

April 28, 1972

To: Federal Open Market Committee

From: J. Charles Partee, Senior Economist

At the January 11 meeting of the Federal Open Market Committee, it was noted that the staff was engaged in a review of the record for accuracy in the various sources of monetary growth projections. The attached tables and analysis compare projections with actual results back through 1970. The summary comparison focuses on the period from 1971 to date, when three sources of projection estimates for most of the aggregate measures have been available.

As the analysis shows, quarterly estimates of growth rates have consistently been somewhat more accurate than those for the monthly data. Even so, there is considerable room for improvement in projection accuracy on all sides, and we are reviewing procedures and practices to that end. We plan now to monitor the comparative results on a continuing basis, and will alert the Committee if and when there are significant changes to report.

Attachments

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM

CONFIDENTIAL (FR)

Office Correspondence

Date April 27, 1972

To Mr. Axilrod

Subject: Comparisons of projections of

From Kathleen Alligood & Helmut Wendel

the monetary aggregates.

The set of attached tables record the growth rates for monetary aggregates that were projected by various estimators-- Bluebook, monthly money market model, N. Y. Fed.--during successive months from 1970 to early 1972.^{1/} These individual projections can be compared with the actual monthly or quarterly growth rates shown at the bottom of each column. The average error for each row of data (on the basis of the actuals as first published) is recorded at the right side of the page. Blank spaces in the table indicate that the data were not projected or the projections not recorded. Projections made by the monthly econometric money market model begin only in late 1970.

The text table on the next page shows a summary for 1971 and the first quarter of 1972 on the average projection errors made in various sets of Federal Reserve forecasts for the monetary aggregates. The detailed tables in the attachment also show results for 1970, but the results are not included in the table on the next page because projections from the model were not made at that time. The average misses in Bluebook and N. Y. Bank projections for M_1 had been generally smaller in 1970 than in 1971.

^{1/} The attached tables show projected quarterly growth rates through the first quarter of 1972. Monthly growth rate projections are shown through the end of 1971.

SUMMARY OF AVERAGE PROJECTION ERRORS--1971 & Q₁ 1972

	Average Projection errors in per cent per annum					
	Bluebook	N.Y. Bank	Model	Bluebook	N.Y. Bank	Model
	M ₁			M ₂		
	<u>Monthly Estimates</u>					
2 months prior	5.0	6.7	5.4	3.1	4.0	6.2
1 month prior	4.2	5.6	5.6	3.5	2.4	5.1
Within 1 month	3.1	3.6	4.8	2.1	2.0	4.1
	<u>Quarterly Estimates</u> ^{1/}					
4 months prior	4.1		3.9	2.8		5.5
2 months prior	3.2	2.6	2.9	2.7	1.7	4.5
1 month prior	2.6	2.2	2.7	2.1	1.4	3.3
	Credit Proxy			Total Reserve		
	<u>Monthly Estimates</u>					
2 months prior	3.9	1.8		5.6		
1 month prior	4.2	2.9		6.7		
Within 1 month	3.7	3.2		4.1		
	<u>Quarterly Estimates</u> ^{1/}					
4 months prior	3.2			4.3		
2 months prior	1.2	1.8		1.7		
1 month prior	2.7	1.7		2.3		

^{1/} Four months prior refers to about the middle of the preceding quarter; two months prior refers to the first month of the quarter being projected; and one month prior refers to about the middle of the quarter being projected.

Note: In computing the average growth rate errors, the signs of the individual errors were disregarded.

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The data in the summary table show the average difference between the actual rate of growth (at annual rates) and the rate of growth that had been projected. In calculating the average errors, the signs of the estimating misses were disregarded. In terms of the levels of the monetary aggregates the per cent of error is considerably smaller than shown here (one-twelfth as large for monthly estimates) since annual percentage rates are used throughout. To obtain the errors, the particular projection was chosen that incorporated a Federal funds rate assumption closest to the Federal funds rate actually obtained for that period. This adjustment was not possible for N.Y. Bank projections, since the N.Y. Fed makes only one estimate based on assumed continuation of the prevailing Federal funds rate. In this regard the projections, therefore, are not fully comparable. In addition, it should also be noted that the Bluebook projection, beginning in 1971, took into account the results of the money market model as well as independent judgmental factors.

As the summary table indicates the errors in general become smaller as the date of estimate approaches and eventually moves into the period that is being estimated. This tendency for improvement in successive estimates, however, does not hold for 1971 projections of the credit proxy--perhaps due to large discrete Treasury borrowing operations whose timing is difficult to project even at near-term.

Also quarterly growth rate errors are usually smaller than the monthly errors, indicating that some of the month-to-month erratic movement

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that contributes to the monthly errors, has less effect or tends to be cancelled out over the quarter.

It can also be seen that M_1 errors tend to be larger than the errors for M_2 and the credit proxy, which is perhaps understandable on the grounds that churning in financial markets or other temporary unpredictable phenomena are more likely to be reflected in cash balances than in holdings of interest-earning deposits. The total reserve projections are especially weak on a monthly basis, perhaps due to the additional difficulty of estimating in the very short run excess reserves and reserves held against interbank deposits as well as U. S. Government deposits. It may also be noted that only Bluebook projections were available for total reserves.

While the average misses are large--and they seem especially large when expressed at their annual rates--the forecasts frequently gave fairly good indications of major changes in the growth rates of M_1 . For example, the acceleration in the M_1 growth rate in the first quarters of 1971 and 1972 were well indicated, as shown in the table below.

Sizeable accelerations in quarterly M_1 growth rates

	1970 Q_{IV}	1971 Q_1	1971 Q_{IV}	1972 Q_I
Actuals, as first published	<u>3.4</u>	<u>8.9</u>	<u>1.1</u>	<u>9.5</u>
Early projections ^{1/}				
Bluebook		8.5		8
N. Y. Bank Model		5.6		8.6
		9.5		9.3

^{1/} For Q_I 1971 shows projections made in January 1971 For Q_I 1972 shows projections made in the preceding December, except for N. Y. Bank projection which was prepared in January 1972.

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On the other hand, major declarations in M_1 growth, particularly for the third quarter of 1971, were not well indicated as shown in the table below.

Sizeable decelerations in quarterly M_1 growth rates

	1970		1971	
	Q _{III}	Q _{IV}	Q _{II}	Q _{III}
Actuals, as first published	<u>5.1</u>	<u>3.4</u>	<u>11.3</u>	<u>3.0</u>
Early projections ^{1/}				
Bluebook		5		9
N. Y. Bank Model		4.6		8.3
		3.9		12.6

^{1/} Shows projections made in the first month of the quarter that was being projected.

In the third quarter of 1971, the introduction of the new economic program--including its exchange rate repercussions--was probably a new element contributing to an abrupt shift in the demand for money. This shift had not been projected for third quarter, but a deceleration of M_1 growth later in the year had been indicated. In July the Bluebook projected a 9 per cent M_1 growth for the third quarter, but expected growth to slow to 4 per cent by the fourth quarter. In that Bluebook it was pointed out that "Growth in M_1 , given current money market conditions, is expected to slow between now and year-end", and that "while there are reasons to expect slower growth in M_1 , it is difficult to pinpoint timing".

Because of divergence in success of projection, we have attempted to see if future developments would be more accurately projected by averaging the N. Y. Fed and Bluebook projections.

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Except for the credit proxy, there is no significant improvement as shown in the following comparison for monthly and quarterly growth rate estimates made two months prior to the end of the periods (a negative figure indicates the projection would have been made worse).

Improvement in Bluebook projection from averaging

	<u>Monthly ests.</u>	<u>Qtrly. ests.</u>
M ₁	-.6	-.4
M ₂	.4	-.1
Credit proxy	1.1	.5

F. R. CONFIDENTIAL

Attachment to memorandum on projections of the monetary aggregates by Mrs. Alligood and Mr. Wendel (April 27, 1972);

Projections of Monthly Growth rates of Monetary Aggregates, 1970 and 1971.

Projections of Quarterly Growth rates of Monetary Aggregates, 1970 to Q₁ 1972.

Comparisons of Various Monthly Projections of
 M_1 Growth Rates at Succeeding Time Periods
 for 1970
 (In per cent per annum)

M_1 Monthly Estimates ^{1/}	1970 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average Absolute Miss ^{3/}	Sample Size
<u>Bluebook</u>														
2 months prior ^{2/}					7	-1	6	6	1.5	5	5.5	4	2.4	8
1 month prior		--	(+)	(+)	3.5	-4	.9	2	6	7.5	6	8	3.9	8
Within 1 month	--	(-)	4-7	4	9	-2.5	11	6.5	-1.5	4.5	3	9.5	3.9	10
<u>New York Bank</u>														
2 months prior				-4.7	8.3	1.7			1.2			2.3	5.5	5
1 month prior		9	5.3	1.1	9.4	-1.8		8.2	1.2	3.5	7.4	6.7	5.2	10
Within 1 month	--	-2.3	7.2	1.1	10	-1.7	10	10	-2.3	4	--	7.3	4.3	11
<u>Model</u>														
2 months prior														
1 month prior														
Within 1 month												4.5		
<u>Actuals</u>														
As first published	9.6	-10.7	13.2	10.7	3.5	-1.8	4.1	10.0	1.2	1.1	2.8	6.2		
Latest revised data	10.6	-4.6	11.7	9.3	4.0	2.3	5.2	7.4	6.8	1.7	2.8	6.7		

^{1/} Bluebook and Model estimates of M_1 are based on Federal funds rate assumptions which correspond most closely to actual Federal funds rates obtained in the estimated periods; N.Y. Bank estimates assume a continuation of the prevailing Federal funds rate.

^{2/} The specific dates of estimation are those of successive Bluebooks for periods up to, and including, the estimated month.

^{3/} The average misses of samples with fewer than 3 observations are omitted.

n.e.--not estimated

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Comparisons of Various Monthly Projections of
M₁ Growth Rates at Succeeding Time Periods for 1971

(In per cent per annum)

M ₁ Monthly Estimates ^{1/}	1971												Average Absolute Miss ^{3/}	Sample Size
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Bluebook														
2 months prior ^{2/}		6.5	8.5		8.5	2.5	9	9.5	8.5		5	4	5.6	9
1 month prior	9	10.5	8.5	6.5	9	6	14.5	6	5	5.5	2	1.5	4.3	12
Within 1 month	6	9.5	5.5	9	8.5	9.5	10	7.5	1.5	3	-1	4.5	3.3	12
New York Bank														
2 months prior			3.3					12.2	3.7			4.2	6.7	4
1 month prior		5	5			6.4		8.4	5.8		4.8	3.7	5.6	7
Within 1 month	8.4	10	3.3	7.1	11.4	5.4	5.3	8.4	-6.8	-2.6	2.1	3.2	4.1	12
Model														
2 months prior		16.2	-1.1	5	11.4	11.3	18	10.5	8.3	8.3	-2.1	1.1	5.9	11
1 month prior	6.2	10.6	3.3	6.6	11.4	18.3	16.5	10.5	10.0	7.8	-0.5	1.6	5.9	12
Within 1 month	5	12.3	1.6	10.4	10.3	11.8	18.1	5.8	10.5	n.e.	-4.2	5.3	5.1	11
Actuals														
As first published	1.1	14.0	11.6	9.8	15.2	9.1	10.1	2.6	-3.7	0.5	0.5	2.6		
Latest revised data	2.8	13.4	11.0	8.2	14.1	9.1	10.1	3.2	-2.1	0.5	0	2.6		

For footnotes, see page 1.

n.e.--not estimated

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Comparisons of Various Quarterly Projections of
M₁ Growth Rates at Succeeding Time Periods from 1970 to Present

(In per cent per annum)

M ₁ Quarterly Estimates 1/	1970				1971				1972	Average Absolute Miss 3/	Sample Size
	Q _I	Q _{II}	Q _{III}	Q _{IV}	Q _I	Q _{II}	Q _{III}	Q _{IV}	Q _I		
<u>Bluebook</u>											
5 months prior ^{2/}							7.5	4	7.5	3.1	3
4 months prior		3	5	6		6	9.5	4	8	2.9	7
3 months prior		3.5	6	5	7	7	9	4.5	8	2.5	8
2 months prior	--	4	5	5	8.5	7	9	3	n.e.	2.1	7
1 month prior	3-4	6	5.5	4	7	8.5	8	--	7.5	1.8	9
Last month of quarter	2	4.5	3.5	5	7	12	5	2	9.5	1.2	9
<u>New York Bank</u>											
3 months prior		3.8					6.9		n.e.		
2 months prior		6.7	6.5	4.6	5.6		8.3	2.1	8.6	2.2	7
1 month prior	4.6	6.4	5.1	2.5	6	9.9	8.3	1.1	8.1	1.7	9
Last month of quarter	2.2	5.4	4.3	4.2	6.5	10.6	2.1	1.4	9.8	1.0	9
<u>Model</u>											
5 months prior							11.9	1.5	6	4.3	3
4 months prior						7	10.6	3	7.8	3.9	4
3 months prior						9.6	12	2.8	9.3	3.2	4
2 months prior				3.9	9.5	10.1	12.6	1.3	n.e.	2.4	5
1 month prior				3	8	13.8	8.9	-1.3	7.5	2.4	6
Last month of quarter				0.8	10.6	12	7.8	1.6	9.5	1.7	6
<u>Actuals</u>											
As first published	3.8	4.2	5.1	3.4	8.9	11.3	3.0	1.1	9.5		
Lastest revised data	5.9	5.2	6.5	3.8	9.1	10.6	3.7	1.1			

For footnotes, see page 1.

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Comparisons of Various Monthly Projections of
M₂ Growth Rates at Succeeding Time Periods for 1971

(In per cent per annum)

M ₂ Monthly Estimates 1/	1971												Average Sample	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Absolute Miss 3/	Size
<u>Bluebook</u>														
2 months prior ^{2/}					12.5	6.5	9	9	8.5		7	6.5	3.2	7
1 month prior			14	12	11	6.5	12	6.5	6.5	7.5	4	3.5	3.4	10
Within 1 month		20	13.5	13	8.5	12.5	10	7	5.5	6.5	7	8.5	2.4	11
<u>New York Bank</u>														
2 months prior								12.7	5			9.3	4.0	3
1 month prior						11.3		5.5	8.7		9.2	8.6	2.4	5
Within 1 month			11.1	15.1	12.5	10.5	8	8.5	1.1	5.8	8.4	9.1	2.1	10
<u>Model</u>														
2 months prior		13.3	3.9	7.5	9.9	10.6	12.5	8.4	7.8	8.1	2.6	3.9	5.4	11
1 month prior	7	14.1	7.8	10.8	9.8	14.3	13.6	7.9	8.7	7.6	5.8	3.9	4.8	12
Within 1 month	10.2	15	5	10.5	10.3	10.2	7.7	6.1	9	n.e.	1.6	2.6	4.6	11
<u>Actuals</u>														
As first published	11.5	22.1	18.9	12.6	14.1	11.0	7.2	4.8	1.6	7.1	6.8	9.9		
Latest revised data	14.1	20.7	18.7	12.1	13.9	10.7	7.5	2.9	2.9	7.1	6.5	10.2		

n.e.--not estimated

For footnotes, see page 1.

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Comparisons of Various Quarterly Projections of
M₂ Growth Rates at Succeeding Time Periods from 1971 to Present

M ₂ Quarterly Estimates ^{1/} 1971	Q _{II}	Q _{III}	Q _{IV}	1972 Q _I	Average Absolute Miss 3/	Sample Size
<u>Bluebook</u>						
5 months prior ^{2/}		8	5	7	4.3	3
4 months prior	14	9	7	9	2.8	4
3 months prior	12.5	9	7	9	2.5	4
2 months prior	10.5	8	5.5	n.e.	2.7	3
1 month prior	16	9.5	7	5.5	12.5	5
Last month of quarter	15.5	13.5	6	7.5	13.0	5
<u>New York Bank</u>						
3 months prior		10.7		n.e		
2 months prior		6.4	8.1	10.1	1.7	3
1 month prior	12.2	8.2	7.3	13.9	1.4	4
Last month of quarter	15	12.6	4.3	7.7	.8	5
<u>Model</u>						
5 months prior		10.5	4.3	3.5	6.5	3
4 months prior	9.6	10.7	5.0	3.7	5.5	4
3 months prior	8.0	11.3	8.3	4.5	5.4	5
2 months prior	9.5	10.4	9.1	5.0	n.e.	4
1 month prior	12.3	11.8	7.5	3.8	10.1	5
Last month of quarter	14.1	12.2	6.9	5.1	13.3	5
<u>Actuals</u>						
As first published	17.8	12.6	4.5	8.0	13.3	
Latest revised data	18.1	12.4	4.4	8.0		

n.e.--not estimated

For footnotes, see page 1.

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Comparisons of Various Monthly Projections of
Adjusted Credit Proxy Growth Rates at Succeeding Time Periods for 1970

(In per cent per annum)

Adjusted Credit Proxy Monthly Estimates ^{1/}	1970												Average Absolute Miss ^{3/}	Sample Size
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		
Bluebook														
2 months prior ^{2/}					-2	5.5	7	9	12	14.5	10.5	8.5	6.9	8
1 month prior		(-4)-(-7)		5-8	-7.5	7	4	12	12	10.5	11	6.5	7.2	8
Within 1 month	(-1)-(-4)	(-)	8-11	10	-2	8	17	20.1	9.5	7	6	17.5	2.0	9
New York Bank														
2 months prior				2.4	-1.2	9.2			10.1			9.1	4.3	5
1 month prior		-4.8	0.8	8.6	2.3	4.1		12.9	14.9	2.2	13.2	10.7	5.0	10
Within 1 month	-3.6	-7.9	10.7	10.6	-0.8	7.8	18.5	22.0	10.1	7	7	12.1	1.7	12
Actuals														
As first published	-3.1	-5.1	10.7	13.7	-1.2	7.0	18.1	23.2	9.7	1.1	7.0	16.5		
Latest revised data	-3.5	-5.5	10.7	13.7	-1.2	7.0	18.1	23.2	9.7	1.1	7.0	16.5		

n.e.--not estimated

For footnotes, see page 1.

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Comparisons of Various Monthly Projections of
Adjusted Credit Proxy Growth Rates at Succeeding Time Periods for 1971

(In per cent per annum)

Adjusted Credit Proxy Monthly Estimates <u>1/</u>	1971												Average Absolute Miss <u>3/</u>	Sample Size	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.			
Bluebook															
2 months prior <u>2/</u>		10.5	7.5		3.5	5.5	0.5	8.5	9		12	0.5	3.5	9	
1 month prior	11	13.5	14.5	19	3	8	8	11	4	7.5	11.5	-0.5	4.1	12	
Within 1 month	12.5	9.0	12	11.5	--	9	15.5	12	8	5.5	6	8.5	3.9	12	
New York Bank															
2 months prior			6.1					12.4	9.2			11.1	1.8	4	
1 month prior		10.4	6.4			12.6		7.2	10.6		10.5	9.4	2.9	7	
Within 1 month	9.4	11.5	5.7	16.6	4.6	9.4	11.8	14.8	6.2	4.8	8.8	11.1	3.3	12	
Actuals															
As first published	10.5	12.9	8.9	5.3	7.4	6.6	8.0	10.3	8.9	3.7	11.2	13.1			
Latest revised data	10.5	12.9	8.9	5.3	7.4	6.6	8.0	10.3	8.9	4.8					

n.e.--not estimated
For footnotes see page 1.

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Comparisons of Various Quarterly Projections of
Adjusted Credit Proxy Growth Rates At Succeeding Time Periods from 1970 to Present

(In per cent per annum)

Adjusted Credit Proxy Quarterly Estimates <u>1/</u>	1970				1971				1972	Average Absolute Miss <u>3/</u>	Sample Size
	Q _I	Q _{II}	Q _{III}	Q _{IV}	Q _I	Q _{II}	Q _{III}	Q _{IV}	Q _I		
<u>Bluebook</u>											
5 months prior <u>2/</u>							7.5	7			
4 months prior		5	8	12.5		12.5	9	8	7	3.9	7
3 months prior		6.5	7.5	10	11	9.5	10	6.5	6	3.1	8
2 months prior	(-)	4	14	9	11.5	6.5	9	6	n.e.	1.6	7
1 month prior	(-2)-(-4)	6.5	17	4.5	11.5	4.5	8	3.5	8.5	2.2	8
Last month of quarter	.5	7	17.5	9	12	7.5	9	8.5	10.5	.7	9
<u>New York Bank</u>											
3 months prior		7.7					10.8				
2 months prior		8.5	14	9.9	8.7		8.6	8.8	8.4	2.0	7
1 month prior	-3.5	5.7	18.6	6.2	9.7	7.6	11	7.5	9.9	1.9	9
Last month of quarter	0.3	7.1	17.5	7.0	9.8	7.8	8.3	9.4	11.6	.7	9
<u>Actuals</u>											
As first published	0.5	6.5	17.2	8.3	10.9	6.5	9.1	10.2	11.4		
Latest revised data						8.4	7.6	9.7			

n.e.--not estimated
For footnotes, see page 1.

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Monthly Projections of
Growth Rates of Total Reserves at Succeeding Time Periods for 1970-1971

(In per cent per annum)

Total Reserves Monthly Estimates <u>1/</u>	1970												Average Absolute Miss <u>3/</u>	Sample Size
	Jan.	Feb.	Mar.	Apr.	May	June.	July	Aug.	Sep.	Oct.	Nov.	Dec.		
<u>Bluebook</u>														
2 months prior <u>2/</u>					--	-6.5	--	4	5	13	8.5	5.5	12.9	8
1 month prior					-11	1	0.5	18.5	12.5	7	33.5	10.5	9.6	8
Within 1 month				17	-17	--	4	25.5	23.5	-16.5	11.5	18.5	4.1	9
<u>Actuals</u>														
As first published				21.3	-13.9	0.5	6.0	23.3	27.5	-3.6	3.6	18.4		
Latest revised data				25.5	-21.3	4.6	11.9	16.1	15.2	5.8	0.2	17.9		
Total Reserves Monthly Estimates <u>1/</u>	1971												Average Absolute Miss <u>3/</u>	Sample Size
	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		
<u>Bluebook</u>														
2 months prior <u>2/</u>		-1	1		14	-5	5	12.5	7.5		8.5	-4	6.0	9
1 month prior	17	16	8	13.5	15	-6	11.5	13.5	17	1	12.5	-8.5	6.5	12
Within 1 month	17.5	14.5	17.5	3	18.5	11.5	18.5	17	17.5	-14	6.5	6	4.7	12
<u>Actuals</u>														
As first published	12.2	11.4	9.2	2.7	17.0	0.2	0.3	14.7	15.8	-15.9	7.9	5.1		
Latest revised data	10.6	8.6	7.3	8.5	13.5	7.9	4.4	4.1	12.8	-7.4	3.4	10.7		

n.e.--not estimated
For footnotes, see page 1

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Quarterly Projections of
Growth Rates of Total Reserves at Succeeding Time Periods from 1970 to Present

(In per cent per annum)

Total Reserves Quarterly Estimates <u>1/</u>	1970 Q _I	Q _{II}	Q _{III}	Q _{IV}	1971 Q _I	Q _{II}	Q _{III}	Q _{IV}	1972 Q _I	Average Absolute Miss <u>3/</u>	Sample Size
<u>Bluebook</u>											
5 months prior <u>2/</u>							6.5	11			
4 months prior		-1	3.5	14		8.5	10.5	9	5	6.3	7
3 months prior		4.5	3	9.5	8.5	7.5	12	3	7	4.1	8
2 months prior		0.5	9.5	7.5	11.5	4	7.5	-2	n.e.	2.8	7
1 month prior		2	14.5	6	11.5	5	11.5	-6	6.5	2.2	8
Last month of quarter	-3	3	18	5.5	13.5	10.5	11	0.5	10.5	1.3	9
<u>Actuals</u>											
As first published	-2.9	2.6	19.1	6.6	11.0	6.6	10.4	-1.1	10.1		
Latest revised data	-4.5	5.4	14.6	8.0	8.9	10.0	7.2	2.2			

n.e.--not estimated

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