BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM
WASHINGTON, D C 20551

June 11, 1973

<u>CONFIDENTIAL (FR)</u>

To: Federal Open Market Committee

From: Arthur L. Broida

Enclosed for your information is a copy of a staff memorandum dated June 8, 1973, and entitled "Review of RPD Experiment," together with a transmittal from Mr. Axilrod.

Also enclosed is a memorandum of the same date from the System Account Manager entitled "Comment on staff review of the RPD experiment."

Arthur L. Broida
Deputy Secretary
Federal Open Market Committee

Enclosures

June 8, 1973

TO: Federal Open Market Committee

FROM: Stephen H. Axilrod

     Attached is a staff paper reviewing experience with RPD's. The paper represents a technical analysis, on the basis of evidence since February 1972, of the characteristics of the RPD experiment and of the extent to which the experiment made a positive contribution to the effectiveness of open market operations. Other reserve measures and money market conditions are discussed insofar as they are relevant to an understanding of the RPD experiment.

CONFIDENTIAL   (FR)

June 8, 1973

TO: Federal Open Market Committee   SUBJECT: Review of RPD
                                                            Experiment
FROM: Staff (Messrs. Axilrod, Pierce and Wendel)

I. Introduction and conclusions

This paper assesses the role of reserves available to support pri-
vate deposits (RPD's) in open market operations based on experience since
February 1972, when the experiment with RPD's began. The second section of
the paper (pp. 2 to 12) attempts to clarify the extent to which RPD's can
be construed as a target for day-to-day open market operations and to
characterize the RPD experiment actually undertaken. The third section
(pp. 12 to 29) examines the statistical evidence during the period of the
experiment.

The conclusions of our analysis are indicated below. These
conclusions do not, it should be pointed out, prejudge the degree to
which the objectives of policy should focus on monetary aggregates or
interest rates. They evaluate the technical role that RPD's can play,
in light of the evidence accumulated so far, in helping to achieve better
control of monetary aggregates.

(1) Introduction of RPD's has been helpful, even when hedged
by constraints. Its contribution has been reduced at times when multiplier
errors have been sizable. Thus, further research is needed on how best to
calculate the multipliers.

(2) The degree to which RPD's are helpful is enhanced if the RPD target range is narrow. Narrowing of the range by the Committee in recent meetings has served to trigger more promptly adjustments in money market conditions as the Desk attempts to attain the particular RPD pattern.

(3) The evidence of the past year appears to make it clear that, in the interval between Committee meetings, a wider Federal funds rate range and/or a lesser restriction on the volatility of the funds rate within the range is required if RPD's are to assume a more definite target role.

(4) The evidence about RPD's is, nevertheless, mixed and difficult to interpret. While continuing, and perhaps sharpening, the experiment, it is certainly desirable to intensify research on the role and value of other reserve targets (such as nonborrowed reserves) and money market conditions for controlling the aggregates.

II. Characteristics of the RPD Experiment

In its efforts to get a better handle on controlling the monetary aggregates, the FOMC changed its instructions to the Desk beginning in February 1972 so that reserves available to support private deposits (RPD's) became an operating target. The FOMC chose to specify a target range, or range of tolerance, within which RPD's should grow over a two-month period -- the month during which the FOMC meeting took place and the subsequent month.

-3-

The experiment was a limited one, however, in the sense that RPD's were not the only operating target. Thus, the instructions to the Manager also specified a range of tolerance for movements in the Federal funds rate between meetings as well as bimonthly objectives for the monetary aggregates themselves. The Manager was also instructed to promote "orderly" conditions in the Federal funds market, i.e. to avoid large changes in the funds rate from week to week. The effect of the limited experiment was to blend the RPD range with criteria for money market conditions and the aggregates themselves in designing a "reaction function" for open market operations.

The Manager's actions do not directly determine the level of M_1 or M_2, but they do directly affect the quantity of nonborrowed reserves and money market conditions. It was thought that specifying an RPD tolerance range would lead to changes in nonborrowed reserves and money market conditions that would in turn improve control over the aggregates. Adherence to an RPD target limits growth in both M_1 and M_2 (and also to a degree bank credit), with the weights determined by reserve requirements. In practice, the Committee seemed to place relatively more emphasis on M_1, which also receives the largest weight in RPD's.

This strategy assumes that the RPD target range bears a dependable relationship to the aggregates. However, by including the aggregates themselves in its instructions, the FOMC gave the Manager latitude to "look through" RPD's to the aggregates when unforseen shifts occurred in the relationship between RPD's and the aggregates.

-4-

The establishment of interest rate constraints -- both the range of tolerance and the allowable weekly change for the funds rate -- tends to weaken control over both RPD's and the aggregates. At times, it may be necessary to allow RPD's to grow outside their range in order to meet the interest rate constraints. This in turn may lead to growth in the aggregates outside of their ranges.

The specification of a range for RPD growth rather than a single growth path can be justified on several grounds. First, because the goals for the aggregates are often stated in terms of ranges, different growth rates of the aggregates imply different RPD growth rates. Second, a range of tolerance for RPD growth aids in meeting interest rate constraints without conflict between goals. Thus RPD growth can be allowed to move around in its range as the Manager acts to stabilize the money market. Conflicts cannot be completely avoided, however, because a relatively wide RPD range could well have the disadvantage of delaying adjustments in money market conditions required to gain desired control over the aggregates. Third, a range allows the RPD path to be adjusted in response to persisting, unforeseen shifts in the multiplier relationship between RPD's and the aggregates. For example, if growth in the aggregates is greater than desired but RPD growth is within its range, RPD's can be pushed down in their range as an offset.

If it were possible to predict the relationships among RPD's, interest rates, and the aggregates with a high degree of accuracy, desired growth rates for the aggregates could be achieved by operating on either target -- RPD's or money market conditions. In this world, if the Manager

-5-

operated on a given RPD growth rate path, it would imply both 1) attainment of some desired growth for the aggregates and 2) some predictable pattern for money market conditions. Alternatively, if the Manager were to operate directly to achieve those money market conditions, the same pattern for RPD growth would still obtain as if he had achieved it directly. The relevance of the RPD experiment, however, lies in a situation in which these relationships are not highly predictable.

When the growth in the aggregates differs from the rates desired, it becomes necessary to decide what must "give" in the original specification of instructions to the Manager. Either the movement in the aggregates must be tolerated or money market conditions must change and reserve operations taken to attempt to maintain RPD's. If the unexpected movement in the aggregates is believed to be temporary, then the FOMC might decide simply to tolerate it through a temporary bulge in RPD's. If it is not temporary, however, reserve pressure must be applied, and interest rates changed, to bring the aggregates back on track. The purpose of the RPD growth range is to limit the extent to which the growth in the aggregates can depart from their desired range. RPD's serve this purpose so long as the relationship between RPD's and the aggregates is predictable within a reasonable tolerance range on average.

Because the practical role that RPD's play in controlling the aggregates depends in part on the interest rate constraints specified by the FOMC, it is convenient first to discuss the consequences that would ensue if there were no interest rate constraints, i.e. RPD growth were

-6-

the Manager's only target. A discussion of the role of RPD's when interest rate constraints exist will then follow.

An RPD target without constraints. Assume for purposes of discussion that a certain RPD growth rate is specified for the ensuing month. A weekly pattern that is consistent with the month's desired RPD growth is then projected. After abstracting from errors in projections of reserve factors, it is assumed that the Manager attempts to hit the RPD growth rate week by week.

Suppose that required reserves in a given week turn out to be larger than anticipated. If the Manager holds to his RPD target, banks will come under reserve pressure and bid for additional funds in the Federal funds market, thereby putting upward pressure on the funds rate. Member banks will also turn to the discount window as a source of reserves. If the RPD target is to be achieved, the Manager must reduce nonborrowed reserves sufficiently to offset the increase in borrowed reserves. Because member bank borrowing would rise sharply in response to the reduction in the growth of nonborrowed reserves, a very sharp reduction in nonborrowed reserves might be required to hit the RPD growth target in the given week. This reduction in nonborrowed reserves will put additional upward pressure on the Federal funds rate and also could force banks into minimal or even negative excess reserve positions. Provided that the Manager is instructed to allow negative excess reserve positions, should they arise, and to permit any degree of volitility in the Federal funds rate, the targeted RPD

growth rate could be achieved. Even if member bank borrowings completely offset the reduction in nonborrowed reserves in a given week, the need to repay large borrowings would cause bank portfolio adjustments leading to a reduction in deposits and required reserves and to attainment of the RPD target in subsequent weeks.

If the rise in required reserves were transitory, the Federal funds rate would rise sharply and then fall as the Manager adhered to his RPD target. Other short-term interest rates would also show a similar pattern as banks attempt to gain additional reserves by selling Treasury bills and other short-term assets.

If the unanticipated upward movement in the demand for required reserves tended to continue, it would still be possible to achieve the RPD target. The Federal funds rate would remain at high levels and probably rise further as the discount window, through administrative pressure, became less available as a source of individual member bank reserve adjustment. Borrowing banks would soon be forced to increase their sale of assets, and this reduction in bank investments would tend to reduce demand deposits and, therefore, required reserves. By this process, which may well require sharp increases in interest rates, protracted sizable increases in required reserves that are unanticipated would simply not be possible and the RPD growth path would be achieved.

If negative excess reserves for the banking system are avoided, however, the targeted RPD might not be achieved on a week-by-week basis.

-8-

It may simply not be possible to reduce nonborrowed reserves sufficiently
to hit the target if required reserves exceed the total implied by the
RPD target. If the Manager limits the supply of nonborrowed reserves,
though not enough to hit his RPD target, the resulting rise in short-term
interest rates will still lead to a reduction in the growth of required
reserves over a series of weeks and bring RPD growth back on track. By
applying continued reserve pressure, banks would be forced to liquidate
a sufficient quantity of investments to bring required reserves back
in line with their desired path.

It is important to note that even in a situation without constraints
on the movement in the Federal funds rate, the Manager cannot <u>directly</u>
control RPD growth. Required reserves, by far the largest part of RPD's
are determined by the banking system's supply and the public's demand for
deposits. The Manager can attempt to influence the supply and demand for
deposits by changing nonborrowed reserves. He has no way of directly
changing required reserves, however. Thus, his true operating target is
nonborrowed reserves through which he affects total reserves after allowance
for changes in borrowing. The Committee can instruct the Manager to
ignore the reserve effect of changes in Government deposits, and thus
express its reserve objective in terms of RPD's, more specifically for
operating purposes nonborrowed RPD's.[1]

---

[1] The complications introduced by lagged reserve accounting are not
   discussed here. A report by a System staff committee on that
   subject is in preparation. The preliminary analysis suggests that
   two-week lagged reserve accounting does not seriously constrain
   the Desk's ability to hit an RPD target over a length of time of
   one to three months, but that to do so may require a somewhat wider
   funds rate range than would be necessary without lags.

The RPD experiment as designed in practice. In the above illustra-
tion, the Manager is concerned only with achieving some specific growth rate
for RPD's. In actual practice, he is given a relatively wide target range
of RPD growth rates and concurrent instructions (a) to maintain the Federal
funds rate within a range of tolerance, (b) to move the funds rate in an
"orderly" manner within the specified range and (c) to adjust RPD growth
if the aggregates appear to be going off their targeted course. The
mechanics of the actual RPD experiment can be discussed by assuming again
that there is an unanticipated expansion in required reserves.

In accordance with the instruction to avoid sizable weekly changes
in the Federal funds rate, the Manager initially would tend to accomodate
most of the increase in required reserves by additional reserve injections.
He might take a net reserve action that is consistent with a Federal funds
rate an eighth or possibly a quarter of a percent higher than the previously
prevailing funds rate in a particular statement week. To accomplish this,
the Manager would inject a smaller quantity of nonborrowed reserves than
the amount that would fully offset the unanticipated expansion in required
reserves.[1] Past experience indicates that if the Manager injects around
$50 million less than the fully accommodating amount of reserves, the

---

[1] The Manager's operational strategy with regard to the RPD target,
given the constraints imposed on it, is succinctly set forth in pp.
10-12 of his annual report to the FOMC for 1972.

Federal funds rate is likely to rise by the desired amount. Despite this reduction in the expansion of nonborrowed reserves, in a given statement week, RPD's would tend to overshoot the target path by nearly the full amount of the original required reserves overshoot. This would occur because member banks are likely to respond in the short run by increasing their borrowing by close to the $50 million reduction in the nonborrowed reserve injection. If the expansion in required reserves is persistent, RPD's would continue to grow subsequently at a rate that is above the target set by the FOMC.

In subsequent weeks, by a process explained in the previous section, growth in deposits and required reserves would be curtailed. But the constraints on movement of the funds rate (both the range of tolerance and extent of weekly change) may be such as to prevent attainment of the RPD target range in the interval between FOMC meetings. The movement in short-term interest rates may not be sufficient to induce the needed reduction in required reserves by the banking system.

In the approach described here, the Manager clearly cannot hit the RPD target unless the original specifications of the RPD and the funds rate ranges are mutually consistent. He can aim at a definite RPD growth rate, but he is limited in his ability to hit it because of the Federal funds rate constraints. In practice, the funds rate is quite sensitive to small variations in reserve injections. Thus, even relatively small inconsistencies in the funds rate and RPD's can lead to the result that the funds rate constraints often dominate reserve objectives, at least within the ranges utilized in the experiment so far.

In the absence of consistency between RPD's and funds rates, the RPD target operates mainly as a trigger mechanism that determines the desired movement and level of the funds rate. If the data in hand, combined with current projections, indicate that RPD growth is near or outside a limit of its range of tolerance, then the Manager reacts by adjusting the pattern of nonborrowed reserve injections to produce a series of small changes in the funds rate in the appropriate direction. This response pattern is repeated until the funds rate reaches its own established limit. The RPD experiment thus implies that the Manager does not aim directly at correcting the growth rate of RPD's, nor can he in fact do so if the funds rate range is too narrow or the allowable weekly changes in the rate are too small.

Even if the RPD growth range is limited more to an indicator than a target role, the effectiveness of monetary policy is enhanced since it facilitates prompter market response than would otherwise be the case. However, if the RPD band is unduly wide, its value as an indicator of needed changes in money market conditions would be greatly diluted.

The value of adding RPD's to the Manager's targets is questionable if RPD's bear no dependable relationship to the more ultimate monetary aggregate objectives of policy. If, in practice, it is not dependable, then RPD instructions are not helpful -- and could be counter-productive -- and the Manager is better guided only by the funds rate (or perhaps some other reserve measure), adjusting the funds rate to behavior of the monetary aggregates. Thus, it becomes crucial to determine whether the RPD targets that were given were, in fact, closely related to the desired aggregates.

-12-

This discussion has abstracted from uncertainties that the Manager faces regarding demands for reserves and the likely outcome of the Federal funds rate. In practice, the inability to forecast factors other than System actions affecting nonborrowed reserves -- i.e., float, currency in circulation, etc. -- does reduce the extent to which an RPD target can be hit in any given statement week. So long as the misses in projecting reserve factors are random, however, the target would be reachable over a longer period because misses in one direction will have been offset by misses in the other.

III. Evaluation of the RPD Experiment

In this section an attempt is made to determine the contribution that the target range for RPD's has made in achieving the desired growth ranges for the monetary aggregates (as indexed by M_1 and M_2). There are essentially two reasons why target paths for the monetary aggregates are not hit. First, the multiplier relationships between RPD's and the aggregates cannot be predicted with complete accuracy. Thus, even if RPD's remain within their specified range, the monetary aggregates may fall outside of theirs. Second, the demand for M_1 and M_2 is also not predictable with accuracy, so the relationship between short-term interest rates and the aggregates may be inconsistent with the Committee's speci-fications. If these demands are substantially different from expectations, then the range of tolerance and the restrictions on weekly changes for the funds rate may prevent RPD's from remaining in their range. In this case,

the desired growth paths for M_1 and M_2 will not be hit even if the multipliers are predicted accurately.

In evaluating the RPD experiment it is important to determine the extent to which operating procedures have, in fact, been changed. In practice, as noted in the preceding section, there has been a change in procedure, but the change represents more a shading than a qualitative difference in approach. In principle, however, the introduction of RPD's into the Desk's operating procedures represented an important change in emphasis. For the first time, an attempt was made to influence the monetary aggregates through targeted changes in bank reserves, subject of course to constraints, rather than through changes in money market conditions. However, the actual change in operating procedures depends upon the width of the range of tolerance for the funds rate and RPD's and upon the degree of weekly change in the funds rate that is tolerated as it moves toward the limits of the range. The narrower the range of tolerance for the funds rate, and/or the smaller the allowed weekly change in the rate, and the wider the range for RPD, the more nearly the current operating procedures approximate earlier procedures.

Table I provides a tabulation of ranges adopted for the funds rate and growth rates of RPD's. Table II shows the corresponding desired growth rates for M_1 and M_2 along with the actual values realized for these variables since the RPD experiment began in February 1972. The series for RPD's and the aggregates used for 1972 are on the old basis and do not include the changes in definition and seasonal factors that were

-14-

instituted in January 1973. Level adjustments were made to the series to allow computation of growth rates that involved months in the two years.

Perhaps the most striking conclusion from Table I is that the targeted RPD growth range was rarely achieved.1/ In only three of the fourteen bimonthly periods -- March-April and June-July of 1972 and January-February 1973 -- did RPD's fall within their growth rate range.2/ This was true even though the range for RPD's was quite wide -- typically four percentage points and sometimes even more. The pattern of RPD growth relative to its range of tolerance is displayed in Chart 1.

It would appear, then, that the restrictions on movements in the Federal funds rate -- and also a wide permissible range in RPD's -- prevented the experiment from providing much direct evidence on the role that RPD's can have in gaining better control over the growth paths of the monetary aggregates. The pattern of weekly average values of the

_____

1/ Because the Committee uses a bimonthly target that it revises monthly, it is difficult to compare actual bimonthly RPD growth rates to targeted growth rates. There is no obvious way to handle this problem so the figures in the tables should be interpreted with care.

2/ The figures for actual RPD growth are final data. At each meeting, the FOMC only had available projected data for the month of the meeting. Thus, projected RPD growth often differed from actual growth. On the basis of Blue Book projections, projected RPD growth was within its range of tolerance for three additional bimonthly periods -- April-May, July-August and September-October of 1972. Final data revealed that actual RPD growth fell outside the range for these periods.

Table 1

Tolerance Ranges Adopted by the FOMC
for RPD's and Federal Funds Rate
Compared to Actual Growth Rates
(in per cent)

Date of FOMC meeting	Target Period	RPD's Adopted (annual rates of growth)	RPD's Achieved	Federal funds range	Weekly average at close of period
Feb. 15 '72	Feb. - Mar.	6-10	11.5	2-3/4--4	3.91 (Mar. 22)
Mar. 21	Mar. - Apr.	10.5-14.5[1]	11.3	3-1/2--4-3/4	4.04 (Apr. 19)
Apr. 18	Apr. - May	7-11	6.6	4 --5	4.24 (May 24)
May 23	May - June	7.5-11.5	7.0	4-1/4--5-1/2	4.39 (June 20)
June 20	June - July	4.5-8.5	8.2	4 --5-1/2	4.46 (July 19)
July 18	July - Aug.	3-7	8.0	4 --5-1/2	4.86 (Aug. 16)
Aug. 15	Aug. - Sept.	5-9	10.6	4-1/2--5-1/4	4.93 (Sept. 20)
Sept. 19	Sept.- Oct.	9.5-13.5[2]	8.2	4-3/4--5-3/8	4.91 (Oct. 18)
Oct. 17	Oct. - Nov.	9-14[2]	8.2	4-3/4--5-1/2	4.97 (Nov. 22)
Nov. 21	Nov. - Dec.	6-10	15.2	4-3/4--5-1/2	5.38 (Dec. 20)
Dec. 19	Dec. - Jan.	4-11	20.0	5-1/2--5-7/8	5.86 (Jan. 17)
Jan. 16 '73	Jan. - Feb.	4.5-10.5	9.0	5-3/4--6-3/8	6.58 (Feb. 14)
Feb. 13	Feb. - Mar.	-2.5 +2.5	4.4	6 --7	6.96 (Mar. 21)
Mar. 20	Mar. - Apr.	12-16	11.5	6-3/4--7-1/2	7.23 (Apr. 18)

1/ Adjusted for introduction of PEPS System for clearing international transfers; originally a 9-13 per cent target had been set.

2/ Adjusted to take account of the timing of implementing Regulations D and J. The Sept. - Oct. RPD range originally was set at 11.5 to 15.5 per cent to allow for additional demand for excess reserves upon assumed implementation of Reg. D and J. The Oct. - Nov. range was originally set at 6-11 per cent and then revised upward upon implementation of Reg. D and J.

Table II

Tolerance Ranges Adopted by the FOMC
for M_1 and M_2
Compared to Actual Growth Rates
(in per cent)

| Date of FOMC meeting	Target period	M_1		M_2	
		Adopted	Achieved	Adopted	Achieved
			(annual rates of growth)		
Feb. 15 '72	Feb. - Mar.	7-8	12.3	12	13.0
March 21	Mar. - Apr.	9	9.9	9	9.5
Apr. 18	Apr. - May	8	5.1	8	7.5
May 23	May - June	6.5	4.1	10	9.2
June 20	June-July	7.5	9.9	10	11.0
July 18	July-Aug.	6	9.9	9	9.7
Aug. 15	Aug.-Sept.	5.5	5.5	7.5	8.2
Sept.19	Sept.-Oct.	9	4.5	9.5	8.1
Oct. 17	Oct.-Nov.	3.5--6.5	5.0	5-8	7.7
Nov. 21	Nov.-Dec.	4 --7	11.1	5-8	11.2
Dec. 19	Dec.-Jan.	3 --9	7.6	4-10	10.5
Jan. 16 '73	Jan.-Feb.	3 --7.5	2.8	4-9	6.2
Feb. 13	Feb.-Mar.	3 --8	2.8	2-7	5.3
Mar. 20	Mar.-Apr.	4 --7	3.5	5-8	6.4

Latest data: June 1, 1973.

-16-

Chart 1   RPD's

per cent

Actual Growth Rates and Tolerance Ranges Adopted by the FOMC
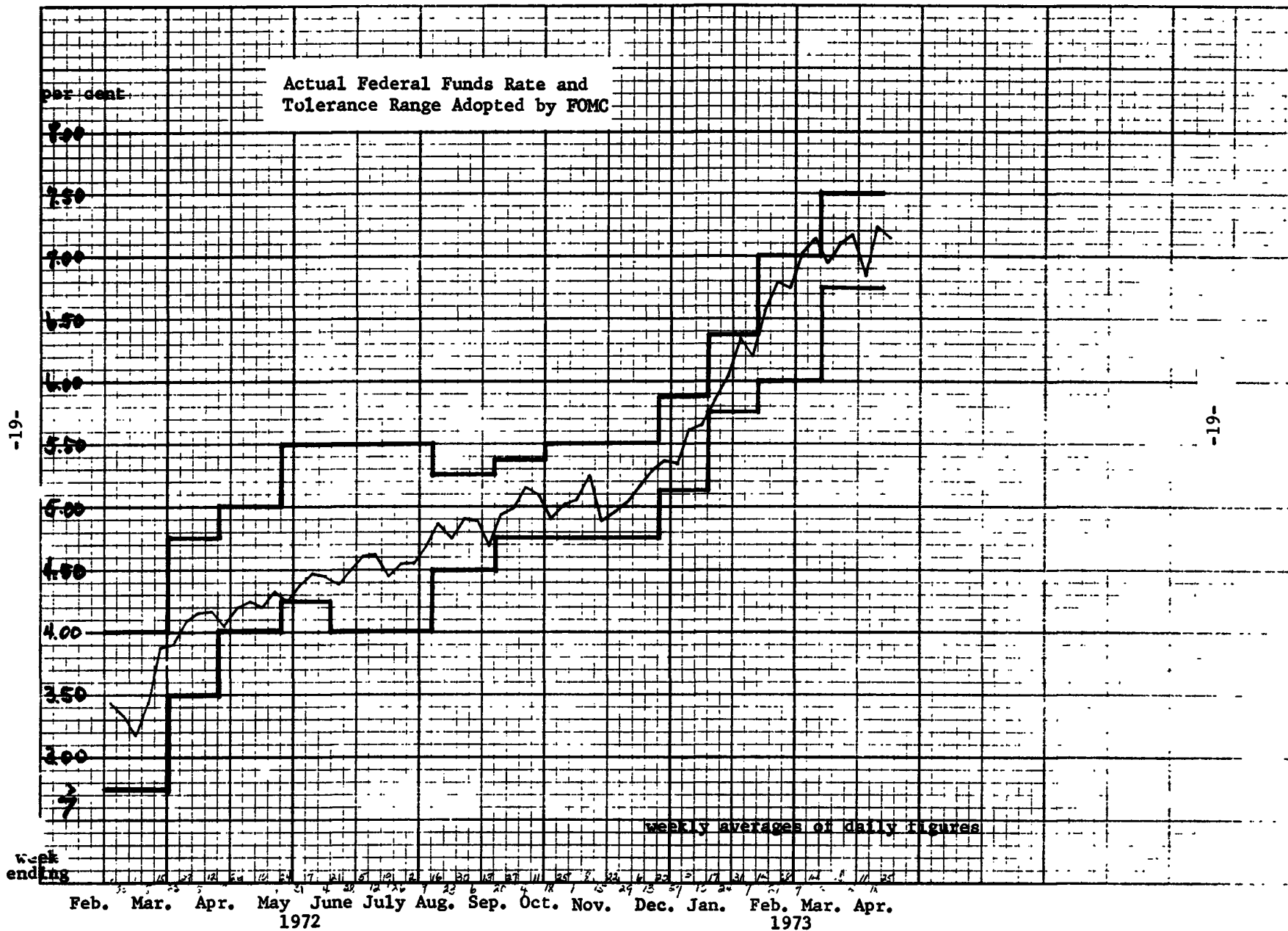(two-month averages)
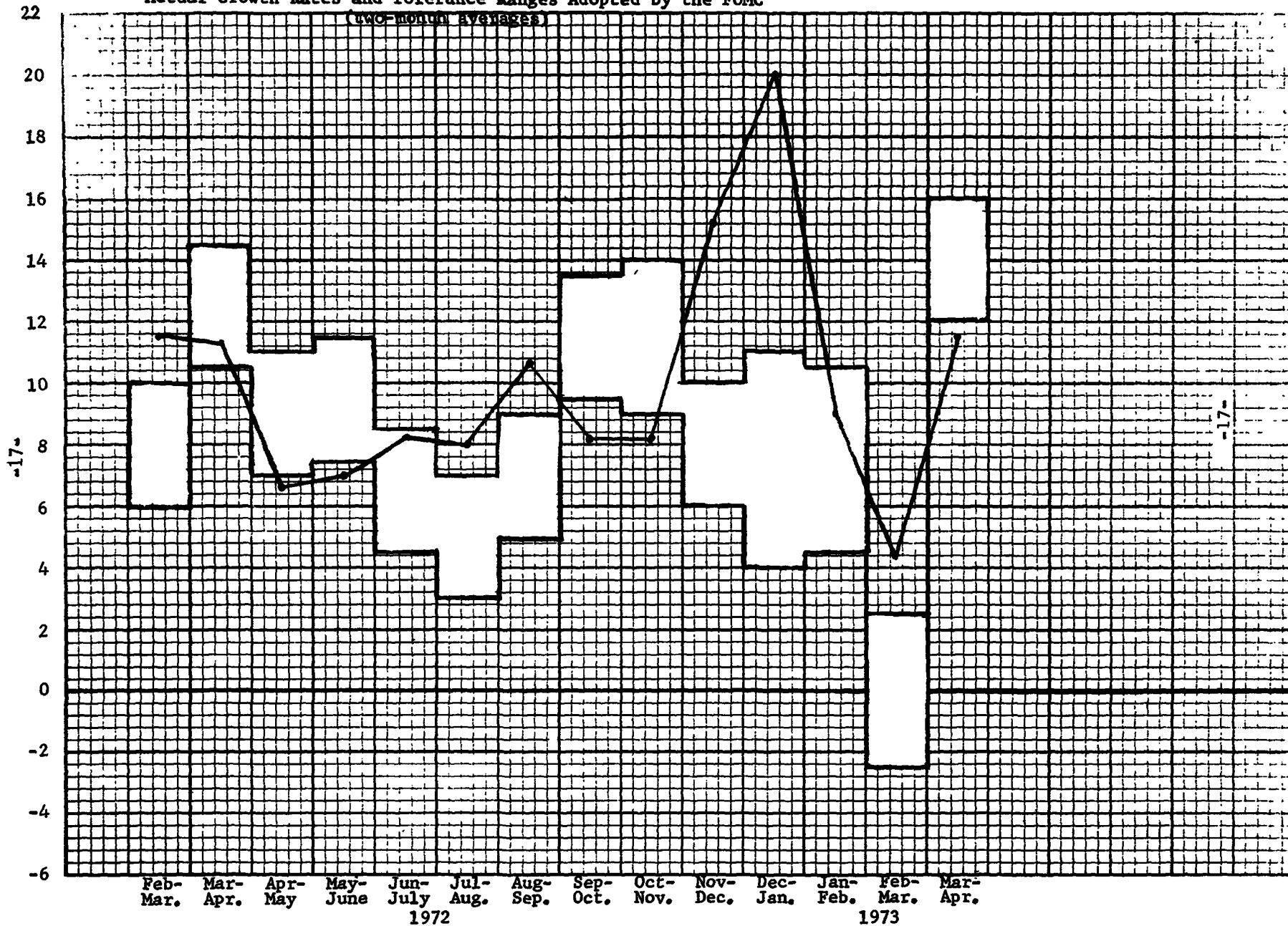
-18-

funds rate relative to the range of tolerance for the rate is displayed in Chart 2. The chart indicates that the funds rate was slow to move toward the upper or lower limits of the band even when RPD growth was far outside its range. Furthermore, the funds rate rarely reached the limits of the band although it did so more often in 1973 than in 1972. Thus, misses in achieving the desired RPD range are not only attributable to the range of tolerance for the funds rate, but perhaps more importantly to restrictions on the speed and amount of adjustment in the rate from week to week.

One purpose of introducing the target range for RPD growth was to signal the need for a change in the funds rate as RPD's moved through and then outside their range. One might expect, therefore, that the weekly changes in the funds rate would be larger on average than those observed prior to the introduction of the experiment, particularly since RPD growth rarely fell within the target range. In fact, the second is that the weekly change in the funds rate has been smaller during the period of the RPD experiment than it was earlier. The mean absolute change (without regard to sign) in the funds rate from week to week was 14 basis points during the fourteen months of the experiment. The mean absolute change in the funds rate in the fourteen months just prior to the experiment was 18 basis points.

Because RPD's fell within their range so rarely, it is necessary to look for indirect evidence on the role of RPD's for controlling the monetary aggregates. To do so, we have to ask if the RPD range had been hit,

Chart 2

Actual Federal Funds Rate and
Tolerance Range Adopted by FOMC

weekly averages of daily figures

week
ending

Feb. Mar. Apr. May June July Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar. Apr.
1972   1973

-20-

and therefore the range of fluctuation of short-term market rates had
been greater, would better control over the monetary aggregates have
been achieved? Table III shows the bimonthly periods in which RPD's,
M_1 and M_2 were either above, within or below their target growth rate
ranges. The table suggests -- although not very strongly -- that if
RPD's had been kept in their range, M_1 and M_2 would have come closer to
their targeted growth rates. In the five bimonthly periods during which
RPD's were growing slower than the lower limit targeted by the Committee,
M_1 was simultaneously growing at a rate below its target in four of the
periods and at its targeted rate in one of the periods. M_2 was growing
below its target in two of the periods and within its range in the
remaining three periods. In the six bimonthly periods during which RPD's
were growing at a rate above the upper limit targeted by the Committee,
M_1 was growing at a rate above its target in three of them, at its target
value in two periods and below its target in another. M_2 was growing
above its range in five periods and within its range in the remaining
periods. In the three monthly periods during which RPD's were growing
at a rate within the band targeted, M_1 was growing at a rate above that
targeted in two of them and in the other period at a rate below that
targeted. M_2 was simultaneously growing at a rate above its target in
one period and within its range in the remaining two periods. On average,
when RPD's have been growing at a rate above their targeted range, the
monetary aggregates have also been growing above their target rates, and
vice versa. This qualitative relationship has been a very loose one,
however. M_2 has been kept within and close to its targeted range more
consistently than either M_1 or RPD's.

Table III

Scoresheet: Actual Growth Rates Achieved
in Relation to Adopted Targeted Growth Rate Range
(see Tables I and II)

-21-

Target Period	RPD's			M_1			M_2		
	above	within	below	above	within	below	above	within	below
Feb.-Mar. '72	X			X			X		
Mar.-Apr.		X		X				X	
Apr.-May			X			X		X	
May-June		X				X			X
June-July		X		X			X		
July-Aug.	X			X			X		
Aug.-Sept.	X				X		X		
Sept.-Oct.			X			X			X
Oct.-Nov.			X		X			X	
Nov.-Dec.	X			X			X		
Dec.-Jan.	X				X		X		
Jan-Feb. '73		X				X		X	
Feb.-Mar.	X					X		X	
Mar.-Apr.			X			X		X	
Total	6	3	5	5	3	6	6	6	2

-22-

In an effort to throw the issues in clearer perspective, experiments were conducted that sought to determine the extent to which the staff's estimate of the M_1 multiplier -- which is implied by the RPD and M_1 paths provided in the Bluebook -- would predict the actual growth in the money stock given the growth that actually occurred in RPD's. The multipliers used in the experiment were not necessarily the ones implied by the RPD and M_1 paths selected by the Committee, but rather were derived from the Bluebook paths that were closest in terms of the growth of M_1 that actually materialized. The reason that this was done is that different M_1 target paths have different RPD multipliers. It is appropriate to take the staff's Bluebook estimate of the implied multiplier for the M_1 growth alternative that was most nearly like the one that actually occurred. Because the actual M_1 growth sometimes differed markedly from any of the Bluebook alternatives presented, the results of the exercise tend to overstate the extent of the error in the multiplier.

The results of applying the Bluebook implied multiplier to the actual movement in RPD's are presented in Table IV.[1] The results clearly show that sizable errors have been made at times in the multiplier and thus in the predictions of the bimonthly growth in the money stock that would result from the actual bimonthly growth in RPD's. Over the entire period from February 1972 through April 1973, the mean absolute error in

---

[1] As in previous tables, the 1972 money stock series is on the old basis and level adjustments were made to the 1972 series to allow computation of growth rates that spanned months in both years.

Table IV

M_1 Growth Rates

Over Two-Month Periods

Date of FOMC Meeting	Target Period	Actual M_1	Predicted[1] M_1	Difference* (Actual-Predicted)
Feb. 15 '72	Feb. - Mar.	12.3	12.0	0.3
Mar. 21	Mar. - Apr.	9.9	6.3	3.5
Apr. 18	Apr. - May	5.1	6.1	-0.9
May 23	May - June	4.1	3.9	0.2
June 20	June - July	9.9	9.6	0.3
July 18	July - Aug.	9.9	8.8	1.1
Aug. 15	Aug. - Sept.	5.5	9.6	-4.1
Sept. 19	Sept.- Oct.	4.5	6.5	-2.0
Oct. 17	Oct. - Nov.	5.0	1.2	3.8
Nov. 21	Nov. - Dec.	11.1	13.6	-2.4
Dec. 19	Dec. - Jan.	7.6	15.7	-8.0
Jan. 16 '73	Jan. - Feb.	2.8	2.8	0
Feb. 13	Feb. - Mar.	2.8	10.2	-7.4
Mar. 20	Mar. - Apr.	3.5	2.5	1.0

mean difference   -1.0

mean absolute difference   2.5

1/ Predicted M_1 obtained by applying the Bluebook implied multiplier to actual RPD.

* may not add due to rounding

-23-

-24-

predicting the bimonthly growth of M_1 was 2.5 percentage points. Particularly large errors were made for the December-January and February-March 1973 periods. The error for the December-January period was in some part attributable to the fact that the multiplier projections had to be made prior to completion of the revision in the money stock series that occurred in January of 1973.

The results do indicate that there is an underlying relationship between RPD's and M_1, but that predictions of the relationship are subject to error. While these estimates probably can be improved as we gain experience, some error will always remain.

The critical issue is whether the underlying relationship between RPD's and the monetary aggregates has been predicted well enough to improve open market policy. This is a most difficult question to answer, involving as it does comparison of what actually happened to RPD's and the aggregates (which was at least in some degree influenced by the RPD experiment as carried out) and what might have happened to the aggregates if RPD's had grown at a rate more consistent with the Committee's objectives.

Table V makes a number of comparisons that aid in approaching an answer to the question. The first column of the table shows the difference between the actual rate of growth in M_1 achieved during bimonthly policy periods since the RPD experiment began and the "targeted" rate of growth (taken as the mid-point of the range) specified by the FOMC (derived from Table II). The second column shows by how much the rate of growth in M_1 would have differed from target (given the actual growth in RPD's) because

-25-

Table V

Comparison of Misses* in M_1, RPD's, and the Multiplier

	Deviation in M_1 growth from target mid-point (1)	Miss in M_1 attributable to multiplier error, given actual RPD growth (2)	Deviation in RPD's from target mid-point (3)
February - March '72	4.8	.3	3.5
March - April	.9	3.5	-1.2
April - May	-2.9	- .9	-2.4
May - June	-2.4	.2	-2.5
June - July	2.4	.3	1.7
July - August	3.9	1.1	3.0
August - September	0.0	-4.1	3.6
September - October	-4.5	-2.0	-3.3
October - November	0.0	3.8	-3.3
November - December	5.6	-2.4	7.2
December - January	1.6	-8.0	12.5
January - February '73	-2.5	0.0	1.5
February - March	-2.7	-7.4	4.4
March - April	-2.0	1.0	-2.5
Average absolute miss	2.6	2.5	3.8

NOTE: Figures are expressed as percentage annual rates.

* - A miss is the actual value less the target or predicted value.

of errors in predicting the multiplier. That is, it shows the difference between the actual M_1 growth rate and the M_1 growth rate predicted on the basis of the Bluebook multiplier applied to the actual path of RPD's (as shown on Table IV). The third column shows the deviation between actual and targeted RPD's, again, using the mid-point of the range specified.

Interpretation of this table may be helped by taking the July - August period as an example. M_1 in that period was 3.9 percentage points (annual rate) above target. Given the actual RPD growth rate, which was 3.0 percentage points above the mid-point of its range, the Bluebook multiplier predicts a growth rate of money 1.1 percentage points less than actually occurred. Thus, the multiplier error contributed 1.1 percentage points to the 3.9 percentage point excess of M_1 growth over the mid-point of its target. The remaining explanation for the higher than desired growth in M_1 must be with the behavior of RPD's. In this case better control over M_1 would have been accomplished by slowing the growth in RPD's to a rate within its target range.

While the faster than targeted growth in RPD's was the major source of the miss in M_1 in July-August, there are other periods when deviation in RPD growth from target promoted achievement of desired M_1. In August-September, for example, more rapid growth in RPD's was required to offset the fact that the Bluebook multiplier turned out to be greater than the actual multiplier. In this case it was necessary to look through RPD's to the aggregates to meet the Committee's objectives.

-27-

The bottom line of the table averages the various types of misses on an absolute basis (without respect to sign). The largest average miss is in the deviation of RPD's from its mid-point, a miss of 3.8 percentage points. The average absolute miss in M_1 growth because of errors in predicting the multiplier, given actual RPD growth, is smaller -- a miss of 2.5 percentage points.

As the two examples given above indicate, growth in monetary aggregates can deviate from their mid-points either because of errors in the multiplier that the Desk is offsetting or because of the Federal funds rate constraints. These two effects can be further disentangled by looking at specific time periods.

For example, the second block of time periods in the Table V (covering June-July 1972 through Dec. '72 - Jan. '73) covers an interval when M_1 generally grew more rapidly than desired and actual RPD's were, on balance, substantially in excess of target as shown in Column 3. However, the actual multiplier was smaller than predicted, on balance, during the period. The excess RPD growth (over the mid-point of its target) was large enough to lead to higher than targeted M_1 growth. If the Bluebook multiplier had been correct, M_1 growth would have been even more above target. Thus the errors in the multiplier during this period served, on average, to make M_1 growth actually closer to the Committee's objectives. It was the excessive RPD growth that caused the misses in the targets.

-28-

In subsequent months (the last block of time on the table) M_1 turned out to be less than the mid-point of target ranges. This development was not unwelcome to the FOMC and served to offset the excess M_1 expansion of earlier periods. Multiplier errors in this period were either negligible, or in the case of February-March, worked to lower M_1 for a given RPD.[1]/

On balance, the behavior of M_1 over a relatively long period was not substantially in excess of Committee desires since slow growth in 1973 offset high growth in the second half of 1972. This averaging out to something around a desired M_1 over a longer run required willingness by the Committee to tolerate large longer-run movements in short-term interest rates over protracted periods.

It is clear, though, that over time intervals as short as a quarter, targets for the aggregates were not achieved with accuracy. Given the infrequency with which the RPD target range was hit, it is difficult to attribute this inaccuracy to the experiment of using RPD's.

Even though sizable errors have been made in predicting the RPD multiplier -- and at times the Manager has had to look through RPD's to M_1 to obtain better control -- the evidence suggests that better short-term control over growth in the aggregates would have been achieved if the RPD range had been adhered to more closely. Closer adherence to the RPD range

---

1/ Examination of the deviation of M_2 growth from the mid-point of its ranges during the period of the entire experiment suggest that M_2 targets were not a cause of the large deviations of RPD growth from the mid-point of its range.

-29-

would have induced larger short-term movements in the funds rate. However, those variations, by improving short-term control over the aggregates, might have reduced the necessity for such large longer-term movements in short rates. Better short-term control of the aggregates also would improve the chances of achieving the longer-run targets.

June 3, 1973

To: Federal Open Market Committee   Subject: Comment on staff
                                             review of the RPD experiment.
From: Alan R. Holmes

       The staff report on the RPD experiment is a useful analysis
of some of the key issues confronting the Committee as it seeks
to improve its procedures for controlling the monetary aggregates.
On the one hand, I feel somewhat more skeptical than the report
that greater emphasis on RPD targets would provide better control
of the aggregates--and the report itself is rather cautious on
this score. On the other hand, I feel somewhat more constructive
about the past year's experience, feeling that the Committee has
initiated procedural changes that do accelerate the System's
response to undesired deviations in the aggregates. The Committee
has begun developing tolerance ranges for the aggregates that
trigger quicker Desk responses and begun amending its Federal
funds rate range when necessary between meetings. Further develop-
ment along these lines seems more promising to me than to rely
more mechanically on RPD targets.

       The report's analysis suggests that better control of
M_1 by means of the RPD handle requires two things: (1) improved
forecasts of the RPD-M_1 multiplier, so that the FOMC's setting
of its RPD target for the month ahead will be more accurate; and
(2) a wider operational range for the Federal funds rate between
FOMC meetings, so that the Manager could be more successful in
hitting the RPD target chosen for the month following the FOMC
meeting.

-2-

The evidence provided on the experience to date is not very encouraging on the first point. The absolute average error in M_1 attributable to multiplier error in the 14 months of the experiment thus far amounted to 2.5 percentage points at an annual rate--about the same extent by which M_1 growth differed from its target mid-point (2.6 percentage points), even with the misses in RPD. This suggests that the multiplier-error problem is of the same order of magnitude as the control problem itself.

On the second point, we at the Trading Desk would share the staff's expectation that larger sustained changes in the Federal funds rate between meetings would achieve a given change in deposits, and RPD, more quickly. But we doubt that RPD is more controllable than M_1. Even if the Federal funds rate constraints were relaxed substantially, changes in short-term rates influence RPD through portfolio changes affecting deposits. Given existing information on the lags involved (unless the increase in the funds rate was very large indeed) one could not expect the portfolio adjustments of banks and their customers to proceed so rapidly as to offset unforeseen shifts in the demand for money within a four to five week interval. This would seem the case even if we were able to act with perfect foreknowledge at the beginning of the inter-meeting period. In fact, our operations must always take into account that considerable uncertainty will remain about the target month's M_1 at the time that the Committee meets within that month.

-3-

In sum, it seems more realistic to us to think of the tolerance ranges for either RPD or M_1 or any other aggregate as the Committee's specification of how the Desk is to respond to incoming information rather than as achievable targets.

I remain doubtful that the use of RPD specifications contributes much to the clarity of the Committee's instructions to the Desk or of the Desk's reports to the Committee on its operations. Both the Committee and the Desk have tended to look through RPD to the movements of deposits, more particularly to the tolerance ranges established for M_1 and M_2. In this way, one sidesteps the troublesome multiplier problem associated with the shifts of deposits among different deposit categories and different groups of banks. On the other hand, the Committee's use of RPD does serve to emphasize that the System's open market policy exerts its effects through operations on bank reserves. It is certainly feasible for the Committee to continue using it in its instructions.

Recent developments in the Committee's procedures go a considerable distance, it seems to me, in dealing with the problems that the staff report finds in its analysis of the RPD experiment. The Committee has, on occasion, established two-month tolerance ranges for RPD, M_1, and M_2 that involved slower growth than the staff believed consistent with the six-month goals of the Committee. It has narrowed the tolerance ranges, and has adopted asymmetrical ranges. This has served to trigger a more rapid Desk response to deposit strength. In consequence, the Manger has more frequently

-4-

encountered the upper limit of the Federal funds rate range rather

soon. And the Committee has made interim changes in the tolerance

range for the Federal funds rate to give effect to its policy

of monetary restraint. In this way, the Committee has introduced

a further element of flexibility and promptness in the System's

policy response to new information.