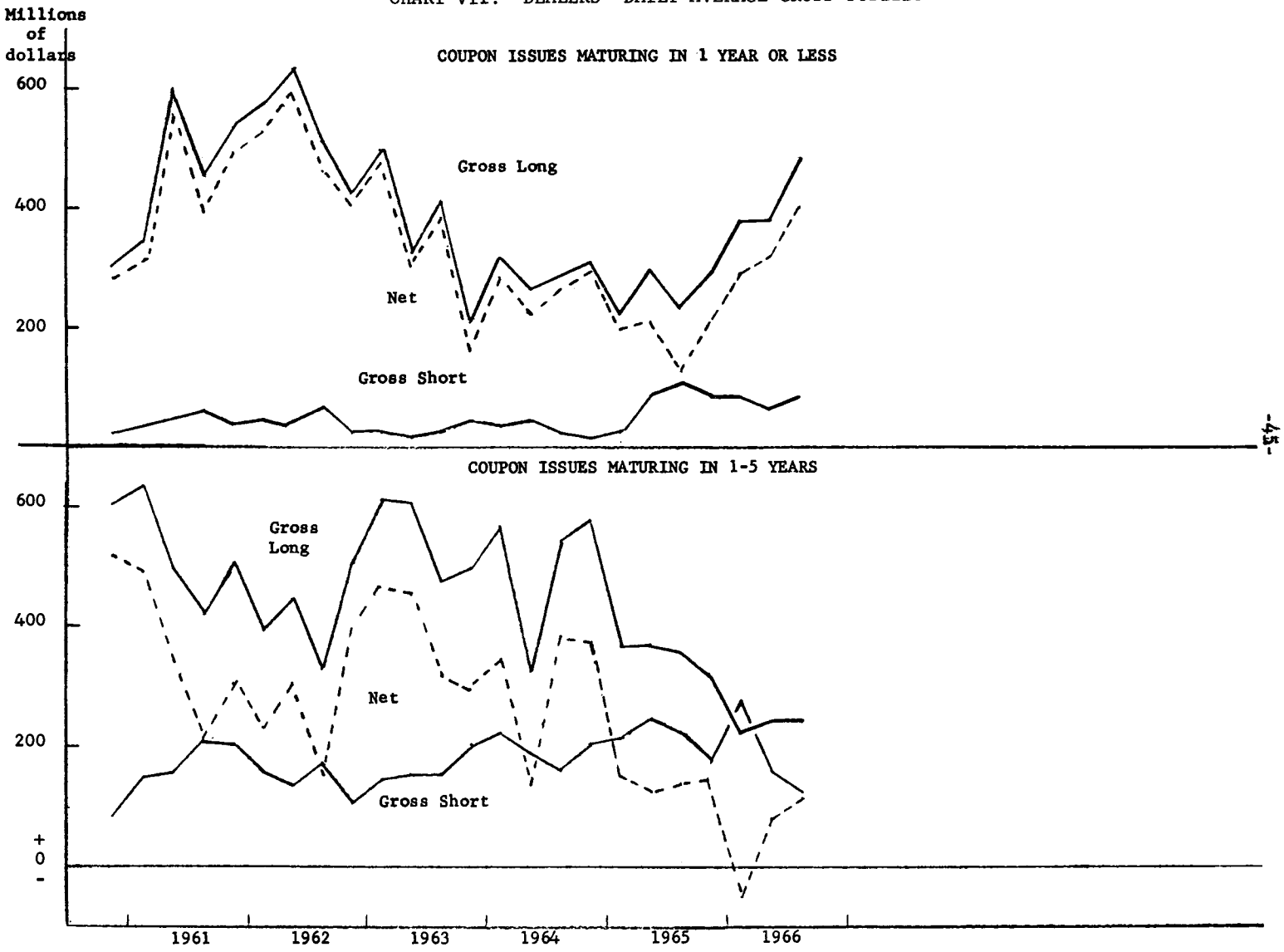
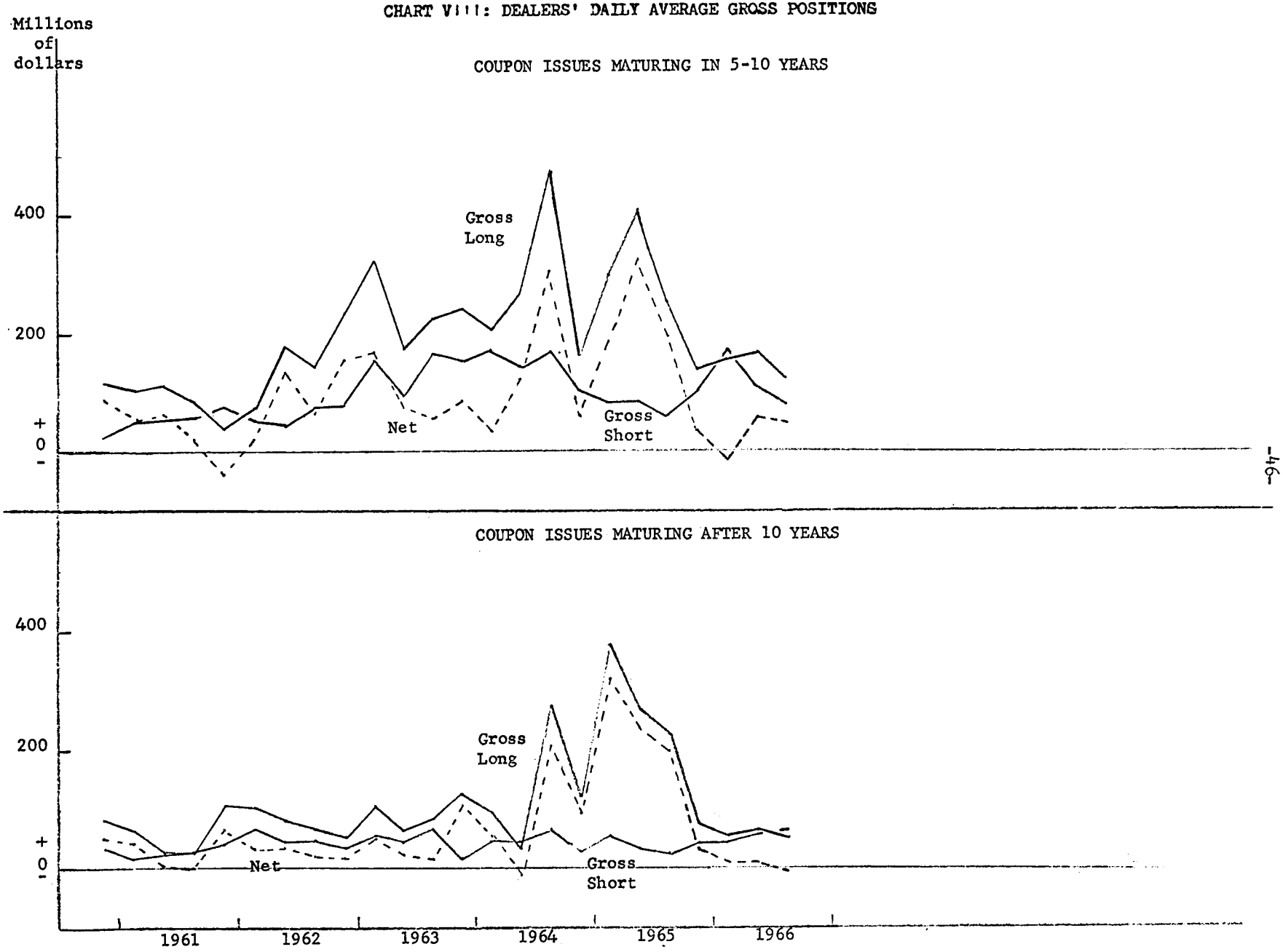


CHART VIII: DEALERS' DAILY AVERAGE GROSS POSITIONS



In what remains of this chapter a model of the determination of dealers' positions is formulated and estimated for the fifties and for the sixties. It attempts to ascertain the degree to which position movements can be explained by such factors as Treasury financings, Federal Reserve open-market operations, the financial environment including expected future interest rates and dealer financing costs, and the volume of trading in securities. The model, once estimated, can then be used to pinpoint causes of the observed changes in dealers' positions. Also, the model incorporates the position impact of several of the important factors composing the altered environment in the U.S. Government securities market during the sixties, such as greater stability of interest rates and Federal Reserve operations in coupon issues. Utilizing such analyses, a final section in this chapter attempts to draw some conclusions about dealer performance in the sixties as compared with the fifties..

B. The Model

Underlying the model of the determination of dealers' positions tested here are two primary assertions. First, it is claimed that dealers' daily positions on average over a quarter year are generally in equilibrium, namely that dealers' actual positions are equal to their desired positions. Such an assertion at first glance may seem at odds with the statement that in an efficiently functioning market the dealers will readily absorb investor buy and sell orders, even when such absorption

may lead to actual levels of dealers' positions that vary from the desired. These statements can be reconciled, however, by consideration of the adjustment process whereby dealer positions that diverge from the desired are brought to an equilibrium level. Given such a divergence, dealers could be expected to react by changing bid and offered security prices, in order to elicit greater net purchases or sales by investors and thus bring actual into line with desired positions.[1] This adjustment process could be almost instantaneous but, in any event, it would be very rapid relative to a period as long as a quarter year.

An added factor that allows dealers to remain basically in equilibrium and still rapidly satisfy investor orders is that the size of single investor[2] transactions is usually small in relation to dealers' positions, at least for short-term issues. Thus while it is likely that such transactions will be partially reflected in position levels, so that by the end of any day the actual position of a dealer will vary slightly from the desired, such a variance should be relatively minor. And in addition it should partially average out over the quarter. The variance of actual from desired positions should be greater on this account for longer-term bonds where the size of an individual transaction might

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1 The new level of security prices might of course also alter dealers' desired positions.

2 The model explicitly includes Treasury and Federal Reserve transactions which are large enough to affect dealers' positions significantly, and which may also alter the level of desired positions.

be large relative to dealers' positions.[1] When all is considered, some divergence between actual and desired positions probably occurs and, if so, the model tested here would be unlikely to explain fully the variance in dealers' positions.

Secondly, the model asserts that the desired level of dealers' positions is a function of profitability, and the basic economic factors influencing that profitability. In an extreme case of a sustained period of losses (involving at least several years), dealers might respond by withdrawing completely from the market or by reducing gross positions to minimal levels in an attempt to reduce losses while still remaining in business. In the more normal short-run situation, dealers will vary the size of their gross positions and the relationship between their gross long and gross short positions--and thus the size of their net positions-in order to augment profits (or reduce losses).

For purposes of analysis, dealers' profits (or losses) may be said to flow from three main sources: (1) speculative operations; (2) trading operations; (3) interest carry. Speculative profits (or losses) derive from capital gains and losses on the securities held by dealers as security prices fluctuate. A gross long position will bring

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1 In both long- and short-term sectors of the market, seasonal and cyclical forces may lead a wide range of investors to enter the market simultaneously on either the buy or sell side. Dealers' response to such investor transactions that are occasioned by the business cycle is likely to be reflected in changing security yields and prices rather than in a sustained deviation between desired and actual positions, since dealers could be expected to move with the market rather than against it. Strong seasonal net purchases or sales by investors are more likely to be reflected in dealers' positions, if dealers are aware of the seasonal nature of the transactions. To account for the latter possibility, seasonal dummies were included in the regressions and these were, in some cases, significant.

profits when security prices are rising (yields are declining) and a gross short position will bring profits when security prices are falling. Thus, when security prices are expected to fall in the near term, dealers' net positions should be relatively low (and possibly negative) as gross short positions are increased while gross long positions decline.

The certainty with which expectations are held should also have an impact on positions. Growing uncertainty about the interest rate outlook might well lead to a decline in gross positions and should certainly bring about increased hedging of gross long by gross short positions so that net positions decline.

Profits are also derived from trading. The size of such profits will depend on the volume of trading and the spreads between bid and offered prices, less trading costs. Enhanced profit opportunities resulting from either a greater volume of trading or wider spreads[1] should be associated with larger positions (gross and net), although this is more important as a factor underlying long-run position levels than as a factor in short-run fluctuations in positions. A potentially important factor influencing trading profits is the share of trading accounted for by small odd-lot transactions. Such transactions probably involve higher unit trading costs, though the higher costs could be offset by wider spreads. A shift in the share of debt held by commercial banks, which generally involves an opposite shift in the share of debt held by individuals who presumably account for the bulk of odd-lot transactions, might thus influence positions.

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1 Assuming, of course, that marginal revenue exceeds marginal cost.

Interest carry is also an important factor in the dealers' profit statement. Nonbank dealers finance their positions by borrowing short-term, generally from the major New York City Banks, from "outside" banks or from corporations.[1] They simultaneously earn interest on the securities they hold in position. When interest paid on the funds borrowed to finance the position is more than interest earned on the securities held there is a "negative carry"; when interest earned is greater than interest paid on borrowings there is a "positive carry". A rising negative carry or a falling positive carry should induce dealers to lighten their portfolios.

A theoretical framework accounting for the determination of dealers' positions would not be complete without allowing for the influence of Treasury financings and System and Treasury open-market operations. Dealers play a major role in underwriting Treasury financings. While it is difficult to conceive of large-scale financings without dealer underwriting, it must be noted that dealers would be unlikely to position newly-offered Treasury securities if they could not expect some profits, either speculative or trading, in subsequent market activity. The relationship between financings and positions is complex,[2] but in general positions (gross and net) will be positively related to financings unless the financing is very late in the quarter.

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1 See Louise Freeman, "The Financing of Government Securities Dealers" in the Federal Reserve Bank of New York, Monthly Review, June 1964.

2 The precise relationships will be detailed when the empirical results are presented.

Dealers also accommodate a large volume of System and Treasury trust fund market transactions. Such purchases and sales may have two distinguishable impacts on dealers' positions. In the first place, because official transactions on any one day are often large in relation to total market transactions and to dealers' positions,[1] they may cause dealers' positions to diverge temporarily from the desired level. This is likely to be the case when purchases and sales do not net out over the quarter, that is, when net purchases or net sales are considerable. Secondly, official transactions may cause a shift in the level of positions dealers desire to hold because of their impact on expectations of future security prices or the success of a financing and because of their possible effect on uncertainty.

The relative importance of these two impacts might well vary by maturity area: for bills and short-term coupon issues it is the first impact that should predominate while for longer-term coupon issues price and uncertainty effects would gain in importance. To further complicate matters, the impact on positions may vary depending on whether the transactor is the Federal Reserve or the Treasury, and on whether the Treasury transaction is in support of a financing. In the specific case

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1 Daily average official transactions over the entire quarter are minute compared to daily average total market transactions or dealers' positions, even in the bill area.

of Federal Reserve operations in coupon issues, undertaken in late 1960-early 1961 and largely concentrated on the buy side of the market, it would be expected that such purchases would induce dealers to hold larger gross long and net positions but smaller gross short positions, if indeed they have any noticeable impact.

C. Data and Empirical Results

A model of dealer behavior was estimated by the simple least squares technique, with quarterly data, for three separate time periods: 1954-1966,Q3; 1954-1960,Q1; and 1960,Q4-1966,Q3.[1] For every time period, regressions were calculated for each of the following maturity classes of U.S. Government securities: bills, coupon securities maturing in 1 year or less, securities maturing in more than 1 but less than or equal to 5 years, securities maturing in more than 5 but less than or equal to 10 years, and securities maturing after 10 years.

The dependent variables were daily average dealers' positions in U.S. Government securities. For the fifties and sixties together, and for the fifties, only net positions were analyzed. For the sixties, gross long positions (including repurchase agreements) and gross short positions were analyzed as well as net positions.

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1 The shorter periods subdivide the longer period into the fifties and sixties and also into periods for which the source of dealer data is the same.

While the specification of the theoretical model is reasonably straightforward, a number of problems were encountered in attempting to estimate the model. To allow the reader to reach his own conclusions about the reliability of the empirical results these problems are presented in some detail. They include both data insufficiencies and difficulties of measurement of the relationships, in particular multicollinearity.

1. Data

Data problems were encountered from the outset, due to the inconsistent reporting of dealers' positions. In mid-1960 the reporting basis was changed in certain respects and the number of reporting dealers was increased at the same time the trading series was changed as noted in Chapter II. Specifically, position data were supposed to be classified by the first call date of the U.S. Government security issues before mid-1960 and by the final maturity date of the issues thereafter. Moreover, repurchase agreements for all dealers and investment accounts for nonbank dealers were included in positions in the later period whereas dealer reporting practices in this respect were not uniform earlier.

The extent and direction of the bias in dealers' positions between the fifties and the sixties as a result of these statistical discrepancies varies. The omission in the fifties of one dealer with a substantial business led to an understatement of positions in the fifties when compared with the sixties, particularly in bills. The less comprehensive inclusion of repurchase agreements in the fifites also resulted in

an understatement of positions, primarily in bills and short-term coupon issues. Finally, the shift from a first call to a final maturity basis in reporting coupon issues meant an understatement of positions in over-10 year issues and an overstatement of positions in within 1 year issues during the fifties; the impact on intermediate-term issues is unclear. The net result of these various sources of statistical bias is to lead to a clear-cut understatement of dealers' positions in Treasury bills and to a lesser degree in over-10 year maturities in the fifties. The impact on other maturity classes is unclear but likely to also result in some understatement in the fifties, except perhaps for coupon issues maturing within 1 year.

This data problem is not present in the regression analyses of the two sub-periods, for which the data is consistent within each period.[1] In the regression analyses of the entire period, 1954-1966,Q3, a dummy variable equal to +1 in every quarter from 1960,Q2 through 1966,Q3 was introduced to account for the data discrepancy. In only one maturity class, that of Treasury bills, did this variable account for any significant change in dealers' positions. For bills, however, the effect of this dummy, and thus presumably the reporting shift, was substantial. In

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1 In comparing the two sub-periods, the data differences would presumably be reflected in a larger (positive) constant term for the sixties when compared with the fifties, ceteris paribus.

the period beginning with the second quarter of 1960, dealers' net bill positions have been higher by about $1.1 billion as a result.[1]

There are also some strategic data inadequacies concerning a number of the independent variables. The most serious shortcoming in this regard is an inability to satisfactorily measure dealers' expectations of future interest rates.

A number of variables were employed in this study to measure expectations. In general, these measures postulate that expectations of future movements in security prices are based on what has happened in past periods or on what is currently happening. The specific variables tested in the regressions were the change in interest rates in the preceding quarter,[2] and the current change in the discount rate and in free reserves.[3] In addition to allowing for expected changes in interest

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1 See Appendix Table 15, variable X_{34}. This dummy variable was the single most important determinant (as defined by the largest beta coefficient and partial correlation coefficient) of dealers' net bill positions for the whole 1954-66 period. The dummy could, however, be picking up other structural changes from the fifties to the sixties not specifically included in the regression as independent variables. As an alternative, a series on the number of reporting dealers was tried in the regressions. The number of reporting dealers varied between 16 and 21 during the 1954-66 period, and was greatest during the sixties. As with the dummy, it was found to be a significant determinant of positions only for Treasury bills. The dummy was used in the final regressions because use of the dealer series postulates a linearity assumption (positions rise by the same amount with each new reporting dealer) that is not valid.

2 The use of current interest rate changes would have improved the regression results but would at the same time have resulted in biased coefficients. The bias would occur since current interest rate changes may be a result, as well as a cause, of current position changes. For example, a rising negative carry might lead dealers to reduce their positions, in turn putting interest rates under upward pressure.

3 Changes in free reserves were tried in the regressions in an unadjusted form and also in a form that excluded all quarterly changes of less than $50 million. The latter form performed the best, as was expected, since dealers are aware that small misses in free reserves do not indicate a shift in monetary policy.

rates, the study incorporated a measure of expected stability in interest rates. A high frequency of small daily price or yield changes over the quarter indicates that near-term expectations are for relative stability in interest rates.

A measure of the certainty with which expectations are held is even more difficult to derive. Working from published data on daily yield levels, a series was constructed on the number of turning points in yields in the quarter weighted by the size of the turnaround. Or, to put it another way, the series is the summation over the quarter of the absolute sizes of turning points: $\sum_{t=1}^{n} |\Delta(\Delta i)|$

where i - interest rates
t - number of days in the quarter where Δi has changed direction.

The larger the number, that is the more daily interest rate changes shift direction and the greater the size of the shifts, the greater is the degree of uncertainty. In practice this variable is highly correlated (negatively) with the frequency of small daily price or yield changes, and thus the relative impacts on dealers' positions of the certainty with which expectations are held and expectations of rate stability cannot be separated.[1]

But these expectational measures leave much to be desired. Dealers' expectations are at least partly--and perhaps mainly--based on

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1 The simple correlation between this measure of uncertainty and the frequency of small daily yield changes for Treasury bills was -.78 in the 1954-66 period, -.64 in the 1950's, and -.84 in the 1960's. Differences between the two series arise when there are sizable and frequent one-directional movements in interest rates. Such movements should occur in certain stages of the cycle, increasing the frequency of yield changes but not affecting the measure of uncertainty. The decreased correlation between the two measures in the 1950's when compared with the 1960's may be explained in this light.

forecasts of policy actions, monetary or fiscal, and of credit demands that will not necessarily be related to current or past movements in these variables. Moreover, a quarterly period is too long to adequately allow for the much shorter time horizon dealers undoubtedly have in taking advantage of expected price (and rate) movements.

Measurement of the factors affecting trading profits presented a number of problems. A series on trading costs is not available and the series on spreads between bid and asked securities' prices originated for this study is not felt to be reliable enough to use in the regressions. While data on the volume of trading is available, it must be used carefully since (1) the volume of trading and positions increase simultaneously during Treasury financings; (2) there is probably a two-way relationship between trading and positions with position size having some influence on trading volume as well as the more important influence of trading on positions. For these reasons, this study for the most part utilized either the volume of trading during the preceding quarter or debt outstanding as a proxy for trading volume.

The difficulties in deriving series to measure interest carry (interest earned less financing costs) are almost innumerable. To begin with the financing cost side, series on nonbank dealer borrowing costs "out-of-town" are at best rough and the series on financing costs in

New York are largely based on posted rates, not rates actually paid.[1] In addition, bank dealers utilize internal funds, for which a cost is not available. Since dealer loan rates can often be considerably lower "out-of-town" than in New York, particularly when money is tight, a shift in the relative amounts borrowed in and out of New York can significantly alter interest carry.

From the interest earned side, shifts in the composition of the dealers' portfolio among specific Treasury issues can importantly affect interest carry. Because the portfolio composition is unknown, however, this study could use as a measure of interest earned only a simple unweighted average of market yields on bills (the latest 3-month, 6-month, and 1-year bills)[2] and an unweighted average of coupon rates on

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1 The posted rates will overstate dealer borrowing costs since dealers satisfy their borrowing needs at the lowest posted rates. Also, a wide use of repurchase agreements by the System will lower dealer borrowing costs. The several alternative measures of financing rates used in this study include: (1) the midpoint of posted loan rates on new loans in federal funds at the New York City banks; (2) the midpoint of typical posted loan rates on new and renewal loans at the New York City banks; (3) the midpoint of typical loan rates "out-of-town". Posted dealer loan rates at the New York City banks are reported daily to the Federal Reserve Bank of New York. "Out-of-town" rates are derived from informal reports of dealers to the Trading Desk at the New York Federal Reserve on the rates at which they cover the bulk of their financing needs; these rates are then passed on to the Federal Reserve Board where sometimes sketchy records have been kept.

2 The turnover of dealers' holdings of Treasury bills may be so great as to make this measure of carry on bills almost meaningless. To the degree dealers sell newly-auctioned bills prior to the payment date they incur no financing costs; for weekly auctions of 3-month and 6-month bills dealer sales begin on Tuesday and the payment date is Thursday. And since interest on Treasury bills accrues as the bill approaches maturity a rapid turnover may eliminate interest earned.

other outstanding Treasury issues.[1] From this measure of interest earned financing costs were then subtracted to yield a measure of interest carry.

2. Empirical results

As noted earlier, separate multiple regressions on dealers' net positions were calculated for three individual time periods (1954-1966, Q3; 1954-1960,Q1; 1960,Q4-1966,Q3) and for five individual maturity classes. For the period of the 1960's, regressions were also calculated for gross long and gross short positions. There are, therefore, 25 final equations, which are presented in Appendix Tables 15-20. In addition, for the sub-periods equations are included in the Tables using the same variables as appear in the equation for the entire 1954-66 period.

The number of observations, particularly for the sub-periods, was quite small relative to the number of variables specified in the theoretical model. For this reason, the final equations generally include only those variables that were significant at at least the 5 per cent level. In some cases, variables were included in the final equations if they were close to being significant and carried the expected coefficient sign and size.

The proportion of the variance in dealers' positions explained by the equations differs considerably by maturity category and by data period. The adjusted R^2 ($\bar{R}^2$) ranges from a high of .93 (for net positions

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1 The 1-1/2 per cent notes were not included in the average of coupon rates.

in Treasury bills during 1954-66) to a low of .38 (for gross short positions in coupon issues maturing within 1 year during the 1960's). Of the 25 final equations, $\bar{R}^2$ was at or above .75 in 7 equations and below .50 in 4 equations.[1] In every maturity category except for Treasury bills the variance in net positions in the two sub-periods was more fully explained than in the entire 1954-66 period taken alone.

It is difficult to characterize the overall reliability of the regression results. There was found to be no basis to reject a hypothesis of no serial correlation of the residuals in just under half of the final equations.[2] But in the remainder there was evidence of negative (in 5 of the 25 final equations) or positive serial correlation, thus raising some doubts about the true significance of the regression coefficients.[3]

A more serious problem is presented by the strong presence of multicollinearity.[4] It has resulted in the exclusion of some variables from the final equations that might actually be significant determinants

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1 Because of the small number of degrees of freedom in the equations for the sub-periods, there is a wide divergence between R^2 and $\bar{R}^2$. In most of the final equations for the sub-periods the unadjusted R^2 accounts for 5-10 per cent more of the variance in dealers' positions.

2 Based on Theil and Nagar's table, using 1 per cent significance levels.

3 Serial correlation of the residuals, while it leaves the estimated regression coefficients unbiased, results in an understatement of the computed standard errors and an invalidity of the usual significance tests.

4 In J. Johnston, Econometric Methods, page 201, multicollinearity is defined as ". . . the general problem which arises when some or all of the explanatory variables in a relation are so highly correlated one with another that it becomes very difficult, if not impossible, to disentangle their separate influences and obtain a reasonably precise estimate of their relative effects."

of dealers' positions and in these cases probably made the coefficients of certain of the remaining (multicollinear) independent variables larger, and of greater significance, than would have been the case. Multicollinearity in this study involves primarily the following independent variables: new issues in Treasury financings, the volume of trading and debt outstanding, official market transactions, and the frequency of small daily price and yield changes. During the period studied, and particularly beginning in the early 1960's, these variables in some maturity areas have all increased considerably. The problem was particularly serious for the Treasury bill sector during the sixties when the frequency of small daily yield changes by itself accounted for some 75 per cent of the variance in net bill positions--to the exclusion of all other theoretically important variables; since this was felt to be a nonsense result this variable was dropped from the final equation.[1] In interpreting the statistical results these data and estimation problems must be kept in mind. But these problems notwithstanding, the estimated model was for the most part consistent with *a priori* expectations.[2]

Expectations of future interest rates. Changes in security prices are probably the most important determinant of dealers' profits[3] and it is

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1 See Table 15.

2 There is one other known econometric study of dealers' positions: Ira O. Scott, Jr., Government Securities Market, McGraw-Hill Book Company, 1965. Comparison of the empirical results is difficult due to diverse specification and time periods, but the model's results do not appear to be inconsistent with the results of this study.

3 William Colby, Jr. "Dealer Profits and Capital Availability in the U.S. Government Secuirties Industry, 1955-65", Treasury-Federal Reserve Study of the U.S. Government Securities Market, 1967.

not with surprise therefore that expectations of future interest rates were found to be a critical factor in the determination of dealers' positions. An association between positions and expected changes in security prices was found to be significant in virtually every maturity category for every time period tested (1954-66; 1954-60; 1960-66). Text Table 4 summarizes the findings of this study on the position impact of dealers' expectations of future interest rates.

Daily average net positions in any quarter were negatively related to changes in yields last quarter (column 3 of the Table), implying that dealers expected the direction of rate changes last quarter to continue. Net positions were also negatively related to current changes in the discount rate (column 1) and positively related to changes in free reserves (column 2). In all cases, dealers expected past or current policies and interest rate movements to continue, and altered their positions accordingly. In doing so they were generally destabilizing as far as interest rates are concerned (at least for quarterly periods) but aided in the attainment of monetary policy targets.

The change in net positions associated with expectational currents resulted from movements in both gross long and gross short positions. When interest rates were expected to rise, gross long positions declined while gross short positions rose. Thus the size of the coefficient for rate expectations was always larger for net than for gross long positions.

TABLE 4

NET REGRESSION COEFFICIENTS FOR THE VARIABLES MEASURING EXPECTATIONS

Equation	(1) Change in discount rate (X_1) (basis points)	(2) Change in free reserves > $50 mil. ($X_2$) (millions of dollars)	(3) Change in interest rates in preceding quarter (X_3) (basis pts.)	(4) Frequency of small daily price & yield changes (X_4) (per cent)	(5) Uncertainty (X_5)
POSITIONS IN TREASURY BILLS					
Net: 50's & 60's		.51*		9.63**	
50's			-1.68**		
60's		1.60			-3.06
Gross Long: 60's		1.57*			-2.65
Gross Short: 60's		- .27**			
POSITIONS IN COUPON ISSUES DUE WITHIN 1 YEAR					
Net: 50's & 60's	-1.33**				
50's	-1.55**				
POSITIONS IN ISSUES DUE IN 1-5 YEARS					
Net: 50's & 60's		.31**			
50's	-1.91**				
60's			-2.52*		
Gross Short: 60's			1.78**	2.18**	
POSITIONS IN ISSUES DUE IN 5-10 YEARS					
Net: 50's & 60's			- .40	1.26*	
50's		.10*			
60's			-2.05**	2.23**	
Gross Long: 60's			-1.56*	3.05**	
Gross Short: 60's		- .25*			
POSITIONS IN ISSUES DUE AFTER 10 YEARS					
Net: 50's & 60's	- .56*			1.30**	
50's	- .43*				
60's			-3.12*	1.72**	
Gross Long: 60's			-2.46*	1.70**	
Gross Short: 60's	.31*			.49**	

NOTE: These coefficients for the expectational variables are as they appear in the final multiple regression equations, Tables 15-20. If any maturity category or period of time is not shown above, no expectational variable was found to be significant. The coefficients reflect an impact of $1 million on daily average positions over the quarter.

* : Significantly different from zero at 5 per cent level.

** : Significantly different from zero at 1 per cent level.

Because of multicollinearity only one of the three expectational measures was used in any one equation, and no great import should be attached to which particular measure entered. For most maturity categories, the expectational measure that was most significant in the fifties was the change in the discount rate while during the sixties it was the change in yields last quarter. Such a shift reflects at least partly the fact that during the sixties the discount rate was changed only three times,[1] and usually after the 3-month bill yield had risen above the discount rate.

During the fifties, expectations concerning future security prices were often the most important determinant of dealers' net positions. Expectations were not as important a factor during the sixties, at least in part because the economic climate led generally to expectations of interest rate stability and because some variables used to measure expectations were unusually stable.

As noted, expectations were a significant factor in position determination in all maturity categories. It would be anticipated, however, that expectations would be a more important factor in longer-term maturities, where relatively small yield changes involve sizable capital gains and losses. Generally, this was found to be the case. While the size of the coefficients of expectational variables was often

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1 During the 1954-1960 Q 1 period it was changed during 16 quarters.

smaller in the longer-term maturity areas, after allowing for the differences in average position size the impact of expectational factors on positions was considerably larger in percentage terms in the longer-term sectors.

As to expected interest rate stability, dealers' net positions (and in some cases gross long and gross short positions) were significantly influenced in a positive relationship by the frequency of small daily price and yield changes during the quarter[1] (column 4). This variable was significant only for Treasury bills and the longer-term coupon issues and only for the 1960's and the entire 1954-66 period.[2] In these cases, however, it has been one of the most important factors affecting movements in dealers' positions.

Through most of the 1960's, until about mid-1965, day-to-day rate stability increased sharply.[3] Its positive impact on positions certainly reflects the decreased risk of capital losses on gross positions inherent in greater rate stability: thus the significance for positions in longer-term issues. But in addition it probably reflects an attempt by dealers to increase the volume of trading--and trading profits--in a

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1 Small daily yield changes were defined as 1 basis point or less for Treasury bills and small daily price changes as 2/32 or less for over 5 year issues.

2 Its insignificance during the 1950's is not unexpected. Over the 1950's day-to-day rate stability decreased considerably. But expectations of greater rate instability would have a different directional impact on positions depending on whether expectations were for upward or downward movements in interest rates, and the 1950's was a period of alternating expectations.

3 See Profile Charts and Chapter IV.

period when speculative profits were restricted because of the lack of fluctuation in security prices: thus its importance for Treasury bill positions.

The variable constructed to measure uncertainty (column 5) was tested only in the Treasury bill and over 10 year maturity sectors. It was not significant in the latter sector but it was almost significant for Treasury bill positions in the 1960's--presumably as a substitute for the frequency of small daily yield changes which was not utilized in the final bill equation for the 1960's. In this case, as uncertainty increased, positions declined.

Trading and debt. The empirical results on the position impact of trading activity are not altogether satisfactory and, in addition, are rather difficult to evaluate. This certainly stems in part from the data difficulties noted earlier, but also from multicollinearity problems involving particularly debt outstanding but volume of trading measures as well. As a result, for a number of the final equations--most notably for the 1950's in intermediate-term maturities and for 5-10 year issues generally--no significant relationships were found between positions and trading. Table 5 summarizes the study's findings on trading and debt measures.

In only one maturity category, coupon issues due within 1 year, did such measures consistently and significantly account for some

TABLE 5

NET REGRESSION COEFFICIENTS FOR THE VARIABLES MEASURING TRADING PROFITABILITY

EQUATION	(1) Volume of trading preceding quarter (X_6) (millions of dollars)	(2) Volume of trading current qrtr. excluding financing days (X_7) (millions of dollars)	(3) Marketable debt, publicly-held, current qrtr. (X_8) (billions of dollars)	(4) Marketable debt, publicly-held preceding qrtr. (X_9) (billions of dollars)	(5) Ratio of debt held by commercial banks to total debt outstanding (X_{10}) (per cent)
POSITIONS IN COUPON ISSUES DUE WITHIN 1 YEAR					
Net: 50's & 60's			8.89**		6.66**
50's			11.17*		
60's		1.30**			7.15*
Gross Long: 60's		1.29**			7.22*
POSITIONS IN ISSUES DUE IN 1-5 YEARS					
Net: 50's & 60's			4.52*		
60's	2.23*				
Gross Long: 60's	2.22**				
Gross Short: 60's				8.99*	-8.16**
POSITIONS IN ISSUES DUE IN 5-10 YEARS					
Gross Long: 60's				10.31**	
Gross Short: 60's		1.04**			-12.31*
POSITIONS IN ISSUES DUE AFTER 10 YEARS					
Net: 50's	.95**				
60's			36.02**		
Gross Long: 60's			34.17**		
Gross Short: 60's	-.79**				9.71**

NOTE: These coefficients for the expectational variables are as they appear on the final multiple regression equations, Tables 15-20 . If any maturity category or period of time is not shown above, no trading variable was found to be significant. The coefficients reflect an impact of $1 million on daily average positions over the quarter.

* Significantly different from zero at 5 per cent level.

** Significantly different from zero at 1 per cent level.

of the variance in dealers' positions.[1] For these issues, trading was one of the most important determinants of positions. A $1 billion increase in publicly-held debt was associated with a $9 million rise in net positions of coupon issues due within 1 year in the 1954-66 period and with an $11 million rise in these net positions in the 1950's (column 3 of the Table). In the final equation for the 1960's, a $1.0 million rise in the volume of trading (adjusted to exclude financing days) was associated with a $1.3 million dollar rise in net positions (column 2).

In the sporadic cases where trading and debt measures were found to be a significant determinant of positions, the relationships with only one exception surprisingly indicated a more than proportional impact of trading on long positions. That is, a $1 million rise in trading occasioned a greater than $1 million rise in net positions.[2]

For issues maturing in more than 10 years, the coefficients of debt and trading appear out-of-line. Net and gross long positions in the 1960's are shown to rise roughly $35 million for a $1 billion increase in debt (column 3), far too large to fit in with theoretical expectations or the empirical results in other maturity categories. It may be that this coefficient in part is picking up a relationship of positions to Treasury financings in the form of advance refundings not accounted for solely by the use of a new issue variable.

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1 A trading measure was not tried in the regressions in the Treasury bill sector, in which the volume of gross new bill issues was instead utilized.

2 This conclusion was drawn in part by utilizing results from the study of the volume of trading in Chapter II, which includes estimates of the increase in the volume of trading for a given increase in debt outstanding. An increase in debt in every case increased positions by a greater amount than it increased trading.

It was suggested in an earlier section that profits from trading operations might be negatively related to the share of trading accounted for by investors who deal in odd lots. In addition, dealers might be able to hold smaller positions when the size of single transactions declines, even with a constant volume of trading. It was in fact found that as the share of debt held by commercial banks rose (and presumably the share of odd lot transactions declined), positions in some cases also increased, as shown in the Table's column 5. For net and gross long positions such a relationship was significant only for coupon issues maturing within 1 year. For gross short positions in intermediate-term maturities there was a negative relationship between a rising bank share and such short sales. This relationship is difficult to interpret since the share of outstanding debt held by banks moves sharply over the business cycle, rising during recessions when security prices are rising. As a result, the bank share may simply--and probably--be measuring expected changes in security prices.

Interest carry. Empirical results relating to interest carry were not completely satisfactory, again at least in part because of data inadequacies. The cost of--or profit from--carrying a position was found to be a significant determinant of dealers' positions in only some cases.

Most importantly was the Treasury bill sector, where net positions during the 1954-66 period and net and gross long positions

during the 1960's declined with rises in negative carry,[1] though the relationship was not always quite significant at the 5 per cent level. These results are shown in columns 4 and 5 of summary Table 6. The influence of carrying costs on bill positions was sizable, however, a 50 basis point rise in the negative carry leading to a $350-450 million decline in long bill positions.

For coupon issues maturing within 1 year and in 1 - 5 years long positions were in some cases significantly related to interest carry (including positive carry as well as negative). As positive carry increased (or negative carry decreased) by 100 basis points (1 percentage point), long positions rose by some $44-109 million (columns 1-3). In the longer-term maturity areas for the period of the 1960's, however, the opposite impact of carrying costs on positions was encountered: as positive carry declined and became negative, positions increased. While unexpected and perhaps inexplicable,[2] these results were too consistent and too significant to dismiss.

In most maturity categories, there was a significant and positive association between gross short positions and dealers' financing

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1 The series used included only observations for which the interest carry was significantly negative (financing costs> interest earned), deleting observations for which the carry was positive or a small negative. It was used because the variable including positive carry was not significant, perhaps as a result of multicollinearity. In any event, it might not be unreasonable to assert that while a high or rising positive carry would be an insignificant factor in position determination, a sizable negative carry would be important in a maturity area where positions are so large.

2 As negative carrying costs increase, the rise is usually the greatest for long-term issues as is the size of the negative carry. There is therefore no incentive for dealers to shift into the longer-term maturity areas in order to minimize losses from negative carry. While true of the 50's, during the 60's this pattern did not develop. The carry on longer-term securities was more similar to that on shorter-term issues, both as to level and change.

TABLE 6

NET REGRESSION COEFFICIENTS FOR INTEREST CARRY AND FINANCING COST VARIABLES

EQUATION	(1)	(2)	(3)	(4)	(5)	(6)
	Interest Carry[1/] (basis points)				Financing Costs (basis points)	
	X_{11}	X_{12}	X_{14}	X_{15}	X_{16}	X_{17}
POSITIONS IN TREASURY BILLS						
Net: 50's & 60's				7.32*		
60's			8.91			
Gross Long: 60's			7.81			
Gross Short: 60's			-2.10**			
POSITIONS IN COUPON ISSUES DUE WITHIN 1 YR						
Net: 50's		.52*				
Gross Short: 60's					.24**	
POSITIONS IN ISSUES DUE IN 1-5 YEARS						
Net: 50's & 60's		.44**				
60's		.92**				
Gross Long: 60's		1.09**				
POSITIONS IN ISSUES DUE IN 5-10 YEARS						
Net: 50's		.27**				
60's		-.43**				
Gross Long: 60's					.50**	
Gross Short: 60's					.19	
POSITIONS IN ISSUES DUE AFTER 10 YEARS						
Net: 60's	-.71**					
Gross Long: 60's	-.66**					
Gross Short: 60's						.31**

NOTE: These coefficients for the expectational variables are as they appear in the final multiple regression equations, Tables 15-20 . If any maturity category or period of time is not shown above, no interest carry variable was found to be significant. The coefficients reflect an impact of $1 million on daily average positions over the quarter.

* Significantly different from zero at 5 per cent level.

** Significantly different from zero at 1 per cent level.

1/ Interest carry variables were entered so that a positive coefficient indicates rising positions as positive carry rises or negative carry declines A negative coefficient indicates declining positions as positive carry rises or negative carry declines.

costs on long positions (columns 5-6). Since financing costs move with interest rates this relationship is probably another measure of interest rate expectations, although it may also reflect a need for dealers to go short in order to make sales when long positions have been reduced to low levels.

Treasury financings. The empirical results relating dealers' positions to Treasury financings and official operations in the market are not constrained by data inadequacies, as was the case for other independent variables. Interpretation of the results, summarized in Table 7, is not always straightforward, however.

The underwriting function dealers perform during Treasury financings has at times been the single most important determinant of their positions, and has often been one of the most important, for all maturities and for both the fifties and the sixties. For bills, the final equations show that dealers hold a $60-90 million higher level of daily average bill positions for every $1.0 billion rise in gross new bill issues (column 1). This relationship reflects not only the dealers' underwriting of Treasury bill auctions but the response of dealers to a sharply increased volume of market trading as bills outstanding have risen.

The impact on dealers' positions of Treasury financings in coupon issues is a more difficult one to sort out, since such financings

TABLE 7

NET REGRESSION COEFFICIENTS FOR TREASURY FINANCING VARIABLES

EQUATION	(1) Gross new bill issues (X_{18}) (billions of $'s)	(2) Rights held by public (X_{19}) (billions of $'s)	(3) New issues sold to public (X_{20}) (billions of $'s)	(4) New issues sold to public during last mo. of preceding qrtr. (X_{21}) (billions of $'s)	(5) New issues sold to public drng. last mo. of current qrtr (X_{22}) (billions of $'s)
POSITIONS IN TREASURY BILLS					
Net: 50's & 60's	62.03**				
50's	58.30**				
60's	85.58*				
Gross Long: 60's	92.55**				
POSITIONS IN COUPON ISSUES DUE WITHIN 1 YR					
Net: 60's			36.91**		
Gross Long: 60's			35.97**		
POSITIONS IN ISSUES DUE IN 1-5 YEARS					
Net: 50's & 60's		8.12*		35.65**	
50's			9.52	27.16*	
Gross Short: 60's			10.97*		
POSITIONS IN ISSUES DUE IN 5-10 YEARS					
Net: 50's & 60's			13.26**		-14.34*
50's			8.55*		
60's			13.64*		-21.17**
Gross Long: 60's			17.34**		-21.32**
POSITIONS IN ISSUES DUE AFTER 10 YEARS					
Net: 50's & 60's			33.95*		-46.04**
50's			34.70**		
60's			29.93*		
Gross Long: 60's			51.48**		-35.44
Gross Short: 60's			16.35**		

NOTE: These coefficients for the expectational variables are as they appear in the final multiple regression equations, Tables 15-20 . If any maturity category or period of time is not shown above, no financing variable was found to be significant. The coefficients reflect an impact of $1 million on daily average positions over the quarter.

* Significantly different from zero at 5 per cent level.

** Significantly different from zero at 1 per cent level.

may have both negative and positive effects. In "rights" refundings, dealers sell newly-offered securities over the period following the financing announcement and prior to the allotment of the new issues--usually a period of about 1 week. The immediate impact of the financing is thus to raise gross short positions and decrease dealers' net positions in the maturity category of the new issue. After the new issues are allotted, dealers' daily average long (gross and net) positions will be increased by an amount that will depend on the size of dealers' allotments less prior "when-issued" sales and the speed with which the new issues are sold. The impact on positions over the entire quarter will thus depend importantly on the specific date of the financing. In such exchanges prior to allotment, dealers' net and gross long positions will also be enlarged in the maturity category of the "rights". In cash offerings or cash exchanges dealers' gross long and net positions in the new issues will rise beginning 1 or 2 days after the books close.

Moreover, as a financing approaches dealers may make adjustments in their holdings of other issues not directly involved in the financing. This could be done by dealers either to maintain a balanced position in terms of different maturities--thus calling for sales of outstanding issues in the maturity area of the new issue--or to accommodate investor switching into the new issues.

Empirically, such mixed effects on dealers' positions were found. During both the fifties and sixties, Treasury financings were a significant

determinant of movements in dealers' positions. Dealers' daily average gross short, gross long and net positions increased with the volume of new issues (taken by public investors) in the current quarter (column 3). When the financing occurred in the last month of the quarter the positive impact was wiped out, as shown in column 5 of the summary Table, apparently mainly because dealers lightened their positions of other securities not involved in the financing.[1] Financings in the last month of the current quarter sometimes had a positive impact on dealers' net positions in the following quarter (column 4). The volume of rights was generally not a significant determinant of positions.

In a number of cases in the within 1 year and 1 - 5 year maturity areas financings did not have a significant impact on positions. This result is due, in all likelihood, to difficulties of measuring a financing impact that is surely significant in actuality. In these maturity areas, financings in certain of the data periods analysed occurred in almost every quarter. While the financings did vary in size, it is reasonable to suppose that dealers' positions are related more to the existence of a financing than to its size. Thus the true relationship was not capable of being measured statistically. When, in these maturity categories, financings were less frequent there was a significant positive impact on positions.[2]

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1 This statement is based on the fact that the negative coefficients for net positions resulted from a decline in gross long positions rather than an increase in gross short positions as would result from heavy purchases of "when issued" securities by investors.

2 It is probably for this reason that in the 1-5 year maturity area for the 1954-66 period positions were positively related to rights (column 2) rather than to new issues.

No great importance should be attached to the relative size of the financing coefficents. In the first place, their size is influenced by the particular timing within the quarters of the financings and by the mix between cash and "rights" exchanges, for any one period or maturity area. Secondly, if it is true, as postulated in the preceding paragraph, that dealers' positions are to some degree insensitive to the size of financings, the magnitude of the coefficient becomes difficult to interpret.

Official market transactions. Besides underwriting Treasury financings, dealers accommodate a large volume of System and Treasury trust fund market transactions. These transactions, as noted earlier, have a short-run position impact involving a decline in long positions with official purchases and a rise in long positions with official sales and a longer-run impact as well if such transactions lead to specific expectations about future security prices.

Table 8 summarizes this study's findings on the position impact of official operations. The reader will observe that these official operations appear in the final equations in a number of alternative forms: Treasury and Federal Reserve System separately or lumped together, and as total transactions (purchases plus sales), purchases, sales, or net purchases (purchases less sales). In the shorter-term maturity categories--bills and coupon issues due within 1 year--it was assumed that there would be no distinguishable impact on positions as between Treasury and System operations. Otherwise, these variables generally appear in the final

TABLE 8

NET REGRESSION COEFFICIENTS FOR OFFICIAL MARKET OPERATIONS VARIABLES

EQUATION	(1) Official Transactions (X_{23}) 1/ (mil. of $'s)	(2) Official Transactions (X_{24}) 2/ (mil. of $'s)	(3) Official Purchases (X_{25}) 2/ (mil. of $'s)	(4) Official Sales (X_{26}) 2/ (mil. of $'s)	(5) Official Net Purchases (X_{27}) 2/ (mil. of $'s)	(6) Fed. Reserve Transactions (X_{28}) 2/ (mil. of $'s)	(7) Fed. Reserve Purchases (X_{29}) 2/ (mil. of $'s)	(8) Fed. Reserve Sales (X_{30}) 2/ (mil. of $'s)	(9) Treasury Transactions (X_{31}) 2/ (mil. of $'s)	(10) Treasury Purchases (X_{32}) 2/ (mil. of $'s)	(11) Treasury Sales (X_{33}) 2/ (mil. of $'s
POSITIONS IN TREASURY BILLS											
Net: 50's & 60's	-7.81*										
60's		-.21*									
Gross Long: 60's		-.17*									
Gross Short: 60's		.05**									
POSITIONS IN COUPON ISSUES DUE WITHIN 1YR											
Net: 50's & 60's					-.11*						
50's					-.15*						
Gross Short: 60's			.08*	.05*							
POSITIONS IN ISSUES DUE IN 1-5 YEARS											
Net: 60's			-.35	-1.98*							
Gross Long: 60's			-.46**	-2.24*							
Gross Short: 60's										-.12	
POSITIONS IN ISSUES DUE IN 5-10 YEARS											
Net: 50's & 60's		.18**									
60's							.30*				
Gross Long: 60's							.31**				
POSITIONS IN ISSUES DUE AFTER 10 YEARS											
Net: 50's & 60's							.87				
60's							1.14*			.21*	-8.74*
Gross Long: 60's							1.29*			.16*	-6.23*
Gross Short: 60's										-.033*	

NOTE: These coefficients for the expectational variables are as they appear in the final multiple regression equations, Tables 15-20. If any maturity category or period of time is not shown above, no official operations variable was found to be significant. The coefficients reflect an impact of $1 million on daily average positions over the quarter.

* Significantly different from zero at 5 per cent level.

** Significantly different from zero at 1 per cent level.

1/ Daily average.

2/ Total for quarter.

equations in the most disaggregated form that permitted significant results. In other words, where, for intermediate- and long-term issues, Treasury and System operations are not separated it is because they were either not significant when separated[1] or were not significantly different as to coefficient size.

During the fifties, official transactions were a significant determinant of dealers' positions only for coupon issues due within 1 year. In this case, a rise of $1.0 million in official net purchases was associated with a $.15 million decline in daily average net positions over the quarter (column 5 of the Table). The insignificant position effect of official transactions for other maturity areas during the fifties probably reflects their limited extent. In the sixties, however, there was a very sharp rise in official operations in all maturity areas except for coupon issues due in 1 year, and they became a significant determinant of dealers' positions in all sectors of the market.

In the Treasury bill sector, official transactions led to a decline in dealers' net positions. During the 1954-66 period a rise of $1 million in official transactions on a daily average basis (column 1)

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1 Since Treasury and System transactions have been small relative to total market transactions a lumping together may in some cases enable significant results.

was associated with an $8 million decline in net positions.[1] For the sixties, official transactions were entered as totals, without adjusting them to a daily average basis. In this case, a $1.0 million rise in official transactions led to a $0.21 million decline in net positions (column 2).[2] The decline in net positions was the result of a $.17 million decline in gross long positions and a $.05 million rise in gross short positions. The decline in net positions in bills probably reflects the fact that in virtually every quarter during the sixties purchases of official accounts far exceeded sales, although official net purchases were not significant as an independent variable.[3]

For coupon issues due in 1 year, long positions during the sixties were not significantly affected by official operations. In this regard, it might be noted that in this coupon maturity category alone were official sales at all comparable in size to purchases. Gross short

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1 The large size of the coefficient indicates a multiple impact of daily average official transactions on net bill positions. It signifies that a large transaction by an official account on one day of the quarter will have an impact on dealers' positions lasting for more than one day. For example, should the System purchase $300 million on one day, dealers' positions might be lowered by $300 million the same day, by $250 million the next day and so on in a decreasing progression until dealers' positions have regained their "normal" level.

2 Adjusting this coefficient for the approximate number of trading days in the quarter would transform the coefficient of .21 to 12.0, somewhat larger than the coefficient for the 1954-66 period.

3 Perhaps net purchases were not sizable enough to be statistically significant. In 1965, for example, official net purchases of bills totaled $4.6 billion and official transactions in bills $11.4 billion; total transactions in the bill market were $347 billion.

positions were so affected, however, rising by $.08 million with a $1.0 million increase in official purchases (column 3) and rising by $.05 million with a $1.0 million rise in official sales (column 4). It would appear that official sales, which were concentrated in 1961-1962 as part of operation twist, might have led to expectations of rising yields on these issues, thus causing dealers to hold larger short positions.

Long positions in issues due in 1 - 5 years were negatively related to both official purchases and official sales. A $1 million rise in official purchases caused a $.35-.46 million decline in net and gross long positions (column 3), similar to the results for bills and coupon issues due in 1 year. A much larger $2.0 million decline in long positions resulted from a $1.0 million rise in official sales (column 4). As for shorter-term coupons, the bulk of official sales, while considerably smaller, were concentrated in 1961-62 and apparently led dealers to expect upward yield pressures on these securities.[1] Gross short positions were negatively related to Treasury purchases (column 10), though not to System purchases which were substantially larger.[2]

In the 5 - 10 year maturity area, dealers' net and gross long positions were positively related to System purchases:[3] a $1.0 million

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1 The bulk of official sales were by the Treasury. All official sales of 1 - 5 year maturities totaled $435 million during the 1960,Q4-1966,Q3 period. All but $98 million of the sales were during 1960-1962.

2 While larger, System purchases were concentrated in the 1961-63 period when official accounts were also selling these issues. Treasury purchases, on the other hand, were more concentrated in the 1965-66 period when rising interest rates brought the Treasury into the market to support its financing operations. There would seem to be little reason for Treasury operations of this kind to cause a decline in dealers' short positions; in fact, to the degree the Treasury operations involved purchases of "when-issued" securities prior to the allotment date, gross short positions would rise.

3 System purchases accounted for about 60 per cent of total official purchases of 5-10 year issues.

rise in purchases causing a $.3 million rise in positions (column 7). Over the entire 1954-66 period, total official transactions also led to higher net positions (column 2).

Official purchases led as well to higher net and gross long positions in bonds due in more than 10 years. A $1 million rise in System purchases was associated with a $1.14--1.29 million position increase (column 7) and a similar rise in Treasury purchases with a $.16--.21 million rise in positions (column 10). The smaller coefficient for Treasury purchases may imply that System operations have a greater impact on dealers' expectations; but it may also be a reflection of the concentration of Treasury purchases in financing periods when dealers' inventories are weighing on the market and the impact of such purchases might well be different in kind. But in any event it would appear that System and Treasury purchases bolstered dealers' expectations of rising bond prices and/or moderated any expectations that prices might fall. In reaction to this changed expectational environment, dealers desired to hold larger net and gross long positions of over 5 year issues.

It might be anticipated that such expectations would cause dealers to decrease their gross short positions. But no significant impact of System purchases on short positions was found, although Treasury purchases had the expected negative impact. A $1 million rise in Treasury purchases was associated with a very small $.033 million decline in gross short positions of over 10-year bonds (column 10). The absence of any

significant gross short position impact from System purchases in the face of a significant impact from Treasury purchases is similar to the results for 1 - 5 year issues. But for these over 10-year issues Treasury purchases during the sixties were 6 times larger than System purchases; nevertheless, System purchases seem to have been large enough to have a significantly measurable impact on dealers' long positions.

The System has not sold any securities maturing in more than 5 years but the Treasury has, on a few instances, engaged in very small market sales.[1] While it is difficult to judge the meaningfulness of the results due to the small number of observations, these Treasury sales did have a significant negative impact on net and gross long positions. A $1 million rise in sales was associated with a very sizable $6-9 million decline in long positions during the 1960-1966 period (column 11).

Several important conclusions emerge from this over-abundance of results on System and Treasury market transactions. Official operations in the short- and intermediate-term sectors were associated with declines in dealers' long positions while in the longer-term maturities they were associated with rises in long positions, despite the fact that net purchases predominated in most sectors.[2] We conclude from this that for

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1 The Treasury sold over 10-year bonds during 6 quarters of the sixties, with total sales aggregating only $30 million. During the fifties, Treasury sales were larger but had no measurable impact on positions.

2 For coupon issues due in 1 year sales were slightly larger than purchases.

the shorter-term sectors the relationship was simply one of official net purchases necessarily causing short-lived declines in positions while official purchases of long-term bonds influenced dealers' expectations of future interest rates in such a manner as to cause dealers' desired long position levels to rise.

Consistent with the rise in long positions would have been a cut by dealers in their gross short positions of over 5-year securities as official buying led to expectations of higher security prices. But such a decline in short positions was not always in evidence. In particular, System purchases had no significant impact on gross short positions. Treasury purchases had a small negative impact on short positions of over 10 year bonds but no effect on bonds due in 5 - 10 years.

As for official sales of securities, there is some evidence that they may possibly lead to sizable declines in dealers' long positions, at least when it appears to the dealer community that a rate objective is involved. This appeared to be the case in the intermediate-term sector where sales in the sixties had a negative impact on positions twice their size. But before any firm conclusions can be drawn about the position impact of official sales, more evidence is necessary. Moreover, in the within 1-year maturity area where official sales were largest there was no significant impact on long positions, though gross short positions did rise as a result.

D. Implications For Market Performance

This final section attempts to ascertain whether there has been any substantial shift from the fifties to the sixties in dealers' willingness to take positions. Specifically, have there been any shifts in position-taking that are evident within the framework of the model just presented or that cannot be "explained" by it? Secondly, have any of the factors in the changed market environment in the sixties--such as System purchases of coupon issues or greater price and yield stability--caused dealers to reduce their positions, ceteris paribus?

As discussed earlier, dealers' net positions have on average been at substantially higher levels in the sixties, for all securities except coupon issues due in 1 year. But, again with the exception of short-term coupon issues, the factors affecting dealers' desired position levels would in all cases have induced position increases.

The rise in net positions in Treasury bills from a daily average level of about $600 million in the fifties to one of $2.3 billion in the sixties can be explained essentially by two factors. Based on the equations, the changed reporting basis and larger number of reporting dealers in the sixties accounted for about a $1.1 billion rise in daily average positions. And secondly, the rise in gross new bill issues from a quarterly average of $21.4 billion in the fifties to $29.4 billion in the sixties would have induced a $500-700 million rise in daily average net positions.[1]

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1 It is likely that a portion of this rise should really be attributed to the increased day-to-day yield stability in the sixties.

For coupon issues it is more difficult to attribute the higher average net positions in the sixties to specific independent variables, since in many cases there was a shift between the fifties and the sixties in the specific variables which entered the equations. However, a number of observations seem in order.

Net positions in coupon issues due within 1 year were virtually unchanged from the fifties to the sixties, averaging about $342 million a day. These positions held constant, however, in the face of sizable declines in debt held by the public and the volume of trading, as well as in the volume of new Treasury issues in this maturity area. For example, the drop in publicly-held debt from an average $27.8 billion in the fifties to an average $20.4 billion in the sixties would, ceteris paribus, have caused a $70-120 million decline in average net positions of issues due in 1 year.

Dealers did decrease such positions progressively beginning in 1962 and by early 1965, when trading and debt outstanding in this sector reached a low for the sixties, dealers' net positions had dropped to about $200 million. With the increased financing activity in this area since late 1965 dealers have held considerably higher positions, of around $336 million during the first 3 quarters of 1966.

Dealers held net positions in issues due in 1 - 5 years of $268 million on average in the sixties, up from an average $201 million during the fifties. The contribution of specific variables to the rise in positions can't be quantified but the increased volume of financings,

trading and debt outstanding as well as the mid-1960 change in reporting of positions certainly played some role.

Among all coupon issue maturities, positions in longer-term securities increased most sharply in percentage terms from the fifties to the sixties: 5 - 10 year positions were up from $55 million to $98 million and over 10 year positions rose from $31 million to $67 million. One factor whose contribution to the higher positions can be quantified is the volume of new issues. For both 5 - 10 year and over 10 year bonds the increased volume of new issues in the sixties accounts for some $6-11 million of the higher net position levels.

Official operations in the market during the sixties were also a factor contributing to the higher net positions. System purchases of 5 - 10 year issues averaged $98 million per quarter and purchases of over 10 year issues averaged $19 million per quarter, as compared with virtually no System purchases during the fifties. Daily average net long-term positions, based on the equations, were probably some $20-30 million higher as a result. Increased Treasury purchases and decreased Treasury sales in the sixties may also have contributed to the position rise. In addition, the continual increase in day-to-day price stability throughout the sixties until mid-1965 probably contributed something to the higher positions, as did a rise in the volume of trading.

For all maturity areas except short-term coupon issues, then, the independent variables in general moved in such a manner as to induce

higher positions in the sixties when compared with the fifties.[1] But how much of a rise in positions would be explained by these factors is uncertain, and it is thus impossible to conclude whether any unexplained shift--either upward or downward--in dealers' positions occurred.

Movements in dealers' positions during the sixties were in general related to the same causative factors as in the fifties. But in a number of respects the environment in the U.S. Government securities market was altered in the sixties[2] and dealers reacted quickly. The greater day-to-day stability of security prices and interest rates, described in Chapter IV, led dealers to increase their net and gross long positions and in some cases their gross short positions. This was due to a decreased risk of capital loss on the positions but probably also to dealers' attempts to increase their trading profits at a time when chances for speculative profits were greatly reduced.[3]

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1 The impact interest rate expectations had on positions on average in the fifties and in the sixties is indeterminable. The fifties included two full business cycles while the sixties was largely a period of recovery from recession and renewed expansion at a moderate pace. Of the variables used in this study to measure expectations, average changes during the fifties and sixties were remarkably similar. Quarterly net free reserve changes averaged a negative $27 million in the fifties and a negative $20 million in the sixties. Quarterly interest rate changes were barely positive on average during both periods.

2 For a discussion of the altered environment see Edward C. Ettin, "The Financial and Economic Environment of the 1960's in Relation to the U.S. Government Securities Market", Treasury-Federal Reserve Study of the U.S. Government Securities Market, 1967.

3 That such profits were reduced is clear from the study of William Colby, Jr., op. cit. A long-term decline in such profit potential might ultimately cause dealers to withdraw completely from the market even though dealers' short-run response is to raise their positions.

The initiation of sizable System operations in coupon issues during the sixties was also associated with higher net and gross long positions in the long-term maturities, where operations were confined to purchases which apparently led dealers to expect higher security prices. These purchases showed no evidence of causing dealers to reduce their gross short positions. Very small declines in gross short positions were associated with Treasury purchases, however, which also rose considerably from the fifties to the sixties. And there was limited evidence that official sales of securities might have a downward impact on long positions.

Treasury innovations in the debt management area in the sixties--most notably advance refundings--do not appear to have been associated with any deterioration in dealers' position-taking. Dealers' underwriting of financings continued to be sizable, and of roughly the same magnitude during both the fifties and sixties.

It has sometimes been asserted that the increased competition for short-term funds during the sixties with the development of active markets in certificates of deposit and in federal funds led to a deterioration in dealers' positive carry (or rise in negative carry). The accompanying table indicates that carrying costs on long-term securities did indeed rise in the sixties. For shorter-term Government securities, however, while dealers' financing costs increased in the sixties, coupon rates and bill yields rose even more, thus causing a decline in negative

carry.[1] And it is in the shorter-term issues where carry is an important factor due to the size of these positions.

Average Interest Carry
(Basis points)

Period	Bills	Coupon issues due:			
		Within 1 year	1 - 5 years	5 - 10 years	Over 10 years
1954-60 Q1	-50	-45	-20	-34	13
1960Q4-66 Q2	-27	- 8	-10	-43	-16

NOTE: Interest carry uses dealer loan rates in New York on new loans; had rates on loans "out-of-town" been used the direction of movement in carry would have remained the same.

Moreover, it is difficult to attribute shifts in interest carry to any one factor. The shifts in carrying costs from the fifties to the sixties might, for example, reflect cyclical movements in the yield structure. During periods of tight money the term structure of interest rates is flat to backward-sloping, i.e., short- and intermediate-term rates approach and sometimes rise above long-term rates. The carry on long-term securities held in position thus automatically worsens. But generally in such periods the carry also moves against dealers on short- and intermediate-term issues, which was not the case. Perhaps the divergent movement in carry on short- and long-term securities from the

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1 A renewed warning must be issued about the inadequacies of the carry data, especially for bills.

50's to the 60's should be traced primarily to monetary and debt management policies. During the early years of the 60's, these policies were aimed at keeping short-term Treasury rates under upward pressure and long-term Treasury rates from rising. Simultaneously, substantial reserves were provided to the banking system, helping to keep dealer loan rates low relative to short-term market rates.

In conclusion, this study has found no evidence of any deterioration in dealers' willingness to take positions thus far during the sixties. Positions in most maturity areas were higher on average in the sixties than in the fifties, and in no cases were lower; and these increases could in broad outline be traced to movements in the factors that significantly affect position-taking. Moreover, the changed market environment in the sixties--involving greater day-to-day rate stability, System operations in coupon issues and debt management innovations--resulted in higher, not lower, position levels.

CHAPTER IV

OTHER INDICATORS

A. Frequency of Large and Small Daily Price Changes

Extremely large daily price changes have been considered undesirable because they often imply that the market lacks resiliency--that orders were not available to prevent wide price changes that presumably were out of line with true supply and demand conditions. On the other hand, a period of very small daily price changes has been criticized by dealers as eliminating the possibility for them to make short-run profits on technical price swings. In order to compare the fifties and sixties with respect to the extent of extreme price fluctuations, frequency distributions of daily price fluctuations in selected U.S. Government securities were constructed. One class out of each frequency distribution was selected to represent small changes and one to represent large changes, but movements for other classes would have been similar (see Market Profile Charts, pages 9-13, and Appendix Tables 5 and 6).

In all maturity classes of notes and bonds for which data were prepared, the frequency of small daily price changes increased very sharply in the sixties, particularly after mid-1962 and prior to mid-1965. In fact, for long-term bonds the frequency of small changes in 1963-65 was as great or greater than in 1950 before pegging was eliminated. Thus, from 1963 through most of 1965 daily price changes in

bonds maturing in 5 - 10 years and more than 10 years were 2/32 or less from 75 to 95 per cent of the time. In contrast, such small daily changes during the last half of the fifties occurred only 25 to 50 per cent of the time for bonds maturing after 10 years and 30 to 60 per cent of the time for 5 - 10 year issues.

Correspondingly, large daily changes (defined as $\geq$ 8/32 for over 10-year issues and 5 - 10 year issues and as $\geq$ 6/32 for 1 - 5 year issues) decreased in the sixties. Whereas from 1956 through 1960 large daily changes in long bonds usually occurred on 10 per cent of the days in the quarter and frequently on 20 to 40 per cent of the days, such large daily changes almost disappeared after mid-1962. Of course, towards the end of 1965 the pattern again changed, with large changes increasing and small changes decreasing.

Daily yield fluctuations in the 3-month Treasury bill showed the same pattern of increased stability in the sixties. From 1963 through 1965, a daily yield change of 1 basis point or less on 3-month bills occurred 70 to 92 per cent of the time. In the fifties the peak frequency of such small changes was 57 per cent. Generally such small changes were seen only 25 to 45 per cent of the time. Similarly, large daily changes in bill yields (greater than 5 basis points) occurred less than 2 per cent of the time from 1962 through 1965, compared to a typical frequency of 20 to 60 per cent from 1958-60 and 6 to 16 per cent in 1956 and 1957.

This pattern of price and yield stability in the sixties stemmed from a number of changes in the environment which have been discussed in another

part of the Government Securities Market Study.[1] To summarize briefly, stability in the long-term bond markets largely reflected specific expectations about Federal Reserve and Treasury policy and the business situation. Operation twist was popularly interpreted as an attempt by the Federal Reserve to prevent a rise in long-term rates. Moreover, moderate demands for credit and the absence of expectations of inflation lent added stability to rates. At the same time, the Treasury's eagerness to extend the maturity of the debt through advance refundings whenever the market situation appeared suitable was expected to temper any decline in rates, as was the continuing business expansion.

In the bill market, the authorities' desire to prevent large outflows of short-term funds for balance of payments reasons kept a floor under bill rates, while their objective of accommodating further credit and business expansion tended to keep bill rates from rising much. The publicity given these objectives tended to set up expectations that helped make their attainment possible. Also promoting day-to-day stability in bill rates was the growth of alternative short-term instruments and increased participation in the money market by many investors, both developments that increased the opportunities for arbitrage.

Thus, this indicator of market performance clearly confirms the statement of market participants, but judgments on whether such

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1 See "The Financial and Economic Environment of the 1960's in Relation to the U.S. Government Securities Market" by Edward Ettin.

stability was desirable are complex, depending in part on its impact on behavior of dealers and other investors. For example, there is some evidence that increased stability cut into dealer profits[1] which is undesirable, particularly over a sustained period. On the other hand, dealers apparently responded by holding larger positions, a development that usually implies greater speed in meeting investor orders but that may be risky if positions become exceptionally large relative to dealer capital.

B. Spread Between Quoted Bid and Asked Prices

Spreads between bid and offered prices quoted in the U.S. Government securities market are a key factor in the market's functioning. The size of the spreads is both an indicator of the willingness of dealers to make markets and a determinant of the participation of other investors in that market. A healthy market--one with "depth, breadth, and resiliency"--would be characterized by small spreads, but subject to some minimum level that would not preclude dealer profitability.[2] The smallness of the spreads could be taken as signifying dealer willingness to operate on both sides of the market, to take positions and to trade on the quoted spreads in size. A widening of spreads, on the other hand, might indicate dealer withdrawal from both sides of the market in an attempt to hold positions constant in the fact of extreme uncertainty or dealer desires to change their net positions sharply in one direction. In the extreme

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1 See "Dealer Profits and Capital Availability in the U.S. Government Securities Industry, 1955-65" by William Colby, Jr.

2 A reduction in spreads reduces dealers' trading profits unless the volume of trading rises correspondingly. Trading profits may be especially important when other dealer profits are limited by either high carrying costs or steadily rising interest rates.

case, the dealers would be performing as brokers, taking orders only on a work-out basis. Moreover, widening of spreads would increase investors' costs and give impetus to reduced investor participation in the market.

In the accompanying Profile Charts (pages 9-13) and in Appendix Table 7 spreads are shown for bills and for certain maturity categories of coupon issues. A note of caution must be introduced in interpreting these data, which are derived from published quotations. The published quotations overstate the size of the spread for all preferred customers, whose trades take place at "inside" quotations. Nevertheless, this published series provides the only evidence available on trends in spreads.

Dealers contend that spreads in the 1960's have decreased, at least for Treasury bills. They trace such a decline to increasing competition among the dealer community, to attempts to increase trading activity in a period when speculative operations were largely precluded by the unusual short-term stability in interest rates, and to a rising supply of securities in some maturity areas.

The data confirm the dealers' assertion of declining spreads for Treasury bills but not for other issues. Over most of the period beginning in 1961, the published spread between bid and offered market yields for Treasury bills has been only 2 basis points, though in the latter part of 1965 the spread did rise to 3 basis points. In the mid- to late-1950's, in contrast, the spread fluctuated between 3 and 4

basis points. The typical spread on coupon issues maturing in 6-13 months has generally held steady at 2/32 since the early 1950's, despite a decline in the outstanding debt and in secondary market activity in this maturity category. For issues maturing in 3-5 years the typical spread has also remained generally steady since the early 1950's, fluctuating around 4/32.

For issues maturing in 5 - 10 years, the spread increased in the late 1950's and early 1960's from a typical 4/32 to 8/32, where it remained until 1963 when it declined again to 4/32. In part this fluctuation represents the shifting composition of the issues in the 5 - 10 year maturity area towards high-coupon issues, on which spreads have been lower in recent years. Thus, since early 1961 the spread on high-coupon issues alone has remained steady at 4/32. The typical published spread on over-10 year issues rose to 8/32 in 1958 and has since remained there.

In general, then, the movement in spreads between bid and asked prices indicates some deterioration in market performance in long-term issues, at least for small investors, but this began in the late fifties and not in the sixties. Perhaps some short-run market improvement is implied by the decline in spreads on Treasury bills. A note of caution must be injected, however, in interpreting the decline in bill spreads as an unmitigated blessing. As one factor in dealer profitability, and an important one since the majority of trading is consummated in bills, the low level of spreads on bills at least prior to late 1965 could imply a long-run weakening of dealers' ability to function.

Table 1

Gross Dealer Transactions in U.S. Government Securities, by Maturity, Quarterly 1950-1966*

(Averages of daily data in millions of dollars)

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1950-I	350.3	193.8	107.1	21.4	94.9	767.4
II	344.2	150.7	129.7	14.4	105.7	744.7
III	433.2	460.1	144.0	27.2	119.1	1,203.6
IV	466.0	281.6	76.8	15.0	116.3	955.8
1951-I	410.6	182.8	85.7	16.0	179.2	874.4
II	381.6	201.2	59.1	7.7	72.1	721.7
III	422.3	140.9	46.2	6.1	39.6	655.1
IV	518.2	139.3	86.4	5.8	47.8	797.6
1952-I	477.7	189.7	51.1	6.2	49.1	773.9
II	523.1	193.3	49.9	43.7	82.5	892.6
III	452.7	211.8	45.3	57.4	28.3	795.3
IV	609.4	116.4	130.7	49.5	52.7	958.8
1953-I	597.6	164.0	46.9	27.7	21.0	857.1
II	520.9	189.6	43.7	29.3	40.8	824.3
III	465.3	228.4	80.0	21.3	31.3	826.3
IV	518.4	199.6	100.7	60.0	50.3	929.1
1954-I	619.7	413.6	150.0	101.4	64.1	1,348.8
II	609.3	222.5	179.2	78.0	58.8	1,147.8
III	528.3	172.5	123.3	90.1	35.9	950.1
IV	535.5	185.1	146.0	110.7	36.0	1,013.2
1955-I	490.7	196.4	137.9	80.9	67.4	973.2
II	529.2	152.2	138.2	56.8	21.7	898.2
III	473.9	129.8	145.4	90.3	36.5	875.8
IV	588.9	196.9	217.4	146.0	31.7	1,180.7
1956-I	588.7	166.8	149.2	69.7	21.6	996.1
II	544.3	140.7	132.5	71.7	18.3	907.5
III	515.3	176.1	116.3	68.1	14.7	890.5
IV	642.1	174.6	210.8	89.6	19.0	1,136.1
1957-I	727.1	183.4	102.3	18.2	10.7	1,041.7
II	619.6	162.2	103.6	20.5	13.2	919.0
III	651.4	171.6	92.7	19.5	14.8	949.9
IV	661.1	190.8	196.5	63.0	33.4	1,144.9
1958-I	641.3	292.9	196.4	100.6	54.0	1,285.1
II	620.0	295.7	324.3	163.0	44.6	1,447.5
III	625.8	215.2	125.4	79.1	51.8	1,097.4
IV	844.0	149.0	100.1	39.5	22.7	1,155.2

Table 1 - 2

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1959-I	877.6	216.8	269.9	80.4	38.3	1,483.0
II	780.0	130.1	173.8	33.9	21.1	1,139.0
III	793.6	145.9	179.1	28.0	13.8	1,160.5
IV	866.0	164.8	279.0	55.5	14.4	1,379.7
1960-I	876.9	191.3	222.1	24.7	11.2	1,326.2
II#	761.6	141.9	216.4	20.9	17.2	1,158.0
III	722.6	111.7	193.1	51.2	26.6	1,105.3
IV	908.7	163.5	313.1	63.2	33.8	1,482.5
1961-I	932.8	139.0	364.9	58.7	29.3	1,524.7
II	955.1	188.6	227.4	71.7	30.9	1,473.8
III	1,095.8	165.6	204.2	45.4	22.1	1,533.2
IV	1,161.5	176.8	263.9	37.5	37.5	1,677.4
1962-I	1,266.5	172.5	215.3	75.0	46.6	1,775.9
II	1,189.2	159.9	196.6	109.1	34.1	1,688.9
III	1,205.9	194.9	192.4	100.0	31.9	1,725.1
IV	1,259.7	155.5	296.1	195.8	32.6	1,939.8
1963-I	1,269.8	178.6	276.8	163.9	62.3	1,951.5
II	1,169.6	98.3	216.9	132.1	51.1	1,668.1
III	1,128.2	130.3	171.4	143.3	48.5	1,621.8
IV	1,230.8	71.1	197.9	125.2	37.8	1,662.9
1964-I	1,350.8	109.4	248.9	127.9	50.3	1,887.4
II	1,254.6	79.1	216.2	109.2	20.3	1,679.4
III	1,169.1	85.6	189.4	145.4	51.2	1,640.8
IV	1,435.4	69.1	222.4	121.9	43.3	1,892.3
1965-I	1,435.4	82.2	234.7	116.2	92.3	1,960.9
II	1,362.0	72.1	175.0	100.6	33.8	1,743.6
III	1,177.6	72.0	149.8	81.0	37.4	1,517.9
IV	1,626.1	89.0	219.2	110.3	34.7	2,079.3
1966-I	1,551.9	136.6	288.7	156.7	37.7	2,171.9
II	1,481.9	94.0	181.3	90.4	29.2	1,877.1
III	1,435.1	144.4	180.7	73.1	36.4	1,869.9

* Transactions include dealer purchases and dealer sales, but should exclude allotments of new issues, exchanges, maturities and repurchase agreements. Until mid-May 1960 securities were to be classified by first call date; but after mid-May 1960 they were to be classified by final maturity. Averages are based on the number of trading days in the quarter.

\# The estimates for the second quarter of 1960 are based on Securities Department data through May 13 and Market Statistics Division data after May 13.

Source: 1950 through mid-May 1960, Securities Department, Federal Reserve Bank of New York: mid-May 1960 on, Market Statistics Division, Federal Reserve Bank of New York.

Table 2

Annual Rate of Turnover of Marketable United States Debt*

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
1953 1					
2	6.65	1.13	.539	.480	.430
3	5.82	1.26	.816	.465	.321
4	6.62	1.13	.915	1.158	.531
1954 1	7.75	2.76	1.368	1.208	.732
2	7.19	1.76	1.771	.741	.697
3	6.75	1.45	.981	.828	.483
4	6.84	1.61	1.060	.895	.509
1955 1	6.27	2.30	.921	.542	1.111
2	6.76	2.13	.880	.355	.403
3	5.87	1.63	.953	.566	.649
4	6.92	1.80	1.534	.969	.556
1956 1	6.69	1.65	.936	.496	.395
2	6.52	1.39	.904	.486	.383
3	6.17	1.73	.849	.470	.308
4	6.92	1.52	1.367	.772	.401
1957 1	7.13	1.69	.566	.194	.226
2	6.12	1.51	.581	.219	.288
3	6.19	1.40	.567	.204	.388
4	6.17	1.58	1.125	.592	1.155
1958 1	6.19	2.29	1.223	.798	2.241
2	6.83	2.37	2.039	1.127	1.586
3	6.93	1.82	.769	.527	1.654
4	7.81	1.25	.559	.295	.734
1959 1	7.05	1.90	1.350	.676	1.149
2	5.81	1.22	.823	.315	.590
3	5.46	1.30	.832	.287	.378
4	5.56	1.43	1.254	.569	.437
1960 1	5.49	1.61	.896	.342	.349
2	5.22	1.53	.802	.340	.327
3	5.04	1.50	.762	.671	.368
4	5.85	1.95	1.310	.915	.411
1961 1	5.97	1.51	1.602	.821	.352
2	6.34	1.76	1.123	.793	.411
3	6.80	1.45	1.025	.549	.288
4	6.74	1.69	1.206	.553	.440

Table 2 - 2

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
1962 1	7.22	1.56	1.004	1.079	.542
2	6.87	1.35	1.020	1.306	.399
3	7.03	1.61	1.046	1.064	.397
4	6.80	1.55	1.539	1.766	.451
1963 1	6.47	2.04	1.415	1.329	.935
2	5.98	1.34	1.111	1.025	.703
3	5.91	1.65	.900	1.122	.664
4	6.13	.95	1.067	.956	.501
1964 1	6.41	1.59	1.280	1.021	.656
2	6.05	1.17	1.105	.877	.265
3	5.62	1.46	1.057	1.006	.641
4	6.46	1.12	1.199	.901	.562
1965 1	6.21	1.42	1.270	.848	1.161
2	6.08	1.26	.958	.750	.419
3	5.46	1.13	.850	.626	.468
4	6.99	1.28	1.252	.909	.439
1966 1	6.35	2.05	1.590	1.303	.478
2	6.33	1.49	.978	.772	.372
3	6.32	2.14	1.005	.650	.465

* For coupon issues the annual rate of turnover equals daily average gross dealer transactions multiplied by 249 divided by marketable U. S. debt held by the public. Until the middle of the second quarter of 1960 the debt is classified by first call, thereafter by final maturity. In the case of Treasury bills the divisor is bills outstanding.

Table 3

Sixteenth Lowest Daily Level of Gross Dealer Transactions*
In Each Quarter for Selected Maturity Classes
of U. S. Government Securities

(In millions of dollars)

	U. S. Government Securities				
Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
1953 1	441.5	122.0	31.4	20.7	15.9
2	357.6	138.1	21.9	18.0	23.6
3	313.4	160.7	46.0	10.2	19.3
4	378.1	138.5	76.4	35.5	30.3
1954 1	448.1	265.3	105.5	63.4	49.1
2	453.3	145.3	127.4	55.0	42.0
3	393.7	109.7	78.3	52.0	24.3
4	371.8	114.2	99.6	70.8	24.5
1955 1	353.4	106.8	88.7	52.3	27.1
2	367.5	110.0	88.1	42.0	16.1
3	305.2	83.0	111.0	64.2	20.0
4	401.7	135.6	154.8	110.9	22.4
1956 1	408.6	111.3	107.3	51.9	16.2
2	349.7	99.1	95.1	57.5	13.0
3	347.3	105.6	78.2	42.2	10.1
4	442.8	115.8	125.3	68.3	10.2
1957 1	536.2	95.7	75.0	11.6	7.2
2	440.7	88.6	69.9	14.3	7.7
3	453.4	105.1	52.1	11.2	6.5
4	482.2	117.5	147.5	39.0	20.3
1958 1	488.0	194.9	139.6	58.6	21.9
2	409.9	198.9	220.8	93.4	25.0
3	420.8	113.7	84.5	40.7	23.7
4	599.3	94.8	64.9	31.0	15.3
1959 1	639.1	133.1	198.1	51.7	24.3
2	591.6	84.1	118.9	21.3	14.1
3	574.0	93.4	112.5	19.2	9.0
4	626.0	105.8	210.7	36.9	10.7
1960 1	641.4	137.6	156.3	17.3	7.7
2	524.9	84.7	142.2	8.9	9.4
3	553.1	72.5	141.9	27.8	15.6
4	715.9	104.2	219.2	43.2	23.3

Table 3 - 2

Quarter	U. S. Government Securities				
	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years
1961 1	782.4	103.7	251.7	39.3	18.9
2	806.7	132.0	149.5	34.8	20.8
3	938.3	89.7	118.3	26.1	12.4
4	943.9	117.9	188.9	22.9	20.4
1962 1	1,026.8	108.9	150.9	52.7	22.2
2	978.0	98.8	148.7	86.1	22.9
3	962.5	109.5	128.3	60.0	23.1
4	1,020.5	88.7	235.8	139.1	20.0
1963 1	1,093.1	73.0	184.8	99.0	27.6
2	910.0	51.8	163.2	88.3	28.9
3	892.0	48.7	112.0	82.5	18.2
4	1,014.8	41.3	112.8	90.1	23.5
1964 1	1,098.2	47.9	190.6	90.8	27.3
2	1,007.5	44.7	158.0	65.8	11.7
3	963.7	30.4	109.3	83.1	27.1
4	1,138.7	40.1	156.3	80.8	27.4
1965 1	1,245.2	33.9	142.9	70.1	39.6
2	1,108.0	40.0	124.1	64.5	18.8
3	924.0	36.7	107.9	58.8	22.9
4	1,291.6	62.7	141.5	69.8	23.3

* Transactions include dealer purchases and dealer sales, but should exclude allotments of new issues, exchanges, maturities and repurchase agreements. Until mid-May 1960 securities were to be classified by first call date; but after mid-May 1960 they were to be classified by final maturity. Averages are based on the number of trading days in the quarter.

Table 4

Dealer Net Positions in U.S. Government Securities, by Maturity, Quarterly 1950-1966x

(Averages of daily data in millions of dollars)

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1950-I	406.9	383.5	255.3	15.1	15.3	1,076.0
II	423.4	387.8	364.7	6.6	9.7	1,192.2
III	491.7	345.7	153.7	-6.0	127.6	1,112.6
IV	424.7	261.0	107.3	-8.2	92.7	877.7
1951-I	491.1	231.0	174.2	9.6	98.3	1,004.2
II	400.6	292.2	67.9	2.3	16.6	779.5
III	667.3	404.5	75.0	3.0	41.6	1,191.4
IV	621.5	214.3	66.4	3.6	22.6	928.3
1952-I	337.8	132.1	7.1	16.3	25.1	518.3
II	585.1	414.3	59.3	32.7	93.7	1,185.1
III	467.2	320.5	73.6	54.5	16.5	932.2
IV	763.1	167.1	97.1	13.2	12.3	1,052.9
1953-I	575.5	253.5	41.6	60.5	1.7	932.9
II	683.9	169.1	63.2	53.8	14.4	984.4
III	691.3	391.6	106.9	27.8	26.7	1,244.2
IV	811.4	429.8	191.9	70.4	51.7	1,555.1
1954-I	572.9	486.4	173.8	222.8	34.7	1,490.5
II	612.3	455.3	309.1	199.8	36.7	1,613.2
III	785.4	575.5	295.3	134.8	17.4	1,808.4
IV	350.3	561.8	275.2	92.5	-2.3	1,277.5
1955-I	254.8	277.1	177.8	-7.8	60.0	761.9
II	448.8	232.3	160.4	-2.7	90.2	929.0
III	537.4	162.0	104.9	-12.8	72.8	864.4
IV	575.6	319.5	129.5	55.0	52.8	1,132.3
1956-I	460.1	304.9	239.6	61.0	18.1	1,083.8
II	606.7	258.8	296.1	39.5	1.7	1,202.9
III	516.8	251.5	165.5	32.9	-6.8	959.9
IV	435.3	188.7	160.6	12.9	4.5	802.0
1957-I	620.2	305.5	274.8	-38.0	13.3	1,175.9
II	614.4	321.9	227.7	3.1	1.0	1,168.0
III	709.4	414.3	103.8	5.3	4.7	1,237.5
IV	764.3	499.5	310.6	26.8	63.8	1,665.0
1958-I	868.4	574.7	266.5	113.2	109.2	1,932.0
II	949.8	531.5	384.6	178.8	153.7	2,198.3
III	620.0	188.0	101.5	77.0	31.5	1,017.9
IV	466.1	227.9	96.6	49.4	-0.5	839.5

Table 4 - 2

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1959-I	933.4	297.8	100.9	36.0	12.6	1,380.8
II	851.2	305.8	64.0	46.0	0.4	1,267.4
III	555.7	213.4	178.1	25.6	- 4.4	968.3
IV	458.7	331.3	233.0	24.0	0.9	1,048.0
1960-I	515.6	280.8	191.7	3.6	2.1	993.7
II#	904.6	379.5	491.7	25.2	29.1	1,830.1
III	1,683.2	330.8	619.3	102.0	12.1	2,747.6
IV	1,631.2	281.2	519.7	90.2	50.9	2,573.2
1961-I	1,703.0	311.0	489.1	54.9	42.7	2,600.9
II	1,552.6	553.1	340.2	63.3	2.8	2,512.0
III	1,918.4	394.9	211.6	21.7	- 0.5	2,546.2
IV	2,500.1	492.6	304.9	- 39.1	65.7	3,324.4
1962-I	1,909.6	529.6	232.2	22.3	33.1	2,726.9
II	2,652.9	597.3	307.8	134.6	34.8	3,727.5
III	2,182.5	461.0	155.1	66.5	20.0	2,885.1
IV	2,959.9	404.8	397.2	156.0	18.1	3,936.2
1963-I	2,513.8	477.1	466.2	169.1	50.9	3,677.2
II	2,500.9	304.5	451.9	77.5	22.5	3,357.5
III	2,431.0	384.9	318.9	56.2	16.2	3,207.2
IV	2,729.3	165.7	295.4	88.1	107.5	3,386.1
1964-I	2,553.4	286.5	347.6	34.8	51.6	3,273.9
II	2,512.6	223.0	136.1	122.6	- 13.1	2,981.3
III	2,868.4	267.9	381.3	303.0	206.7	4,027.5
IV	2,597.3	295.0	372.0	60.8	93.0	3,418.3
1965-I	2,513.7	199.9	154.0	217.6	318.3	3,403.7
II	2,616.5	210.0	125.8	323.3	234.7	3,510.5
III	2,873.4	125.7	133.8	197.6	198.5	3,529.2
IV	2,512.6	210.4	144.4	34.3	33.6	2,935.4
1966-I	1,949.2	290.0	- 53.7	- 13.3	9.5	2,181.6
II	1,730.6	317.5	81.3	56.4	11.5	2,197.3
III	1,484.9	400.4	115.7	46.3	- 4.3	2,042.9

* Data are on a commitment basis and include securities sold by dealers under repurchase agreement since mid-May 1960. From 1950 through the fourth quarter of 1960, however, some dealers may have reported differently. Securities were to be classified by first call prior to mid-May 1960 and by final maturity after mid-May 1960. Averages are based on the number of trading days in the quarter.

\# Estimated from Securities Department data through May 13 and from Market Statistics Division data after May 13.

Source: 1950 through mid-May 1960, Securities Department, Federal Reserve Bank of New York: mid-May 1960 on, Market Statistics Division, Federal Reserve Bank of New York.

Table 4a

Dealer Gross Long Positions in U. S. Government Securities, by Maturity, Quarterly 1960, Q4--1966, Q3*

(Averages of daily data in millions of dollars)

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1960-IV	1,734.4	302.4	603.2	118.5	81.8	2,840.3
1961-I	1,807.2	346.5	636.1	105.6	61.0	2,956.4
II	1,686.3	600.5	497.9	115.4	28.4	2,928.5
III	2,053.5	455.4	422.2	80.4	27.7	3,039.3
IV	2,627.1	532.3	507.4	39.7	107.3	3,813.9
1962-I	2,127.6	574.7	390.1	75.2	100.4	3,268.1
II	2,785.0	631.4	444.3	179.0	79.9	4,119.7
III	2,413.8	527.6	328.8	141.4	68.5	3,480.1
IV	3,087.6	426.7	504.1	235.4	51.5	4,305.4
1963-I	2,656.6	498.5	612.2	320.6	105.3	4,193.2
II	2,678.3	323.0	603.6	172.1	63.7	3,840.8
III	2,627.8	410.4	474.3	223.1	81.7	3,817.4
IV	2,873.0	209.5	497.8	240.2	125.9	3,946.4
1964-I	2,706.9	319.4	568.6	206.4	96.1	3,897.4
II	2,673.0	267.3	325.1	269.3	30.7	3,565.6
III	3,038.0	288.8	541.7	472.3	272.3	4,613.4
IV	2,811.6	310.8	576.6	162.2	121.7	3,983.2
1965-I	2,757.7	224.3	366.1	299.9	374.2	4,022.3
II	2,811.9	298.1	369.7	408.3	267.5	4,155.7
III	3,091.8	232.7	358.3	258.5	224.8	4,166.3
IV	2,796.6	294.2	316.8	137.2	76.5	3,621.4
1966-I	2,239.7	376.1	222.6	154.9	52.3	3,045.4
II	2,064.1	380.7	240.0	164.4	61.9	2,911.0
III	1,886.8	484.8	238.3	125.4	52.5	2,787.7

* Data are on a commitment basis and include securities sold by dealers under repurchase agreement. Averages are based on the number of trading days in the quarter.

Source: Market Statistics Division, Federal Reserve Bank of New York.

Table 4b

Dealer Gross Short Positions in U. S. Government Securities, by Maturity, Quarterly 1960, Q4--1966 Q3*

(Averages of daily data in millions of dollars)

Quarter	Bills	Other securities within 1 year	1-5 years	5-10 years	After 10 years	Total
1960-IV	103.2	21.2	83.4	28.3	30.9	267.0
1961-I	104.2	35.4	147.0	50.7	18.3	355.5
II	133.7	47.4	157.7	52.0	25.6	416.4
III	135.1	60.4	210.6	58.8	28.2	493.0
IV	126.9	39.7	202.5	78.8	41.6	489.4
1962-I	218.0	45.1	157.8	52.9	67.3	541.1
II	132.0	34.1	136.4	44.5	45.1	392.2
III	231.3	66.6	173.6	74.9	48.5	594.9
IV	127.7	21.9	106.8	79.4	33.4	369.1
1963-I	142.8	21.3	145.9	151.4	54.4	515.9
II	177.3	18.5	151.7	94.5	41.2	483.3
III	196.8	25.5	155.3	166.9	65.6	610.2
IV	143.7	43.8	202.3	152.1	18.4	560.3
1964-I	153.5	32.9	221.0	171.6	44.5	623.5
II	160.4	44.3	189.0	146.7	43.8	584.3
III	169.6	20.9	160.4	169.3	65.6	585.9
IV	214.3	15.8	204.6	101.4	28.7	564.9
1965-I	244.0	24.4	212.1	82.3	55.9	618.6
II	195.4	88.1	243.9	85.0	32.8	645.2
III	218.4	107.0	224.5	60.9	26.3	637.1
IV	284.0	83.8	172.4	102.9	42.9	686.0
1966-I	290.5	86.1	276.3	168.2	42.8	863.8
II	333.5	63.2	158.7	108.0	50.4	713.7
III	401.9	84.4	122.6	79.1	56.8	744.9

* Data are on a commitment basis. Averages are based on the number of trading days in the quarter.

Source: Market Statistics Division, Federal Reserve Bank of New York.

Table 5

Frequency of Large Daily Price (or Yield) Changes in Selected U. S. Government Securities*

(In per cent of observations)

Quarter	3 month bill (Change > 5 basis points)	1 - 5 year Governments (Change > 6/32)	5 - 10 year Governments (Change > 8/32)	After 10 year Governments (Change > 8/32)
1950 1	Not calculated	.0	.0	.0
2		.0	.0	.5
3		.0	.0	1.1
4		.0	.0	1.6
1951 1		1.6	3.3	8.2
2		.0	.8	4.2
3		.0	.0	3.7
4		1.6	1.6	6.0
1952 1		.0	.0	1.0
2		.0	.8	4.8
3		.0	.8	9.4
4		.0	.0	6.6
1953 1		.0	.0	4.9
2		.0	6.3	21.1
3		.0	3.1	4.6
4		.0	.0	15.5
1954 1		1.6	.0	13.1
2		2.4	4.8	11.9
3		.0	.8	1.6
4	3.2	.0	.0	.0
1955 1	14.3	1.6	3.2	11.9
2	4.8	.0	.0	1.6
3	4.7	1.6	8.6	8.7
4	13.3	1.7	3.3	6.7
1956 1	16.4	.0	5.7	7.3
2	12.5	2.3	11.8	14.1
3	14.3	.8	10.3	19.9
4	6.5	1.6	13.9	21.3
1957 1	16.4	13.1	16.3	34.4
2	6.3	4.0	7.9	18.3
3	10.9	3.9	9.4	16.4
4	11.3	12.8	26.6	31.5

Table 5 - 2

Quarter	3 month bill (Change > 5 basis points)	1 - 5 year Governments (Change > 6/32)	5 - 10 year Governments (Change > 8/32)	After 10 year Governments (Change > 8/32)
1958 1	29.0	2.4	4.0	16.9
2	20.7	4.8	7.2	27.0
3	37.6	25.8	35.9	37.6
4	26.2	7.3	18.8	36.1
1959 1	36.7	5.0	5.8	12.6
2	24.6	.8	5.3	8.4
3	36.9	1.5	4.6	10.7
4	36.1	5.8	16.3	23.8
1960 1	48.5	17.8	34.7	45.1
2	60.3	30.2	22.2	23.0
3	28.1	13.3	17.2	24.3
4	28.3	9.1	12.5	24.3
1961 1	14.8	7.3	8.1	14.0
2	10.9	10.2	9.4	11.7
3	1.6	.8	1.6	13.5
4	4.9	.8	3.3	5.7
1962 1	1.6	3.2	2.4	11.3
2	.0	2.4	9.5	13.6
3	1.6	.0	.0	6.4
4	1.6	.0	.8	2.4
1963 1	.0	.0	.5	.8
2	.0	.0	.0	.0
3	3.2	.0	.0	1.6
4	.0	.0	.0	.0
1964 1	.0	.0	.0	.8
2	.0	.0	.0	.0
3	.0	.0	.0	1.6
4	1.6	1.6	2.5	2.4
1965 1	.0	.0	.0	.0
2	.0	.0	.0	.0
3	.0	.0	.0	.0
4	1.6	1.6	3.2	9.0
1966 1	9.5	1.6	8.7	21.4
2	12.7	2.4	10.3	21.4
3	29.7	8.6	21.1	34.4

* The three month bill issue and usually two issues in each of the other maturity classes were used in the calculations. For the specific coupon issues see Table 5a.

Source: Daily quotation sheets prepared by the Securities Department, Federal Reserve Bank of New York and later by the Market Statistics Division, Federal Reserve Bank of New York.

Table 6

Frequency of Small Daily Price (or Yield) Changes in Selected U. S. Government Securities*

(In per cent of observations)

Quarter	3 month bill (Change 1 basis point or less)	1 - 5 year Governments (Change 1/32 or less)	5 - 10 year Governments (Change 2/32 or less)	After 10 year Governments (Change 2/32 or less)
1950 1	Not calculated	96.8	95.1	89.3
2		97.6	92.9	92.6
3		87.3	81.8	80.9
4		82.8	82.0	81.4
1951 1		81.1	77.1	72.1
2		76.5	78.1	69.3
3		96.8	87.3	60.8
4		82.0	86.1	60.1
1952 1		85.5	82.3	59.6
2		92.8	84.1	60.8
3		90.6	81.3	53.9
4		91.0	85.2	49.2
1953 1		88.5	88.6	49.1
2		71.8	71.9	38.2
3		92.3	86.9	65.4
4		93.4	86.9	40.1
1954 1		68.0	91.0	48.3
2		70.6	67.5	41.2
3		86.0	85.2	70.4
4	55.6	74.5	67.3	53.3
1955 1	41.3	56.4	61.9	47.6
2	42.9	71.5	71.4	63.5
3	40.6	63.2	60.1	53.7
4	41.6	61.7	50.0	57.5
1956 1	37.7	57.4	50.0	52.5
2	32.9	57.1	48.4	44.5
3	33.3	73.0	30.9	31.7
4	57.3	67.2	49.2	40.1
1957 1	37.7	32.8	36.1	24.6
2	39.6	54.8	61.9	34.1
3	40.6	57.8	53.1	37.6
4	46.8	39.5	33.1	26.6

Table 6 - 2

Quarter	3 month bill (Change 1 basis point or less	1 - 5 year Governments (Change 1/32 or less)	5 - 10 year Governments (Change 2/32 or less)	After 10 year Governments (Change 2/32 or less)
1958 1	30.7	51.6	55.7	39.5
2	33.3	42.0	64.2	31.7
3	18.7	13.3	32.8	28.9
4	36.1	39.3	38.5	29.5
1959 1	35.0	48.3	58.3	49.2
2	24.6	59.3	62.4	61.5
3	27.7	51.5	52.3	44.6
4	26.3	41.0	33.6	38.5
1960 1	8.1	25.0	18.5	19.4
2	8.0	19.0	34.9	32.5
3	17.2	25.8	43.7	36.8
4	16.7	29.2	47.5	40.8
1961 1	32.8	29.6	57.3	49.2
2	35.9	44.5	49.2	51.5
3	36.5	52.4	61.9	43.7
4	54.1	57.4	58.2	53.3
1962 1	50.0	60.5	58.0	41.9
2	58.8	62.7	46.0	34.1
3	61.9	69.0	74.6	61.1
4	80.3	82.8	69.7	65.5
1963 1	81.9	88.5	76.5	68.8
2	92.0	83.3	80.9	76.2
3	70.3	80.4	82.9	89.9
4	80.3	82.0	86.1	84.4
1964 1	86.9	78.7	83.6	87.7
2	85.9	76.6	77.3	89.9
3	81.2	87.5	86.0	86.7
4	77.1	87.7	73.7	72.1
1965 1	78.6	91.0	84.4	86.1
2	82.5	92.1	95.3	95.3
3	73.5	90.6	90.6	86.8
4	72.1	79.5	59.0	54.1
1966 1	49.2	52.4	43.7	38.1
2	55.6	65.9	49.2	40.5
3	26.6	46.1	35.9	26.6

* The three month bill issue and usually two issues in each of the other maturity classes were used in the calculations. For the specific coupon issues see Table 6a.

Source: Daily Quotation sheets prepared by the Securities Department, Federal Reserve Bank of New York and later by the Market Statistics Division, Federal Reserve Bank of New York.

Table 6a

Coupon Issues Used for Calculations
In Tables 5 and 6

Quarter	1 - 5 years		5 - 10 years		Over 10 years		
1950 1	2 12/52-54	1 3/8 N 3/54	2 7/8 3/55-60	2 1/4 9/56-59	2 1/2 6/62-67	2 1/2 9/67-72	2 1/2 12/67-72
2	"	"	"	"	"	"	"
3	"	"	"	"	"	"	"
4	"	"	"	"	"	"	"
1951 1	"	"	"	"	"	"	"
2	"	"	"	"	"	"	"
3	"	"	"	"	"	"	"
4	"	"	"	"	"	"	"
1952 1	"	"	"	"	"	"	"
2	"	"	"	"	"	"	"
3	"	"	"	"	"	-	"
4	"	"	"	"	"	-	"
1953 1	"	1 3/4 N 12/55	"	"	"	-	"
2	"	"	"	"	"	-	"
3	"	"	"	"	3 1/4 6/78-83	-	"
4	"	"	"	"	"	-	"
1954 1	2 3/8 6/58	"	"	"	"	-	"
2	"	"	2 1/2 "/61	"	"	-	"
3	"	1 7/8 N 2/59	"	"	"	-	"
4	"	"	"	-	"	-	"
1955 1	"	"	"	2 1/2 8/63	"	-	"
2	"	"	"	"	"	-	"
3	"	"	"	"	"	-	"
4	"	"	"	"	"	-	"
1956 1	"	"	"	"	"	-	"
2	"	"	"	"	"	-	"
3	"	"	"	"	"	-	"
4	"	"	"	"	"	-	"
1957 1	2 1/2 "/61	"	-	"	"	-	"
2	"	"	-	"	"	-	"
3	"	"	2 1/2 6/62-67	"	"	-	"
4	"	"	"	"	"	-	"

1958	1	2 1/2 "/61	3 3/4 N "/62	2 1/2 6/62-67	2 1/25 8/63		3 1/4 6/78-83	2 1/2 12/67-72
	2	"	"	"	"		3 1/2 2/90	"
	3	"	"	"	2 5/8 2/65		"	"
	4	"	"	"	"		"	"
1959	1	"	"	"	"		"	"
	2	"	"	"	"		"	"
	3	"	"	"	"		"	"
	4	"	"	"	"		"	"
1960	1	"	5 N 8/64	"	"		"	"
	2	2 5/8 2/65	"	"	-		"	"
	3	"	"	"	3 7/8 5/68		"	"
	4	"	"	"	"		3 1/2 "/98	"
1961	1	"	"	"	"		"	"
	2	"	"	"	"		"	"
	3	"	"	"	"		"	"
	4	"	"	"	"		"	"
1962	1	"	"	"	"		"	"
	2	"	"	4 8/71	"		"	"
	3	"	"	"	"		"	"
	4	"	"	"	"		"	"
1963	1	"	"	"	"	2 1/2 12/67-72	"	4 1/4 8/87-92
	2	"	3 5/8 N 2/67	"	"	"	"	"
	3	3 7/8 5/68	"	"	-	"	"	"
	4	"	"	"	-	"	"	"
1964	1	"	"	"	-	"	"	"
	2	"	"	"	-	"	"	"
	3	"	"	"	-	"	"	"
	4	"	"	"	-	"	"	"
1965	1	"	"	"	-	"	"	"
	2	"	"	"	-	"	"	"
	3	"	"	"	-	"	"	"
	4	"	"	"	-	"	"	"
1966	1	"	4 B 2/69	"	-	"	"	"
	2	"	"	"	-	"	"	"

Table 7

Spread Between Dealers' Quoted Bid and Asked Prices on U. S. Government Securities*

Quarter		3-Month Treasury bill	6-13 Month coupon issues	3-5 year issues	5-10 year issues	After 10 year issues
		(In basis points)		(Most typical spreads in 32nds)		
1950	1	4	n.a.	2	2	2
	2	4	n.a.	1	2	2
	3	4	n.a.	1	2	2
	4	6	n.a.	2	2	2
1951	1	6	n.a.	1	4	2
	2	8	n.a.	3	4	4
	3	4	n.a.	3	4	4
	4	4	n.a.	2	4	4
1952	1	8	n.a.	2	4	4
	2	6	n.a.	2	4	4
	3	3	n.a.	2	4	4
	4	4	2	2	4	4
1953	1	4	2	4	4	4
	2	5	2	4	4	8
	3	4	2	6	6	8
	4	3	2	6	6	6
1954	1	4	2	4	6	6
	2	4	2	3	4	6
	3	4	2	2	4	4
	4	2	2	2	4	4
1955	1	3	2	3	4	4
	2	4	2	2	4	4
	3	3	2	2	4	4
	4	4	2	4	4	4
1956	1	3	2	4	4	4
	2	4	2	4	4	4
	3	4	2	2	4	4
	4	4	2	4	4	4
1957	1	4	2	8	8	8
	2	4	2	4	4	4
	3	3	2	4	4	4
	4	3	2	4	4	4

n.a. - Not available.

Table 7 - 2

Quarter		3-Month Treasury bill	6-13 Month coupon issues	3-5 year issues	5-10 year issues	After 10 year issues
		(In basis points)		(Most typical spreads in 32nds)		
1958	1	4	2	4	8	8
	2	3	2	4	4	8
	3	4	2	4	8	8
	4	3	2	4	8	8
1959	1	4	2	6	6	8
	2	4	2	4	6	8
	3	4	2	4	6	8
	4	4	2	4	6	8
1960	1	3	4	4	8	8
	2	5	6	4	8	8
	3	3	4	4	8	8
	4	4	4	4	8	8
1961	1	3	4	4	8	8
	2	2	2	4	8	8
	3	3	2	4	8	8
	4	3	2	4	8	8
1962	1	3	2	4	8	8
	2	2	2	4	8	8
	3	2	2	4	8	8
	4	2	2	4	8	8
1963	1	2	2	4	8	8
	2	2	2	2	6	8
	3	2	2	2	6	8
	4	2	2	2	4	8
1964	1	2	2	2	4	8
	2	2	2	4	4	8
	3	2	2	4	4	8
	4	3	2	4	4	8
1965	1	2	2	4	4	8
	2	2	2	4	4	8
	3	2	2	4	4	8
	4	3	2	4	4	8
1966	1	3	2	4	4	8
	2	3	2	4	4	8
	3	3	2	4	4	8

* The quarterly series were derived from observations on the 15th of each month (for bills on the Wednesday closest to the 15th). The typical spread is the one which existed on the 15th of two out of the three months; or, if each spread was different, it is the middle spread.

Source: 1950-February, 1953, U. S. Treasury, Prices and Yields of Public Marketable Securities Issued by the U. S. Government and Federal Agencies; March 1953 to date, Board of Governors of the Federal Reserve System, daily quotation sheets.

Description of Multiple Regression Analyses Explaining Trading (. Chapter II)

Multiple regressions were calculated with quarterly data for three periods, 2'53 - 4'65, 2'53 - 1'60, and 3'60 - 4'65. The shorter periods subdivide the longer period into the fifties and sixties and also into periods for which the source of dealer data is the same.

The dependent variables were y_1, gross trading in U. S. Government securities (in millions of dollars); y_2, gross trading in U. S. Governments minus trading with the Federal Reserve and Treasury (in millions of dollars); y_3, gross trading in U. S. Governments with private customers, i.e. all customers except the Federal Reserve, Treasury, dealers and brokers (in millions of dollars);[1] and y_4, the annual rate of turnover of the marketable U. S. debt held by the public (for problem 101, total bills outstanding). Separate regressions were calculated to explain these dependent variables for each of the following maturity classes of U. S. Government securities: bills, coupon securities maturing in 1 year or less, securities maturing in more than 1 but less than or equal to 5 years, securities maturing in more than 5 but less than or equal to 10 years, and securities maturing after 10 years. Problems concerning these maturity classes were labeled 101, 201, 301, 401, and 501 respectively. The independent variables are listed in Table 8.

The regression program was a stepwise program which first enters the independent variable that causes the greatest reduction in the variance of the dependent variable, with other variables entered in the order of their contribution to the remaining unexplained variance. As a first approximation regressions were calculated using most of the relevant independent variables.

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[1] Calculated for 3'60 - 4'65 only.

Then additional regressions were run using only those variables that caused a significant reduction in unexplained variance when they were entered or that had a significant (at the 5 per cent level) net regression coefficient when all variables had been added.[1] The major results of these equations are presented in Tables 9 through 13. For the sub-periods results are presented both for equations using the same variables as the equation for the entire period and for equations with independent variables that were significant in the given sub-period.

[1] In a few cases variables that were not significant were included because they made others significant.

Table 8

List of Independent Variables for
Multiple Regressions of Trading (Chapter II)

Symbols	Problem	Variable	Unit
X_3 *	All	Federal Reserve and Treasury transactions, quarterly average of daily data	Millions of dollars
X_4 *	All, except 101	Rights to Treasury financings held by public, quarterly total	Billions of dollars
X_4	101	Rights in all maturity classes to Treasury financings held by public, quarterly total	Billions of dollars
X_5 *	All, except 101	New issues sold in Treasury financings to public, quarterly total	Billions of dollars
X_5	101	Dummy variable +1 if advance refunding in quarter	
X_6 *	All, except 101	New issues sold in Treasury financings in last month of preceeding quarter	Billions of dollars
X_6	101	Net change in bills outstanding from start to end of quarter	Billions of dollars
X_7 *	All, except 101	New issues sold in Treasury financings in last month of current quarter	Billions of dollars
X_8 *	All, except 101	Marketable debt held by public, average of end-of-month data for four months in and closest to quarter (maturity classification based on first call until 5'60 and on final maturity for 5'60 on)	Billions of dollars
X_9 *	101	Marketable debt outstanding, average of end-of-month data for four months in and closest to the quarter	Billions of dollars

Table 8 - 2

Symbols	Problem	Variable	Unit
X_{10}		Level of interest rates - quarterly average of monthly averages	%
	101, 201	Market rate on 3-month bills	
	301	Rate on 3-5 year Governments	
	401, 501	Rate on long-term Governments	
X_{11}	Same as for X_{10}	Change in interest rates in current quarter (based on weekly average for last week in quarter)	%
X_{12}	Same as for X_{10}	Change in interest rates in preceeding quarter	%
X_{13}	301, 401	Dummy variable - +1 in fourth quarter	
X_{14}		Frequency of small daily price changes in Governments	%
	101	% of observations in quarter with yield change of 2 basis points or less	
	301	% with change of 1/32 or less	
	401, 501	% with change of 2/32 or less	
X_{15}	All	Free reserves - quarterly average of monthly averages	Millions of dollars
X_{16}	All	Number of dealers in series	
X_{17}	All	Cost of financing at New York City banks, quarterly average	%

* Variable uses data for appropriate maturity class in each problem.

Table 9

Results of Multiple Regressions Explaining Trading in U. S. Treasury Bills

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors					
				X_9	X_3	X_{12}	X_{15}	X_{10}	X_{16}
Y_1									
50's & 60's	.957	46	1.48	20.59* (1.09)	3.36* (.90)	56.12* (18.98)	.086* (.029)		
50's	.859	23	1.44	19.13* (1.81)	4.43* (1.55)	27.19 (17.40)	.037 (.031)		
	.855	25	1.42#	18.86* (1.53)	5.08* (1.49)				
60's	.886	17	1.61#	34.25* (5.47)	2.74* (1.11)	147.00 (94.58)	.476* (.145)		
	.877	18	1.49#	38.77* (4.81)	2.96* (1.14)		.582* (.133)		
Y_2									
50's & 60's	.954	46	1.48	20.59* (1.09)	2.36* (.90)	56.12* (18.98)	.086* (.029)		
50's	.857	23	1.44	19.13* (1.81)	3.43* (1.55)	27.19 (17.40)	.037 (.031)		
	.852	25	1.42#	18.86* (1.53)	4.08* (1.49)				
60's	.874	17	1.61#	34.25* (5.47)	1.74 (1.11)	147.00 (94.58)	.476* (.145)		
	.864	18	1.49#	38.77* (4.81)	1.96 (1.14)		.582* (.133)		
Y_3									
60's	.919	18	1.89#	25.84* (3.16)		126.36* (55.21)	.299* (.085)		

Y_4								
50's & 60's	.409	47	1.39	.016*	.519*		-.511*	
				(.005)	(.137)		(.089)	
50's	.454	24	1.55#	.042*	.319		-.403*	
				(.014)	(.174)		(.109)	
	.403	25	1.53#	.044*			-.294*	
				(.015)			(.095)	
60's	.456	18	1.51#	.017*	1.734*		-.521*	
				(.007)	(.501)		(.184)	
	.652	18	1.85#		1.161*	.0022*		.415*
					(.404)	(.0004)		(.107)

* Significantly different from zero at 5% level.

\# No positive serial correlation. (The hypothesis of serial correlation is rejected at 1% significance level according to Theil and Nagar's table.)

Table 10

Results of Multiple Regressions Explaining Trading
in U. S. Governments (coupon issues) Maturing in ≤1 Year

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors						
				X_8	X_{10}	X_4	X_{11}	X_{12}	X_{15}	X_5
Y_1										
50's & 60's	.737	46	1.65#	4.07* (.74)	-24.75* (5.73)	3.78* (1.05)	-20.81* (8.79)			
50's	.702	23	1.59#	1.66 (1.06)	-11.66 (6.87)	9.76* (1.96)	-24.31* (9.30)			
	.735	24	1.57#			10.98* (1.68)	-25.07* (8.55)	-27.93* (9.84)		
60's	.873	17	2.62#†	4.39* (1.12)	-30.21* (9.80)	2.14* (.71)	13.03 (21.49)			
	.878	18	2.58#	4.60* (1.04)	-27.66* (8.69)	2.00* (.67)				
Y_2										
50's & 60's	.741	46	1.68#	3.97* (.73)	-24.47* (5.64)	3.79* (1.03)	-22.83* (8.65)			
50's	.715	23	1.68#	1.67 (1.04)	-11.99 (6.72)	9.59* (1.91)	-26.37* (9.11)			
	.738	24	1.61#			10.88* (1.67)	-27.21* (8.50)	-26.88* (9.79)		
60's	.865	17	2.54#†	3.61* (1.07)	-30.43* (9.38)	2.42* (.68)	17.72 (20.57)			
	.867	18	2.48#	3.90* (1.01)	-26.96* (8.41)	2.24* (.64)				
Y_3										
60's	.774	19	1.82#			1.47* (.54)			.098* (.013)	

Y_4					
50's & 60's	.424	48	1.45	- .186* (.043)	.032* (.009)
50's	.380	25	1.17	- .112 (.068)	.056* (.019)
60's	.518	19	2.44#	- .248* (.066)	.022* (.007)

* Significantly different from zero at 5% level.

\# No positive serial correlation. (The hypothesis of serial correlation is rejected at 1% significance level according to Theil and Nagar's table.)

† Probable negative serial correlation.

Table 11

Results of Multiple Regressions Explaining Trading
in U. S. Governments Maturing in 1-5 Years

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors						
				X_8	X_{15}	X_{13}	X_7	X_5	X_{12}	X_4
Y_1										
50's & 60's	.552	44	1.83#	3.60*	.043*	30.51*	-11.74*	6.36	-39.72	
				(.70)	(.021)	(15.15)	(5.94)	(3.42)	(20.33)	
50's	.510	21	2.04#	4.08*	.005	61.85*	- .85	9.97*	-97.04*	
				(1.12)	(.031)	(23.47)	(9.52)	(4.32)	(30.10)	
	.552	23	2.03#	4.02*		63.19*		10.11*	-99.80*	
				(.90)		(20.64)		(3.81)	(24.06)	
60's	.291	15	1.73	1.39	.086	22.68	- 8.09	3.92	-48.49	
				(2.67)	(.066)	(23.60)	(9.10)	(7.74)	(58.34)	
	.498	18	1.59#		.119*	52.06*				3.41*
					(.033)	(18.67)				(1.35)
Y_2										
50's & 60's	.545	44	1.87#	3.49*	.039	31.27*	-11.62*	6.32	-40.65*	
				(.69)	(.021)	(14.98)	(5.87)	(3.38)	(20.10)	
50's	.505	21	2.05#	4.06*	.006	61.00*	- 1.05	9.96*	-94.97*	
				(1.12)	(.031)	(23.46)	(9.52)	(4.32)	(30.09)	
	.547	23	2.05#	3.99*		62.64*		10.13*	-98.36*	
				(.90)		(20.64)		(3.81)	(24.07)	
60's	.276	15	1.73	1.76	.074	24.44	- 8.16	3.88	-49.85	
				(2.69)	(.067)	(23.75)	(9.15)	(7.78)	(58.70)	
	.481	18	1.58#		.112*	54.39*				3.49*
					(.034)	(18.91)				(1.36)
Y_3										
60's	.592	18	1.26		.086*	45.09*				2.52*
					(.022)	(12.11)				(.87)

Y_4								
50's & 60's	.261	47	1.92	.00029* (.00012)	.205* (.088)		-.259* (.121)	
50's	.292	24	2.15#	.00017 (.00018)	.294 (.146)		-.476* (.184)	
	.450	24	1.99#		.401* (.131)	.068* (.024)	-.671* (.146)	
60's	.115	18	1.60#	.00026 (.00019)	.155 (.096)		-.116 (.251)	
	.252	19	1.37#		.252* (.094)			.016* (.007)

* Significantly different from zero at 5% level.

\# No positive serial correlation. (The hypothesis of serial correlation is rejected at 1% significance level according to Theil and Nagar's table).

Table 12

Results of Multiple Regressions Explaining Trading in U. S. Governments Maturing in 5-10 Years

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors								
				X_8	X_5	X_{16}	X_{13}	X_3	X_{12}	X_{10}	X_{15}	X_6
Y_1												
50's & 60's	.719	45	1.50	2.84*	5.92*	7.82*	24.24*	4.69*				
				(.45)	(1.30)	(2.18)	(7.51)	(1.75)				
50's	.723	22	2.13#	3.05*	5.87*	10.09*	21.14*	6.10				
				(.55)	(1.50)	(4.77)	(8.68)	(3.03)				
	.815	21	1.81#	2.25*	3.90*		25.20*	19.34*	-58.52*			-16.53*
				(.42)	(1.37)		(7.38)	(4.69)	(20.03)			(4.67)
60's	.490	16	.92	3.94*	5.78	-2.16	27.10	2.09				
				(1.60)	(3.08)	(9.85)	(16.13)	(3.51)				
	.615	19	1.24	7.83*							.122*	
				(1.47)							(.042)	
Y_2												
50's & 60's	.705	45	1.50	2.84*	5.92*	7.82*	24.24*	3.69*				
				(.45)	(1.30)	(2.18)	(7.51)	(1.75)				
50's	.715	22	2.13#	3.05*	5.87*	10.09*	21.14*	5.10				
				(.55)	(1.50)	(4.77)	(8.68)	(3.03)				
	.809	21	1.81#	2.25*	3.90*		25.20*	18.34*	-58.52*			-16.53*
				(.42)	(1.37)		(7.38)	(4.69)	(20.03)			(4.67)
60's	.473	16	.92	3.94*	5.78	-2.16	27.10	1.09				
				(1.60)	(3.08)	(9.85)	(16.13)	(3.51)				
	.585	19	1.21	7.46*							.114*	
				(1.50)							(.043)	
Y_3												
60's	.511	19	1.30#	4.13*							.068*	
				(.93)							(.026)	

Table 12-2

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors							
				X_8	X_5	X_{16}	X_{13}	X_3	X_{12}	X_{10}	X_{15}
Y_4											
50's & 60's	.600	46	1.41		.058* (012)	.068* (.020)	.235* (.070)	.037* (.016)			
50's	.691	23	1.92#		.058* (.012)	.088* (.036)	.221* (.071)	.055* (.024)			
	.750	22	2.08#		.047* (.012)		.264* (.067)	.045* (.021)	-.413* (.184)	-.145* (.061)	
60's	None significant										

* Significantly different from zero at 5% level.

\# No positive serial correlation. (The hypothesis of serial correlation is rejected at 1% significance level according to Theil and Nagar's table.)

Table 13

Results of Multiple Regressions Explaining Trading
in U. S. Governments Maturing After 10 Years

Dependent variable and period	R^2 adjusted	Degrees of freedom	Durbin-Watson ratio	Net regression coefficients and standard errors								
				X_5	X_7	X_3	X_{16}	X_{10}	X_{15}	X_6	X_8	X_{12}
Y_1												
50's & 60's	.679	44	1.19	13.39*	-14.83*	2.61*	2.86*	- 7.58*	.0113*			
				(2.30)	(2.91)	(.92)	(1.02)	(2.85)	(.0046)			
50's	.776	21	1.90#	12.03*	- 7.35	8.37*	2.13	.086	.022*			
				(2.92)	(7.67)	(3.03)	(2.37)	(4.96)	(.006)			
	.857	21	2.00#	12.27*		6.50*			.016*	17.51*	.695*	-18.37*
				(2.39)		(2.53)			(.004)	(6.44)	(.294)	(7.28)
60's	.690	15	2.04#	14.81*	-16.30*	1.76	1.84	-19.92	-.020			
				(3.13)	(3.80)	(1.02)	(3.31)	(27.90)	(.016)			
	.666	18	1.53#	14.77*	-16.59*	2.08*						
				(2.97)	(3.34)	(.949)						
Y_2												
50's & 60's	.578	46	1.05	13.47*	-15.79*	1.87*			.0185*			
				(2.50)	(3.15)	(.92)			(.0044)			
50's	.772	23	1.86#	11.52*	- 7.78	8.07*			.024*			
				(2.84)	(7.50)	(2.92)			(.005)			
	.850	21	2.00#	12.27*		5.50*			.016*	17.51*	.695*	-18.37*
				(2.39)		(2.53)			(.004)	(6.44)	(.294)	(7.28)
60's	.675	17	1.98#	14.91*	-16.14*	.931			-.016			
				(2.74)	(3.09)	(.878)			(.008)			
	.618	18	1.53#	14.77*	-16.59*	1.08						
				(2.97)	(3.34)	(.949)						
Y_3												
60's	.590	18	1.24	7.39*	- 8.12*	.970						
				(1.69)	(1.90)	(.539)						

Y_4										
50's & 60's	.340	46	.547	.339*	-.346*		-.085*	.00033*		
				(.074)	(.095)		(.029)	(.00014)		
50's	.600	23	1.23	.445*	.080		-.216*	.0007*		
				(.108)	(.283)		(.069)	(.0002)		
	.715	23	1.20	.491*				.0002	1.015*	-.647*
				(.089)				(.0001)	(.231)	(.292)
60's	.585	17	1.37	.228*	-.242*		-.022	-.0003		
				(.045)	(.053)		(.045)	(.0002)		
	.647	18	1.25	.190*	-.204*	.033*				
				(.041)	(.046)	(.013)				

* Significantly different from zero at 5% level.

\# No positive serial correlation. (The hypothesis of serial correlation is rejected at 1% significance level according to Theil and Nagar's table.)

Table 14

List of Independent Variables for Multiple Regressions of Dealers' Positions

Symbol	Variable	Unit
X_1	Change in the discount rate	Basis points
X_2	Change in free reserves (based on quarterly averages of monthly averages), excluding all such quarterly changes less than $50 million	Millions of dollars
X_3*	Change in interest rates in preceding quarter (based on weekly averages for last week in quarter, except for 5-10 year maturity yields which were estimated from a constant maturity yield series). Yield series are for 3-month bills, 9-12 month, 3-5 year, 5-10 year, and over 10 year coupon issues	Basis points
X_4*	Frequency of small daily price changes in Governments--per cent of trading days in quarter with a yield change of 1 basis point or less for Treasury bills and with a price change of 1/32 or less for 1-5 year issues and of 2/32 or less for 5-10 and over 10 year issues	Per cent
X_5*	Uncertainty--measured by the number of turning points in the level of daily yields each weighted by the size of the turnaround, i.e., the summation over the quarter of the absolute sizes of turning points. Calculated for 3-month bills and over-10 year bonds	
X_6*	Volume of trading (daily average gross transactions in U. S. Government securities) during preceding quarter	Millions of dollars

Table 14 - 2

Symbol	Variable	Unit
X_7*	Volume of trading (daily average gross transactions in U. S. Government securities) excluding financing periods (for cash financings from the day after the books open through the payment date and for rights exchanges from the day after the announcement date through the payment date)	Millions of dollars
X_8*	Marketable debt held by the public; average of end-of-month data for four months in and closest to the quarter. Classified by call date prior to mid-1960 and by final maturity date thereafter	Billions of dollars
X_9*	Marketable debt held by the public during the preceding quarter; average of end-of-month data for four months in and closest to that quarter. Classified by call date prior to mid-1960 and by final maturity date thereafter	Billions of dollars
X_{10}*	Ratio of marketable Federal debt holdings of commercial banks to total marketable debt outstanding, classified by final maturity; ratio as of the end of preceding quarter. For issues maturing in more than 10 years, the ratio is based on commercial bank plus other large financial institution holdings of debt	Per cent
	Interest carry on dealers' long positions; estimated by subtracting dealers' financing costs from market yields (based on quarterly averages) or coupon rates (average of coupon rates observed in mid-quarter).	

Table 14 - 3

Symbol	Variable	Unit
	Several alternative series on financing costs were available thus forming a variety of different variables measuring interest carry. A positive number indicates positive carry and a negative number, negative carry:	
X_{11}*	Using average coupon rates and an average of financing rates in New York City and "out-of-town "	Basis points
X_{12}*	Using average coupon rates and financing rates posted on new loans in New York City	Basis points
X_{13}*	Using market yields and average financing costs in New York City	Basis points
X_{14}*	Using market yields and an average of financing costs in New York City and "out-of-town"; entered only negative carry values	Basis points
X_{15}*	Using market yields and "out-of-town" financing costs; entered only negative carry values	Basis points
X_{16}	Dealer financing rates posted on new loans in New York City, quarterly average	Basis points
X_{17}	Dealer financing rates in New York City and "out-of-town" averaged	Basis points
X_{18}	Gross new bill issues, quarterly total	Billions of dollars
X_{19}*	Rights to Treasury financings held by public, quarterly total	Billions of dollars

Table 14 - 4

Symbol	Variable	Unit
X_{20}*	New issues sold in Treasury financings to public, quarterly total	Billions of dollars
X_{21}*	New issues sold in Treasury financings to public in last month of preceding quarter	Billions of dollars
X_{22}*	New issues sold in Treasury financings to public in last month of current quarter	Billions of dollars
X_{23}*	Official (Federal Reserve and Treasury) transactions with dealers, quarterly averages of daily data	Millions of dollars
X_{24}*	Official transactions with dealers, quarterly total	Millions of dollars
X_{25}*	Official purchases from dealers, quarterly total	Millions of dollars
X_{26}*	Official sales to dealers, quarterly total	Millions of dollars
X_{27}*	Official net purchases (+) or sales (-) with dealers, quarterly total	Millions of dollars
X_{28}*	Federal Reserve transactions with dealers, quarterly total	Millions of dollars
X_{29}*	Federal Reserve purchases from dealers, quarterly total	Millions of dollars
X_{30}*	Federal Reserve sales to dealers, quarterly total	Millions of dollars
X_{31}*	Treasury transactions with dealers, quarterly total	Millions of dollars
X_{32}*	Treasury purchases from dealers, quarterly total	Millions of dollars

Table 14 - 5

Symbol	Variable	Unit
X_{33}*	Treasury sales to dealers, quarterly total	Millions of dollars
X_{34}	Dummy variable--+1 in all quarters 2'60--3'66 to measure the effect of the increase in the number of reporting dealers and other less important revisions in the dealer position series	
	Dummy variable for seasonal:	
X_{35}	+1 in first quarters	
X_{36}	+1 in second quarters	
X_{37}	+1 in third quarters	

* Variable uses data for appropriate maturity class.

Table 15

Results of Multiple Regressions Explaining Dealers' Positions in U. S. Treasury Bills

Dependent variable and period	R^2	$\bar{R}^2$	Durbin-Watson ratio	Constant	Net regression coefficients and standard errors												
					X_{34}	X_2	X_3	X_4	X_5	X_{15}	X_{14}	X_{18}	X_{23}	X_{24}	X_{35}	X_{36}	X_{37}
Net Positions																	
50's & 60's	.94	.93	1.62	-787.99	1,101.23**	.51*		9.63**		7.32*		62.03**	-7.81*		-156.74	-40.06	42.56
					(114.32)	(.24)		(2.45)		(2.87)		(17.78)	(3.76)		(104.82)	(102.46)	(103.27)
50's	.59	.39	1.50	-1,332.17	1/	.28		3.12		-1.68		83.12**	-2.64		1.29	230.89*	137.59
						(.15)		(2.71)		(2.70)		(24.24)	(5.60)		(86.39)	(88.01)	(81.71)
	.54	.49	1.32#	-623.95			-1.68**					58.30**					
							(.41)					(17.38)					
60's	.82	.73	1.48	1,318.66	1/	-.06		17.03**		4.00		15.06	-5.34		-435.96*	-346.45	-164.89
						(.71)		(5.68)		(7.48)		(37.08)	(4.85)		(151.00)	(188.91)	(153.35)
	.75	.62	1.43	985.05		1.60			-3.06		8.91	85.58*		-.21*	-520.38**	-108.79	-144.65
						(.91)			(2.22)		(4.64)	(37.16)		(.09)	(178.20)	(218.94)	(181.80)
Gross Long Positions																	
60's	.75	.67	1.27	732.12		1.57*			-2.65		7.81	92.55**		-.17*	-397.33*		
						(.73)			(1.85)		(3.78)	(28.69)		(.07)	(139.52)		
Gross Short Positions																	
60's	.85	.80	1.85#	22.29		-.27**					-2.10**			.05**	46.55*	-24.43	11.57
						(.09)					(.35)			(.01)	(21.49)	(22.44)	(20.80)

Footnotes in Table 20

Table 16

Results of Multiple Regressions Explaining Dealers' Positions in U. S. Governments (coupon issues) Maturing in ≤1 Year

Dependent variable and period	R^2	$\bar{R}^2$	Durbin-Watson ratio	Constant	Net regression coefficients and standard errors									
					X_1	X_7	X_8	X_{10}	X_{12}	X_{16}	X_{20}	X_{25}	X_{26}	X_{27}
Net Positions														
50's & 60's	.63	.60	1.71#	- 24.94	-1.33**		8.89**	6.66**						-.11*
					(.40)		(2.00)	(1.60)						(.04)
50's	.71	.65	1.56#	42.51	-1.68**		7.46	5.09*						-.12
					(.53)		(4.90)	(2.26)						(.06)
	.71	.65	1.42	79.85	-1.55**		11.17*		.52*					-.15*
					(.53)		(4.41)		(.23)					(.06)
60's	.67	.61	1.88#	-120.43	.38		16.30**	4.59						-.05
					(1.02)		(5.06)	(5.27)						(.07)
	.80	.77	2.34#	- 24.75		1.30**		7.15*			36.91**			
						(.41)		(3.00)			(10.51)			
Gross Long Positions														
60's	.84	.81	2.54#	22.61		1.29**		7.22*			35.97**			
						(.37)		(2.66)			(9.32)			
Gross Short Positions														
60's	.46	.38	1.62#	- 56.21						.24**		.08*	.05*	
										(.06)		(.03)	(.02)	

Footnotes in Table 20

Table 17

Results of Multiple Regressions Explaining Dealers' Positions in U. S. Governments Maturing in 1-5 Years

Dependent variable and period	R^2	$\bar{R}^2$	Durbin-Watson ratio	Constant	Net regression coefficients and standard errors																
					X_1	X_2	X_3	X_4	X_6	X_8	X_9	X_{10}	X_{12}	X_{20}	X_{21}	X_{19}	X_{25}	X_{26}	X_{32}	X_{35}	X_{36}	X_{37}
Net Positions																					
50's & 60's	.57	.52	1.81#	22.70		.31** (.08)			4.52* (1.71)			.44** (.14)			35.65** (12.18)	8.12* (3.05)						
50's	.39	.26	2.25#	234.95		.20** (.07)			-.95 (2.12)			.08 (.18)			29.42 (15.35)	2/						
	.68	.63	1.82#	182.38	-1.91** (.31)									9.52 (4.86)	27.16* (11.56)							
60's	.54	.42	1.78#	-198.59		.34 (.29)			9.27 (8.15)			.47 (.29)			23.16 (22.51)	6.80 (4.03)						
	.79	.68	2.10	29.06			-2.52* (.95)		2.23* (.78)			.92** (.27)					-.35 (.17)	-1.98* (.89)		-179.26* (79.10)	-182.41* (72.47)	-53.85 (55.15)
Gross Long Positions																					
60's	.70	.57	2.55+	230.69					2.22** (.73)			1.09** (.25)					-.46** (.15)	-2.24* (.83)		-187.43* (70.65)	-159.81* (71.31)	-42.91 (55.11)
Gross Short Positions																					
60's	.77	.69	1.74	- 69.84			1.78** (.36)	2.18** (.64)			8.99* (3.41)	-8.16** (2.32)	10.97* (3.92)						-.12 (.06)			

Footnotes in Table 20

Table 18

Results of Multiple Regressions Explaining Dealers' Positions in U. S. Governments Maturing in 5-10 Years

Dependent variable and period	R^2	$\bar{R}^2$	Durbin-Watson ratio	Constant	Net regression coefficients and standard errors													
					X_2	X_3	X_4	X_7	X_9	X_{10}	X_{12}	X_{16}	X_{20}	X_{22}	X_{24}	X_{29}	X_{35}	X_{36}	X_{37}
Net Positions																		
50's & 60's	.59	.55	1.51	- 30.89		- .40 (.26)	1.26* (.51)						13.26** (3.86)	-14.34* (6.12)	.18** (.07)				
50's	.64	.54	1.27	- 12.68		- .29 (.28)	.91 (.70)						11.27* (4.44)	1.39 (8.19)	.16 (.12)				
	.69	.65	1.19	55.53	.10* (.05)						.27** (.09)		8.55* (3.84)						
60's	.68	.59	1.25	- 75.11		-1.38 (.77)	2.09* (.84)						15.27* (6.43)	-24.91* (8.86)	.12 (.10)				
	.80	.73	1.81#	-109.65		-2.05** (.65)	2.23** (.65)				-.43** (.15)		13.64* (5.30)	-21.17** (7.22)		.30* (.11)			
Gross Long Positions																			
60's a)	.87	.82	2.51†	-247.67		-1.19 (.61)	3.05** (.61)					.50** (.11)	17.34** (4.94)	-21.32** (6.77)		.31** (.10)			
b)	.82	.77	2.09#	-139.82		-1.56* (.70)			10.31** (1.75)				22.89** (5.25)	-21.56* (7.59)		.27* (.10)			
Gross Short Positions																			
60's	.61	.43	1.73	366.26	-.25* (.11)			1.04** (.27)		-12.31* (4.97)		.19 (.10)					-10.78 (23.99)	-26.97 (25.05)	13.91 (22.31)

Footnotes in Table 20

Table 19

Results of Multiple Regressions Explaining Dealers' Positions
in U. S. Governments Maturing After 10 Years

Dependent variable and period	R^2	$\bar{R}^2$	Durbin-Watson ratio	Constant	Net regression coefficients and standard errors														
					X_1	X_3	X_4	X_6	X_8	X_{10}	X_{11}	X_{17}	X_{20}	X_{22}	X_{29}	X_{32}	X_{33}	X_{35}	X_{36}	X_{37}
Net Positions																			
50's & 60's	.48	.42	1.03	- 33.19	-.56*		1.30**						33.95*	-46.04**	.87					
					(.27)		(.43)						(12.92)	(16.23)	(.51)					
50's	.60	.50	1.34	- 14.90	-.65**		.89						22.69	46.20	1.34					
					(.19)		(.50)						(11.94)	(26.66)	(1.11)					
	.64	.59	1.08	- 7.43	-.43*			.95**					34.70**							
					(.16)			(.32)					(9.72)							
60's	.52	.39	1.02	- 60.53	-.08		1.53						39.44	-74.87*	1.25					
					(.91)		(.78)						(21.48)	(32.58)	(1.86)					
	.85	.77	2.42†	-785.60		-3.12*	1.72**		36.02**		-.71**		29.93*		1.14*	.21*	-8.74*			
						(1.11)	(.53)		(8.92)		(.15)		(11.73)		(.52)	(.08)	(3.25)			
Gross Long Positions																			
60's	.91	.85	2.24†	-713.98		-2.46*	1.70**		34.17**		-.66**		51.48**	-35.44	1.29*	.16*	-6.23*			
						(.99)	(.45)		(7.56)		(.13)		(11.26)	(17.83)	(.45)	(.07)	(2.77)			
Gross Short Positions																			
60's	.84	.72	2.73†	-366.71	.31*		.49**	-.79**		9.71**		.31**	16.35**			-.033*		-.67	22.69**	-2.50
					(.11)		(.13)	(.19)		(1.88)		(.05)	(2.95)			(.015)		(6.15)	(5.98)	(5.66)

Footnotes in Table 20

Table 20

FOOTNOTES

* Significantly different from zero at 5 per cent level. ** At 1 per cent level.

\# No positive serial correlation. (Theil and Nagar's Table, 1 per cent significance level for rejecting null hypothesis of residual independence.)

+ Probable negative serial correlation.

1/ Not appropriate for the sub-periods.

2/ Didn't exist during the 50's.