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Money Stock Control Under Alternative Definitions of Money

JOHN A. TATOM

IN recent years, existing definitions of the monetary aggregates have come under increasing attack. Initially, this assault stemmed from allegations that money demand had shifted in 1974 and that the conduct of monetary policy required new measures which were more closely related to the concerns of policy, such as total spending and prices.¹ It has also become apparent that changes in technology, regulations, and financial market institutions have had a significant effect on the payments process and, perhaps, the link between existing aggregate measures and economic activity. An important example of such a change was the introduction of automatic transfer services (ATS) and the extension of NOW accounts to the state of New York on November 1, 1978.² Other innovations include the increasing volume of repurchase agreements, money market mutual funds, and regulatory changes that now allow corporations and state and local governments to hold savings accounts.

In response to these concerns, the staff of the Board of Governors of the Federal Reserve System proposed new definitions for M1, M1+, M2, and M3 monetary aggregates in the January 1979 *Federal Reserve Bulletin*.³ The principal criteria underlying the redefinitions were to improve the ability of the Fed to control output and inflation and to combine deposits that are close substitutes for each other.

The staff's proposal has generated considerable comment both within and outside the Federal Reserve

System. Most critics are in favor of the effort to redefine the aggregates but find fault with the specific measures proposed. The criticisms center on (1) the exclusion of certain means of payment from the proposed M1 measure, (2) the questionable improvement of the relationship of the proposed measures to spending, or of the stability of the demand for money, and (3) disagreements over whether the proposed measures adequately meet the staff's criterion of combining deposits that are close substitutes.

The actual redefinitions that will be forthcoming, if any, are still unknown. Nonetheless, it is useful to examine the issue of money stock control with the measures initially proposed in January 1979. The primary criticism of these measures, from the viewpoint of control, is that timely data from thrifts and other financial institutions have been unavailable. To the extent that the Federal Open Market Committee uses the proposed measures instead of existing measures for targeting aggregate growth, the relationship between the instruments of monetary policy and the different aggregate measures is of considerable importance, regardless of timely data availability. Moreover, any definitions of monetary aggregates that ultimately will be chosen are unlikely to deviate significantly from those examined here.

The issue of controllability is especially important in view of the October 6, 1979, announcement of a Federal Reserve System policy change to improve control over the growth of monetary aggregates by placing greater emphasis on the supply of bank reserves in day-to-day operations. This action represents both a fundamental change in the focus of monetary policy and a clearer recognition of the link between Federal Reserve actions that affect bank reserves and the monetary aggregates which it seeks to control. This article examines the proposed definitions of monetary aggregates as an example of the type of control consideration required by this shift in policy. The re-

¹See S. M. Goldfield, "The Case of the Missing Money," *Brookings Papers on Economic Activity* (3/1976), pp. 683-789, and Jared Engler, Lewis Johnson, and John Paulus, "Some Problems of Money Demand," *Brookings Papers on Economic Activity* (1/1976), pp. 261-280.

²The problems of controlling a broader measure of M1, including new ATS and NOW account balances, with existing measures and policy procedures are discussed in John A. Tatom and Richard W. Lang "Automatic Transfers and the Money Supply Process," this *Review* (February 1979), pp. 2-10.

³See "A Proposal for Redefining the Monetary Aggregates," *Federal Reserve Bulletin* (January 1979), pp. 13-42.

sults indicate that the proposed aggregate measures are less controllable than existing aggregates, although only slightly less so for proposed M1.⁴

EXISTING AND PROPOSED MONETARY AGGREGATES

The major changes in the proposed redefinitions of monetary aggregates are designed to account for demand-deposit type accounts that are not classified as demand deposits, and to aggregate assets by type, irrespective of the institution involved in the creation of such assets. With regard to the first change, proposed M1 would include NOW accounts, demand deposits at thrift institutions, credit union share drafts, and savings accounts at commercial banks that are subject to automatic transfers to demand accounts. This change is especially important after November 1978, when NOW accounts were extended to New York State and ATS was introduced nationwide. Before then, NOW accounts at commercial banks and thrifts, as well as credit union share draft balances, were relatively small. Also, as recommended by the Bach Committee, deposits held by foreign institutions at domestic banks are excluded from the proposed M1 measure.⁵

The attempt to aggregate similar monetary assets regardless of issuing institution is especially important in the proposed measures of M2 and M3. Currently, M2 is equal to M1 plus other deposits at commercial banks—including NOW accounts, ATS savings accounts, other savings accounts, time deposits, and CDs

(except large CDs at weekly reporting banks). The proposed M2 (PM2) would add to proposed M1 (PM1) savings accounts at both commercial banks and thrifts. Consequently, it would differ from the current measure of M2 primarily in its exclusion of time deposits at commercial banks and its inclusion of demand, NOW, and other savings balances at thrifts, and credit union share drafts.

M3, by existing definitions, differs from M2 in its inclusion of time and savings deposits at thrifts and credit unions. Since all but time deposits at these institutions are in PM2, proposed M3 (PM3) is intended to reflect the distinction between savings and time accounts. Thus, PM3 is PM2 plus all time deposits and CDs at commercial banks and thrifts. PM3 differs from M3 in its inclusion of large CDs at weekly reporting banks and demand deposits at thrifts (\$864 million in June 1978). Except for the latter difference, PM3 is essentially the same as the existing aggregate M5. Existing measures M4 and M5 will be dropped according to the proposal. Table 1 summarizes these differences.⁶

The proposal for aggregating over similar types of deposits rather than similar institutions is not without shortcomings. The rationale for the change is based upon an increase in substitutability of deposits among institutions.⁷ It is unclear, however, whether the substitutability of these deposits has increased. Barnett has shown, for example, that there is no significant substitutability between small time deposits at commercial banks and savings and loans, before or after 1974. Also, his evidence shows increases in substitutability between deposits within institutions, making the M2 aggregate a more justifiable measure than before on this criterion.⁸

The proposed redefinitions also ignore the question of whether other assets should be included in the monetary aggregates, or where they might be likely candidates for inclusion. For example, Wenninger and Sive-

⁴Other studies have shown that money demand estimates and the link between intermediate monetary aggregate measures (M1, M2, M3) and GNP are not improved by the proposed measures. See, for example, the staff study, "A Proposal for Redefining the Monetary Aggregates," and Laurence H. Meyer and Murray L. Weidenbaum, "Fed's Proposed Redefinition of Monetary Aggregates Seen Falling Short of Goal," *The Money Manager* (May 7, 1979). Together with the results here, it can be concluded that the link between the monetary base and GNP will be worse under the proposal, as long as intermediate targeting is used. This is significant for the conduct of monetary policy. Andersen and Karnosky have shown that the mean and variance of forecast errors of GNP using the monetary base are not significantly worse than occurs using existing M1 or M2 measures. Adoption of the proposed measures would therefore increase the desirability of targeting on the monetary base instead of intermediate monetary aggregates. See Leonall C. Andersen and Denis S. Karnosky, "Some Considerations in the Use of Monetary Aggregates for the Implementation of Monetary Policy," *this Review* (September 1977), pp. 2-7.

⁵See Advisory Committee on Monetary Statistics, "Improving the Monetary Aggregates," Federal Reserve Board of Governors, June 1976. M1+ is not revised in the proposal except for the exclusion of foreign balances. Currently, M1+ is the same as proposed M1 plus other savings accounts at commercial banks. This measure is not discussed here.

⁶This table is adapted from one originally used by John Wenninger and Charles M. Sivesind, "Defining Money for a Changing Financial System," Federal Reserve Bank of New York *Quarterly Review* (Spring 1979), pp. 1-8.

⁷See William A. Barnett, "Substitutability, Aggregation and Superlative Quantity Indices," Memorandum, Federal Reserve Board of Governors, April 17, 1979, processed, and "A Fully Nested System of Monetary Quantity and Dual User Cost Price Aggregates," (Board of Governors of the Federal Reserve System, Division of Research and Statistics, Econometric and Computer Applications Section, November 1978; processed).

⁸These points have been made by Kenneth C. Froewiss, John P. Judd, Michael W. Keran and John L. Scadding, "Comments on Redefining the Monetary Aggregates," (Federal Reserve Bank of San Francisco, July 5, 1979, processed).

Table 1

Comparison of Current and Proposed Definitions of the Monetary Aggregates

Components	M1		M2		M3	
	Current	Proposed	Current	Proposed	Current	Proposed
Currency in circulation	X	X	X	X	X	X
At Commercial Banks:						
Demand deposits ¹	X	X	X	X	X	X
NOW accounts		X	X	X	X	X
Savings subject to automatic transfer		X	X	X	X	X
Other savings accounts ²			X	X	X	X
Small time deposits			X		X	X
Large time deposits ³			X		X	X
CDs ⁴						X
At Thrift Institutions:						
Demand deposits		X		X		X
NOW accounts		X		X	X	X
Other savings accounts ⁵				X	X	X
Other time deposits					X	X
Credit union share drafts		X		X	X	X

¹The definition of demand deposits differs between the current and proposed aggregates for technical considerations such as the exclusion of deposits held by foreign institutions at domestic banks in the proposed definitions. Precise definitions and historical data may be found in the *Federal Reserve Bulletin*.

²Excluding negotiable order of withdrawal (NOW) accounts and savings subject to automatic transfer.

³\$100,000 or more.

⁴Negotiable certificates of deposit in denominations of \$100,000 or more issued by large weekly reporting banks.

⁵Excluding NOW accounts.

sind question the omission of repurchase agreements, (RPs), money market mutual funds (MMMFs), and new savings balances of state and local governments and corporations, and suggest a broader definition of the money stock, M1.⁹ Meyer and Weidenbaum also argue that RPs and MMMFs should probably be included in a new measure of M1 and/or M2.¹⁰

The major tests of the usefulness of the proposed aggregates have consisted of studies of the comparative predictive performance of the proposed vs. existing aggregates in money demand equations and in the estimation of GNP in reduced form equations (both within sample and out-of-sample). Generally, the evidence does not indicate that the proposed measures are an improvement over existing measures.¹¹

CONTROLLABILITY

Andersen and Karnosky have provided a useful analytical framework for the choice of a monetary aggregate target.¹² They argue that Federal Reserve actions

⁹See Wenninger and Sivesind, "Defining Money."

¹⁰See Meyer and Weidenbaum, "Fed's Proposed Redefinition."

¹¹See, for example, Meyer and Weidenbaum, "Fed's Proposed Redefinition" or the staff study, "A Proposal for Redefining the Monetary Aggregates."

¹²See Andersen and Karnosky, "Some Considerations in the Use of Monetary Aggregates."

determine the adjusted monetary base which, in turn, affects monetary aggregates. Intermediate monetary aggregates influence spending decisions and, consequently, are an indicator of nominal GNP. In order to determine the selection of an intermediate aggregate, the forecasting accuracy of reduced-form equations for GNP can be compared. However, to determine the Fed's ability to influence GNP, they argue, analysts must consider not only the variance of GNP estimates, given an intermediate money aggregate target, but also the relative size of errors in achieving the intermediate monetary aggregate target.¹³

This framework is useful in considering the desirability of conducting policy by controlling the proposed measures. There is no evidence that the proposed measures represent an improvement over

¹³They conclude that, even if there is zero control error in the achievement of intermediate monetary aggregate targets, control of the base itself results in no worse an ability to influence nominal GNP. This conclusion is reinforced by the results below, if the proposed measures are adopted. It is conceivable that the relationship between total spending and existing aggregate measures could have worsened in recent years because of the introduction of new means of payments or other financial assets. In this case, the proposed measures might represent an improvement for policy purposes, despite the lack of evidence using past data. Andersen and Karnosky performed tests for structural change in the relationship between spending and M1, M2, and the monetary base for the period after II/1971 in their equations which are estimated over the period I/1952-IV/1975. The tests rejected such a change in the relationships.

existing measures as intermediate targets in controlling spending. Thus, the question arises whether the proposed measures might improve policymaking by reducing the control errors linking Federal Reserve actions and intermediate aggregate measures. If the proposed measures are controllable with less error, they would represent an improvement over existing measures for policy purposes, and the evidence would strengthen the case for intermediate targeting. On the other hand, if the proposed aggregates do not exhibit more precise control, the case for using the proposed measures as intermediate targets is seriously weakened.¹⁴ The evidence below shows that the proposed measures are less controllable.

A simple model linking equilibrium money stocks to the adjusted monetary base can be used to assess the controllability of monetary aggregates. In equilibrium, a monetary aggregate M_t^* may be thought of as the product of the adjusted monetary base (MB) and a money multiplier (k). Converting this relationship to logarithms (\ln) results in the expression: $\ln M_t^* = \ln k + \ln MB$. Thus, changes in a monetary aggregate are related to changes in the adjusted monetary base and/or the money multiplier for this aggregate measure. Federal Reserve actions determine the adjusted monetary base, but the money multiplier is influenced by the decisions of households, businesses, and financial institutions. Consequently, the ability to control a monetary aggregate requires that the money multiplier be predictable. Variations in the money multiplier cause control errors in achieving a given amount in a monetary aggregate through actions affecting the adjusted monetary base.

A model to assess the variance of monetary aggregates (or the money multiplier), given the monetary base, may be written as

$$(1) \quad \ln M_t^* = \beta_0^* + \beta_1^* \ln MB_t + \beta_2^* t$$

where t is included to allow for a time trend in the money multiplier. Since changes in the adjusted monetary base may not result in instantaneous adjustment of the equilibrium money stock, an adjustment process can be specified as

$$(2) \quad \ln M_t - \ln M_{t-1} = \lambda (\ln M_t^* - \ln M_{t-1})$$

which states that actual changes in the monetary aggregate are some proportion λ of the discrepancy between equilibrium and past levels of the monetary

aggregate. Combining equations 1 and 2, the model may be estimated in the form¹⁵

$$(3) \quad \Delta \ln M_t = \beta_0 + \beta_1 \Delta \ln MB_t + \beta_2 \Delta \ln M_{t-1}$$

where the parameters of the model, excluding β_0 , may be obtained from

$$(4) \quad \begin{aligned} \lambda &= 1 - \beta_2 \\ \beta_1^* &= \frac{\beta_1}{1 - \beta_2} \\ \beta_2^* &= \frac{\beta_0}{1 - \beta_2} \end{aligned}$$

This model is estimated for the period I/1960-II/1978 for existing aggregates M1, M2, and M3 and the proposed aggregates PM1, PM2, and PM3.¹⁶ Differences in the logarithms of monetary aggregates and the adjusted monetary base are multiplied by 400 in order to express annual growth rates. A summary of the estimated equations is given in table 2, where β_0 is omitted when it is insignificant. The equations for the growth rates of M1 and PM1 do not exhibit significant autocorrelation (at the 1 percent level). The equations for the higher aggregates, both existing and proposed, are estimated using the Hildreth-Liu technique to control for the significant first-order autocorrelation of growth rates. The Durbin-Watson h -statistic indicates the absence of remaining autocorrelation. The significant autocorrelation coefficient for higher

¹⁵Estimating the model using equation 3 instead of its counterpart in level-form is motivated primarily by policymakers' interest in controlling aggregate growth. In addition, significant autocorrelation exhibited in the level equations cannot be removed for the aggregates M2, PM2, M3, and PM3 using a first-order autocorrelation adjustment. Thus, in the level-form, the results and experiments below would be biased. Whether the money multiplier for each aggregate is better explained by a model other than that implicit in equations 1-3 is beyond the scope of this paper. The model is not intended to represent the best means for forecasting money. For a recent work on modeling the money multiplier which is more useful for operational purposes, see James M. Johannes and Robert H. Rasche, "Predicting the Money Multiplier," *Journal of Monetary Economics* (July 1979), pp. 301-325.

¹⁶Since some analysts expect the federal funds rate to be important in money stock control, the logarithm of this variable was added to equation 1, resulting in the addition of the first-differences of the logarithm of the rate to the estimated equation 3. The resulting estimates for the six equations failed to reveal a significant impact of the federal funds rate on the equilibrium stock of each aggregate. Since some of the newer deposits such as NOW accounts did not begin until later in the sample period, a check of the relationship of the series was conducted by computing correlation coefficients over the first and last half of the sample. Existing and proposed measures have correlation coefficients of .99+ in both subperiods. Comparing correlations of $\Delta \ln$ s fails to reveal any substantial deterioration in the relations, as well. For the period I/1960-IV/1968, and I/1969-II/1978, the correlation coefficients of $\Delta \ln M1$ and $\Delta \ln PM1$ are 0.98 and 0.97, respectively. For M2 and PM2, comparable coefficients are 0.38 and 0.79; for M3 and PM3, the correlation coefficients are 0.96 and 0.89, respectively.

¹⁴This also implies that the adoption of the proposed measures would reinforce the case for targeting on the monetary base instead of M1 or a higher order M.

Table 2

Monetary Aggregates and the Monetary Base^a

Aggregate ($\Delta \ln$)	β_0	β_1	β_2	λ	β_1^*	ρ	d/h^b	SE/R ²
M1	—	0.557 (7.11)	0.313 (3.29)	0.687 (7.23)	0.811 (19.09)	—	1.78 1.63	1.61 0.62
PM1	—	0.582 (7.26)	0.280 (2.86)	0.720 (7.35)	0.808 (19.12)	—	1.77 1.85	1.68 0.59
M2	2.614 (2.99)	0.469 (3.51)	0.281 (2.71)	0.719 (6.93)	0.653 (3.99)	0.287 (2.56)	1.92 0.77	1.86 0.56
PM2	—	0.507 (4.75)	0.409 (4.18)	0.591 (6.03)	0.858 (6.42)	0.551 (5.64)	1.98 0.13	2.19 0.64
M3	3.353 (3.26)	0.316 (2.53)	0.381 (3.66)	0.619 (5.95)	0.509 (2.95)	0.487 (4.76)	1.85 1.43	1.69 0.67
PM3	2.783 (2.45)	0.434 (3.25)	0.386 (3.87)	0.614 (6.16)	0.706 (3.25)	0.527 (5.30)	1.84 1.27	1.84 0.70

^aThe numbers in parentheses are t-statistics.

^bThe Durbin-Watson d and h statistic, respectively.

order M's may be due to omitted variables or simply the structure of the error process. In either case, control of these aggregates via adjusted monetary base targeting is more difficult because it requires finding and forecasting the omitted variables or accounting for the autocorrelated errors. In all six equations, the model fits the data quite well judging by the R² and the significance of β_1 and β_2 .¹⁷

The growth rate of the existing aggregate measure is more controllable—as shown by its smaller standard error—than the proposed measure for each of the three M's. Both M1 and PM1 are more controllable than the higher order M's. For M1, PM1, and M2, the equilibrium adjustment process for a change in MB is 90 percent complete within two quarters. While the M3 equations have smaller standard errors than those for M2, the lagged adjustment process is longer (smaller λ) for M3 than for M2, but slightly shorter for PM3 than for PM2.¹⁸

Of course, the more important test of controllability is whether the equations in table 2 forecast well in dynamic simulations. Table 3 presents the results for within-sample dynamic simulations of the six equa-

tions reported in table 2. The simulations of the quarterly growth rates (annualized percentage-point differences in logarithms) perform remarkably well for all of the measures except PM2, according to the mean error over the whole sample period. PM2 growth is apparently underestimated on average. The root-mean-squared error (RMSE) compares favorably to the standard errors reported in table 2 for M1, PM1, and M2. The RMSE is substantially higher than the standard error for PM2 and PM3, as well as for the existing M3 measure. Control of these aggregates via the monetary base is poor according to the dynamic simulations.

The controllability of the growth rate of the existing measures is greater than that of the proposed measures, as judged by the error statistics reported in table 3. According to the RMSE and mean absolute errors, the controllability of existing aggregates de-

Table 3

Dynamic Simulations of Aggregate Growth Rates¹
1/1960-II/1978

Aggregate	Root-Mean Squared Error	Mean Absolute Error	Mean Error
M1	1.70%	1.31%	-0.03%
PM1	1.75	1.37	-0.04
M2	2.13	1.63	0.00
PM2	3.53	3.06	0.59
M3	2.47	1.90	0.02
PM3	2.81	2.08	0.00

¹First differences of logarithms at annual percentage rates.

¹⁷Formulas for computing the variance of the restricted parameters (β^*) may be found in Jan Kmenta, *Elements of Econometrics*, (New York: The Macmillan Company, 1971), p. 444.

¹⁸Similar equations were estimated using the net source base instead of the monetary base as the control variable. The results from the comparisons above were the same, but the standard error of the equations was higher in each case. The most striking result of those estimates is that β_1 and β_2^* are not significantly different from zero for M2, PM2, M3, or PM3. Thus, control of the source base alone has no impact on aggregates other than M1 or PM1.

teriorates moving from M1 to M2 to M3. For the proposed measures, however, the growth of PM3 is more controllable than PM2. The results indicate that the adoption of these redefinitions would worsen monetary control, and that, except for PM1, intermediate targeting of quarterly growth rates would be subject to substantially larger control errors.

The dynamic simulations can also be used to compare the accuracy of control of the levels of the various aggregates on a quarterly basis. The results of these simulations are given in table 4. The equations track the quarterly level of the aggregates quite well over the full period, with an average error of less than \$1 billion. The simulations of M1, PM1, and M2 track the level the best, with mean errors of \$30 million or less.

The RMSE and mean absolute error of the quarterly level simulations are \$1 billion or less for both M1 and PM1, with M1 control proving slightly superior again. The RMSE and mean absolute error of the dynamic forecasts for M2 and M3 levels are several times larger than those for M1 under either the existing or proposed definitions, but, as above, existing measures are generally superior to the proposed measures of M2 and M3.

While the results for one-quarter growth rates and quarterly levels from the simulations are compelling, policymakers also concern themselves with growth of aggregates over a longer period. Currently, intermediate targets for M1 and M2 are announced for four-quarter periods. Over such a span, the quarterly errors in growth rates tend to average to a smaller level. To investigate the extent of control over a four-quarter period, the dynamic simulations of the table 2 equations can be used to provide four-quarter growth rate estimates for the period from I/1961-II/1978. The results of comparing the predicted annual growth rates to the actual annual growth rates for each aggregate are summarized in table 5.

For annual periods, M1 and PM1 are substantially more controllable than the corresponding higher order M's. Control of existing aggregates deteriorates moving from M1 to M2 to M3; PM3, however, is more controllable than PM2 as indicated in table 3. The most startling result in table 5 is that control of M3, PM2, and PM3 fails to improve sufficiently when the control horizon moves from a one-quarter to a four-quarter period so that the RMSE is larger than the standard error of the respective equation in table 2. The variances of errors in annual growth control for M1, M2, and PM1, however, are reduced by more than 30 percent of the RMSE for one-quarter forecasts.

Table 4

Dynamic Simulation Errors of
The Level of Monetary Aggregates¹
I/1960-II/1978

Aggregate	Root-Mean Squared Error	Mean Absolute Error	Mean Error
M1	\$.97	\$.73	-\$0.03
PM1	1.01	.76	-.03
M2	2.47	1.79	-.01
PM2	4.59	3.76	0.55
M3	4.80	3.49	0.26
PM3	4.82	3.57	-.15

¹Billions of Dollars.

Table 5

Control of Aggregate Growth Rates
For Four-Quarter Periods
I/1961-II/1978

Aggregate	Root-Mean Squared Error	Mean Absolute Error	Mean Error
M1	1.12%	0.91%	-0.06%
PM1	1.11	0.91	-0.08
M2	1.46	1.46	0.02
PM2	3.03	2.73	0.60
M3	1.99	1.53	0.02
PM3	2.31	1.67	-0.20

Table 6

Controllability of a Broader Asset Measure
II/1969-II/1978

GROWTH RATES			
Aggregate	Root-Mean Squared Error	Mean Absolute Error	Mean Error
A	1.83%	1.38%	.003%
PM1	1.72	1.39	-.07
M1	1.58	1.26	-.06
LEVELS (Billions of Dollars)			
A	\$1.29	\$.98	\$.02
PM1	1.20	.95	-.03
M1	1.09	.87	-.04

Finally, since questions have been raised about the omission of other assets that are close substitutes for demand deposits from M1, it is useful to examine the controllability of such a broader aggregate. The Wenninger and Sivesind measure (referred to as A) consists of the sum of: current M1, corporate and state and local government savings deposits, NOW deposits, ATS savings deposits, credit union share drafts and demand deposits at thrifts, assets of money market mutual funds, repurchase agreements (RPs) at nonbank government securities dealers with non-financial corporations, and RPs at 46 large commercial banks. This measure was constructed for the period IV/1968-I/1979.

When the model above (equations 1-4) is estimated using this enlarged definition of "money" for the period II/1969-II/1978, the results are

$$\beta_0 = 0, \beta_1 = .662 (5.08),$$

$$\beta_1^* = 858 (16.69), \lambda = .771 (5.16), R^2 = .32$$

and a standard error of 1.84, where t-statistics are given in parentheses. For a comparison of controllability, the model was estimated and dynamically simulated over the same period for M1 and PM1.¹⁹ The resulting comparisons of simulations over the period II/1969-II/1978 are presented in table 6 for

the quarterly growth rate equations as well as the aggregate level simulations.

The mean errors of the simulations of growth rates are quite small. The liquid asset measure, however, is substantially less controllable than M1 for both growth rates and levels. The comparisons generally indicate that PM1 is also more controllable than A, although not by as large a difference. The money measure, A, is an inferior measure by which to conduct monetary policy.²⁰

SUMMARY AND CONCLUSION

The Board of Governors is currently considering revising the definitions of the monetary aggregates. One important criterion that should influence the process of redefining these aggregates is the controllability of these measures through Federal Reserve actions. This criterion is especially crucial if the aggregates are to be used as intermediate targets of monetary policy.

Given the framework developed in this article for assessing Federal Reserve control of the monetary aggregates, the evidence indicates that the measures proposed by the Board's staff in January 1979 are subject to greater control errors than current aggregate measures, except for proposed M1.

²⁰Since the Wenninger and Sivesind study, the Board of Governors has released more comprehensive measures of repurchase agreements at commercial banks. See Norman N. Bowsher, "Repurchase Agreements," this *Review* (September 1979), pp. 17-22, for a description of this data. When the Wenninger and Sivesind A measure is adjusted by taking out RPs at 46 large commercial banks and adding in RPs at all commercial banks, the controllability of the resulting aggregate deteriorates further. A detailed comparison is not reported here because data for the comparison is only available for the period since the fourth quarter of 1974.

¹⁹When the M1 equation is estimated over the same period, the estimate of λ rises to 0.797 ($t=5.95$). The point estimate of β_1^* (0.785) is essentially the same and its t-statistic is 18.27. The standard error of the equation is 1.54. A Chow test for structural change in the subperiods I/1960-I/1969 and II/1969-II/1978 rejects the structural change hypothesis. Similar results are obtained for PM1, where λ rises to 0.804 ($t=4.49$) and β_1^* is 0.784 ($t=17.35$). The standard error for the PM1 equation is 1.69.



Federal Agency Debt: Another Side of Federal Borrowing

DAVID H. RESLER and RICHARD W. LANG

DISAPPOINTMENT in recent domestic economic performance has sparked increasing interest in the role of the federal government in the U.S. economy. As it is widely believed that government deficits contribute to inflation, much of the public concern focuses on the size of the federal budget deficit and the growth of federal indebtedness.

Since the government finances most of its spending in excess of tax receipts by issuing new debt, continued budget deficits enlarge the amount of federal debt outstanding. For instance, the large budget deficits of the last four years have contributed to about a \$250 billion increase in Treasury debt outstanding from December 1975 to September 1979.

While the federal deficit is coming under closer public scrutiny, a substantial portion of federally related programs and their associated debt has escaped much of this attention. Specifically, the debt of federally owned and federally sponsored agencies is often overlooked.¹ Like the debt of the Treasury (or, for that matter, any other debt), agency debt has important effects on capital markets.

This article focuses on this additional source of federal influence on capital markets. To provide the

necessary background and perspective, the article first examines the general nature and function of the agencies. Unlike most discussions of these agencies, which focus primarily on their microeconomic effects, this article considers the macroeconomic implications of agency debt operations.

FEDERAL AGENCIES AND SPONSORED AGENCIES

The federal government conducts its business through various departments and agencies, which for the most part receive their authorization to spend (appropriations) through the budget process. Decisions about the level and allocation of federal spending are reflected in the budget of the U.S. government.² This authorized budget spending is primarily financed by the Treasury's tax receipts and by sales of Treasury debt, although some on-budget agencies are authorized to issue their own debt (panel A of exhibit 1). Spending of some *federally owned* agencies, however, is placed outside the budgetary process and is designated as "off-budget." Panel B of exhibit 1 lists these federally owned, off-budget agencies.

¹Federally sponsored agencies are, technically, independent private enterprises that have been created by congressional legislation. Despite this independent status, these agencies remain subject to broad policy guidance from the federal government.

²Although the unified budget concept represents the official budget of the federal government, the national income accounts (NIA) concept is more frequently used in evaluating economic activity. For a description of these two budget concepts, see David J. Ott and Attiat F. Ott, *Federal Budget Policy*, 3rd ed. (Washington, D.C.: The Brookings Institution, 1977), pp. 4-23.

In addition, the federal government sponsors a number of other "private" agencies, whose spending is also excluded from the federal budget. These sponsored agencies are listed in panel C of exhibit 1.

Functions of Government Agencies

While some agencies, such as the Postal Service or the Tennessee Valley Authority, mainly provide certain services, the primary function of many federal agencies is to allocate credit to particular sectors of the economy. For instance, the Federal Housing Administration (FHA) was established in the 1930s to mitigate the increase in mortgage foreclosures that accompanied the Depression. Similarly, a variety of other federal agencies has been established to allocate credit to particular sectors such as housing (e.g., Federal National Mortgage Association), agriculture (e.g., Federal Land Banks), small businesses (e.g., Small Business Administration), and international trade (e.g., Export-Import Bank).

The justification for directing agency aid to particular sectors generally relies on allegations that capital market imperfections prevent resources from flowing naturally to certain socially desirable activities. These alleged imperfections include monopolistic elements in lending markets, economies of scale enjoyed by some borrowers but not others, and external benefits to society in excess of those capturable by the borrower (and ultimately the lender). The belief that such imperfections discriminate "unfairly" against particular sectors or classes of borrowers within the economy has prompted Congress to authorize various sector-specific credit programs.³

Federally Owned Agencies

Though the off-budget agencies listed in panel B of exhibit 1 are wholly owned by the U.S. government, their spending is not reflected in the unified budget totals, despite the recommendation of the President's Commission on Budget Concepts that the unified budget "... include all programs of the federal

³Sometimes, however, imperfections are confused with economic differentiation. It is not an imperfection of the capital market when an unrestricted market assigns a higher risk premium to certain activities, since some projects entail more risk than others. If riskier projects are to succeed in attracting financial capital, they must offer investors a higher potential return. The primary function of a competitive capital market is to allocate credit toward the most promising among alternative projects for a given level of risk. In a free market, lenders bear the risk inherent in a given project. Government loan guarantees, loan participations, and other subsidies that are channelled through government agencies do not eliminate the inherent risk of making loans to certain groups; they simply spread the risk over a larger segment of society, the taxpaying public.

Exhibit 1

A. On-Budget Entities Authorized to Issue Debt Not Subject to Federal Debt Limitations

Government National Mortgage Association (GNMA)
Export-Import Bank of the United States (Ex-Im Bank)
Tennessee Valley Authority (TVA)
Family Housing Program of the Defense Department

B. Federally Owned, Off-budget Agencies

Rural Electrification and Telephone Revolving Fund
Rural Telephone Bank
Pension Benefit Guaranty Corporation
Postal Service
Federal Financing Bank (FFB)
Regional Rail Reorganization Program of the U.S. Railway Association

C. Federally Sponsored Agencies

Federal National Mortgage Association (FNMA)¹
Student Loan Marketing Association (SLMA)²
Banks for Cooperatives³
Federal Intermediate Credit Banks (FICB)³
Federal Land Banks (FLB)⁴
Federal Home Loan Banks (FHLB)⁵
Federal Home Loan Mortgage Corporation (FHLMC)⁶

¹Converted to private ownership in September 1968.

²Created as private enterprise in June 1972.

³Converted to private ownership in December 1968.

⁴Converted to private ownership in 1947.

⁵Converted to private ownership in 1951.

⁶Created as private corporation in July 1970.

government and its [wholly owned] agencies."⁴ Some of these agencies' activities are, nevertheless, subject to congressional and presidential review.

Both on-budget and off-budget federal agencies allocate credit primarily through the administration of loan programs directed toward particular sectors of the economy. The agencies may grant loans either directly, by lending to specific borrowers, or indirectly, by purchasing loans initiated by private lenders but guaranteed or insured by the federal government. Loans are financed either by the Treasury or by agency borrowing. The Treasury-financed portion of the agencies' activities is, like all Treasury debt, subject to statutory debt limitations.⁵

⁴Report of the President's Commission on Budget Concepts (Government Printing Office, 1967), p. 7.

⁵The statutory debt limitation refers to the legal ceiling of the debt of the federal government, as set by Congress. Only the House of Representatives may initiate changes in this statutory debt limit, which was \$830 billion as of June 30, 1979. While constituting a legal ceiling on outstanding debt, the debt limitation has been changed by Congress whenever government financing needs have nudged against the ceiling.

Debt issued directly by off-budget agencies, however, is free from these statutory limitations, although it is reported by the Treasury as part of gross federal debt. In addition, there are some on-budget agencies that can issue debt which is not subject to statutory limitation (see panel A of exhibit 1). Consequently, federal debt subject to statutory limitation, a frequently used measure of the overall government debt, understates the full extent of direct federal government borrowing. For instance, at the end of June 1979, outstanding Treasury debt was \$804.9 billion while federally owned agency debt was \$7.3 billion, for a total of \$812.2 billion. Of this total, only \$806 billion was subject to the prevailing statutory limit of \$830 billion.

Since 1973, outlays of federally owned, off-budget agencies have increased rapidly (table 1).⁶ This rapid growth has largely been associated with the activity of the Federal Financing Bank (FFB), an intermediary that merits special attention.

The Federal Financing Bank

In December 1973, Congress established the Federal Financing Bank as an independent agency of the U.S. government.⁷ The FFB acts as an intermediary by coordinating the federally owned agencies' fundraising activity in U.S. capital markets. Of the federally sponsored agencies (panel C of exhibit 1), only the Student Loan Marketing Association (SLMA) is eligible for FFB financing.⁸

The FFB facilitates the funding of various agencies' programs in three ways. First, it acquires new or outstanding debt from federally owned agencies. This effectively reduces competition among the agencies and the Treasury for the existing supply of loanable funds in capital markets. Testimony given in the congressional hearings on the creation of the FFB clearly reveals this to be the primary function intended for the FFB. The declining volume of off-budget, federally owned agency debt provides evidence that the FFB has succeeded in reducing the independent debt operations of these agencies.

Second, it acquires loan assets from federal agencies and third, it acquires loans that have been guar-

Table 1

Outlays of Off-Budget, Federally Owned Agencies (Millions of Dollars)

Fiscal Year	Outlays
1973	\$ 60
1974	1,447
1975	8,054
1976	7,285
TQ*	1,785
1977	8,684
1978	10,327
1979 (Est.)	11,990
1980 (Est.)	11,956

*TQ = Transition Quarter (July 1976-September 1976).

SOURCE: U.S. Office of Management and Budget, *The Budget of the U.S. Government*, 1980.

anteed by other federally owned agencies.⁹ As discussed below, both of these FFB transactions can be used by agencies as alternatives to debt issuance in financing agency programs. FFB acquisition of agencies' loan assets and guaranteed loans in 1978 had risen to about two-thirds of its financing of agency activity.

In all three cases, the FFB finances its activity either by issuing its own debt or by borrowing directly from the Treasury. Though the FFB is authorized to issue up to \$15 billion of its own securities, it has raised virtually all of its funds through Treasury borrowing. On the only occasion when it issued its own securities, its market-determined borrowing costs were considerably higher than anticipated.

The rationale for creating the FFB was to lower the cost of marketing agency debt by effectively consolidating the debt of several agencies and by coordinating its placement. The differential between the rate paid on the FFB's borrowings and that earned on its holdings of various agencies' debt covers its operating expenses. The FFB currently acquires agency debt at a yield 12.5 basis points ($\frac{1}{8}$ percentage point) above the interest rate on Treasury securities of comparable maturity. The FFB itself borrows from the Treasury at this latter rate.

The balance sheets of a typical agency, the FFB, and the Treasury help to illustrate the method of

⁶Outlays, in general, refer to the expenditures and loans of an agency.

⁷The actual operations of the FFB are carried out in an office within the U.S. Treasury.

⁸Even though the SLMA is an independent, federally sponsored agency, its loan assets are fully guaranteed by the government and are, therefore, eligible for FFB financing.

⁹For simplicity, guaranteed loans are defined here to include certificates of beneficial ownership (CBOs), which some agencies issue. These CBOs are essentially ownership claims on a pool of loans, which themselves remain in the agency's possession. The CBOs are then guaranteed by the issuing agency. Under present accounting procedures, CBOs are not treated as agency debt.

Exhibit 2

Agency		FFB	
Assets	Liabilities	Assets	Liabilities
\$10 M Cash (Proceeds from sale of note to FFB)	\$10 M Note	\$10 M Agency Note	\$10 M Loan from Treasury
Treasury			
Assets	Liabilities		
\$10 M Loan to FFB	\$10 M Treasury Note		

FFB debt intermediation (exhibit 2). Suppose the agency has issued a new \$10 million note which the FFB purchases. The FFB, in turn, finances this transaction by borrowing \$10 million directly from the Treasury. The Treasury issues \$10 million of its securities to finance its loan to the off-budget FFB. This final transaction becomes part of the debt subject to the congressionally imposed statutory debt limitation.

In the case of on-budget agencies, the discipline imposed by the budget process may be compromised when the FFB acquires loan assets from agencies or loans guaranteed by agencies. This may occur because of the way in which spending authorizations are determined. In calculating the outlay totals for budgetary purposes for some on-budget agencies, repayments of past loans to the agency *and* the sale of existing loan assets are deducted from new loans. The resulting net new loan figure is the basis for determining the agency's budgeted outlays. For example, suppose an agency is budgeted to make outlays of \$10 million and currently has outlays totalling \$10 million, including \$7 million of loans. If it sells this \$7 million of loan assets to the FFB, its outlays for budgetary purposes then would amount to \$3 million.

Similarly, sales by an agency of guaranteed loans are treated as an offset to the agency's outlay totals for budgetary purposes. In effect, these loan-asset and guaranteed-loan sales become alternative means of financing the agencies' programs.

To illustrate this type of FFB intermediation, exhibit 3 again presents the balance sheets of an agency, the FFB, and the Treasury. Suppose the agency grants a loan of \$20 million to a borrower (A) and finances this loan with a sale of its own debt. If this debt is purchased by the FFB, the example parallels exactly the case developed in exhibit 2. The agency, however, can sell this loan (the loan asset)

Exhibit 3

Agency		FFB	
Assets	Liabilities	Assets	Liabilities
Loan Assets + Note from A \$20 Million - Note from A \$20 Million + Note from B \$20 Million	Debt \$20 Million	Loan Assets Note from A \$20 Million	Borrowings from Treasury \$20 Million
		Treasury	
		Assets	Liabilities
		Loans to the FFB \$20 Million	Treasury Debt \$20 Million

to the FFB if the loan is guaranteed by this or another agency. Suppose the agency conducts such a sale and uses the proceeds to issue a new loan to another borrower (B). The net result of this transaction is that the agency's balance sheet remains unchanged. The FFB's balance sheet now shows a \$20 million loan asset (the note from A) and a \$20 million liability in the form of its borrowings from the Treasury. Finally, the Treasury's balance sheet shows a \$20 million loan to the FFB and \$20 million in newly issued debt. The net result of this transaction is that the Treasury has indirectly financed the extension of an agency loan. This process could, in principle, continue repeatedly until the agency reached its lending limit. Only the most recently granted loan would appear on the agency's balance sheet as a loan asset (or note). The FFB, however, would be holding notes on all previously granted loans while the Treasury's debt would expand to accommodate these transactions.

When the FFB acquires a guaranteed loan from an agency, the transaction effectively transforms a *contingent* liability of the government (in the form of a loan guarantee) into a *direct* loan by the Treasury. This transformation occurs because the FFB finances its acquisitions with loans from the Treasury, which, in turn, finances the loan to the FFB by issuing new debt. Thus, the FFB's acquisition of guaranteed loans or loan assets tends to distort the budget process by lowering the *outlay* totals for budgetary purposes of those agencies authorized to make such sales. Nevertheless, sales of loan assets and guaranteed loans to the FFB, as well as the budgeted outlays, all ultimately affect the Treasury's indebtedness.¹⁰

¹⁰The dramatic increase in guaranteed loans and their extensive purchase by the FFB has led to several, as yet unsuccessful, legislative initiatives to limit their use.

A hypothetical example illustrates how these transactions could distort what many people consider the meaning of a "balanced" federal budget. Though it is widely believed that a balanced budget implies no additional federal borrowing, this is not necessarily true. Suppose that all authorized and budgeted outlays of agencies are fully financed by tax receipts. While the budget would be balanced, the Treasury or the FFB would still issue additional debt if at least one agency, whether on- or off-budget, grants loans that are then sold to the FFB in a loan asset sale. In this case, the net outlays of the agency remain unchanged, but the Treasury's debt rises when it finances the FFB's acquisition of the loan asset.

The FFB's operations have at least two additional effects on capital markets. First, the agencies' access to funds via the FFB lowers their cost of funds relative to low-risk private borrowers. While government insurance or loan guarantees for various programs have always given such programs a competitive edge in financial markets, the method of placement used before the FFB's creation did involve an implied market assessment of their riskiness. When different agencies issued debt, the market implicitly made a relative evaluation of the various programs. Furthermore, the cost of funds to the agencies prior to the FFB's creation was higher. This is evident from the fact that in 1974 the FFB initially was lending to the agencies at a 37.5 basis-point (% percentage point) premium over the new-issue Treasury bill rate. This rate was at or below the prevailing interest rate on agency securities at that time. This spread was reduced in two steps (in November 1974 and May 1975) to the present 12.5 basis points. In congressional hearings, these reductions were said to have primarily reflected a narrowing in the market spreads between yields on agency and Treasury issues as the general level of interest rates declined during the 1974-75 recession.¹¹ Although such yield spreads tend to be cyclical, the FFB's lending rate has maintained the same 12.5 basis-point spread over Treasury yields as interest rates have risen during the 1975-79 expansion. Thus, agencies can obtain funds at only a slight premium above the Treasury's own rates, a fact which may have the additional long-run effect of encouraging agencies to place more debt than otherwise.

A second effect the FFB has on capital markets results from the transformation of guaranteed loans into direct loans. Before the establishment of the FFB, insured agency loans were sold to the public in pri-

Table 2

Annual Averages of Monthly Levels
of Outstanding Debt
(Billions of Dollars)

Year	Aggregate Federal Debt	Treasury Debt	Agency Debt
1955	\$280.8	\$277.8	\$ 3.0
1956	280.0	276.1	4.0
1957	279.6	274.3	5.3
1958	283.7	277.2	6.5
1959	295.5	287.5	8.0
1960	298.8	289.1	9.6
1961	302.0	292.0	10.0
1962	311.7	299.5	12.2
1963	319.2	305.6	13.6
1964	328.3	312.7	15.6
1965	336.1	318.5	17.6
1966	346.1	323.5	22.6
1967	361.4	334.1	27.2
1968	386.2	352.2	34.0
1969	401.1	360.7	40.4
1970	424.1	375.6	48.6
1971	453.6	403.4	50.2
1972	485.4	432.5	52.9
1973	523.1	459.6	63.5
1974	556.1	477.7	79.4
1975	623.1	535.5	93.2
1976	711.0	620.0	101.5
1977	778.3	682.2	108.4
1978	864.9	754.3	124.9
1979*	924.9	797.6	144.1

*Average based on first six months of 1979.

SOURCE: Federal Reserve Bulletin.

vate capital markets. Since its formation, however, the FFB (and ultimately the Treasury) has financed an increasing portion of these transactions. By effectively underwriting loans to the private sector in this way, the FFB channels loanable funds to relatively high-risk borrowers who otherwise would have acquired the loans only at a higher cost, if at all.

Federally Sponsored Agencies

In addition to federally owned agencies, Congress has also established several *federally sponsored* agencies to allocate credit to selected sectors of the economy. Because these sponsored agencies either were converted to private ownership or were initially established as private enterprises, their activity falls completely outside the budgetary process. Like federally owned agencies, they channel funds to specialized sectors within the economy, either through

¹¹Loan Guarantees and the Federal Financing Bank, Hearings before the Subcommittee on Economic Stabilization, 95 Cong. 1 Sess. (GPO, 1977), p. 180.

Table 3

Percent Changes in
Annual Averages of Outstanding Debt

Year	Aggregate Federal Debt	Treasury Debt	Agency Debt
1956	-0.3%	-0.6%	30.5%
1957	-0.2	-0.6	33.0
1958	1.5	1.0	24.3
1959	4.1	3.7	22.5
1960	1.1	0.6	20.1
1961	1.1	1.0	4.0
1962	3.2	2.6	21.9
1963	2.4	2.0	11.1
1964	2.9	2.3	15.1
1965	2.4	1.8	12.9
1966	3.0	1.6	28.5
1967	4.4	3.3	20.4
1968	6.9	5.4	24.8
1969	3.9	2.4	18.7
1970	5.7	4.1	20.3
1971	6.9	7.4	3.4
1972	7.0	7.2	5.4
1973	7.8	6.3	20.0
1974	6.3	3.9	25.0
1975	12.0	12.1	17.4
1976	14.1	15.8	8.9
1977	9.5	10.0	6.8
1978	11.1	10.6	15.1
1979*	6.9	5.7	15.4

*Based on first six months of 1979.

direct loans to individual borrowers or through the purchase of loans that were initiated in the private sector. These government-sponsored agencies are listed in panel C of exhibit 1.

The programs and debt of sponsored agencies are not part of the unified budget, are not subject to the debt limitation of Congress, and, except for the SLMA, do not involve indirect FFB financing by the Treasury. Many of these programs were converted to private ownership and thereby removed from the budgetary process soon after Congress adopted the new unified budget concept in 1967. Though these agencies' budgets are not directly subject to congressional review, their activity is not completely independent of the federal government. For instance, FNMA has a guaranteed emergency access to Treasury loans up to specific limits. Despite the formal distinctions usually made between the Treasury and the sponsored agencies, the debt of these agencies constitutes a source of federally related credit demand in U.S. capital markets.

AGGREGATING FEDERAL DEBT

The sum of Treasury debt, federally owned on- and off-budget agency debt, and federally sponsored agency debt is a more appropriate measure of the federal government's full impact on U.S. credit markets. Since the FFB essentially converts agency debt into Treasury debt, that debt which the FFB intermediates must be deducted from the total. An example will clarify this calculation.

When an agency issues debt to finance its programs, that debt is counted in the total of agency debt outstanding. When the FFB purchases this debt, it borrows from the Treasury which, in turn, issues new Treasury debt, thereby adding to the total Treasury debt outstanding. A simple total of these two debt categories essentially would count the agency-initiated debt twice. For example, this double counting would occur if, in exhibit 2, the debt of the agency and that of the Treasury were added together. Since the FFB essentially passed the agency debt through to the Treasury, the debt should be counted only once. Subtracting the FFB-financed debt eliminates this double counting.¹²

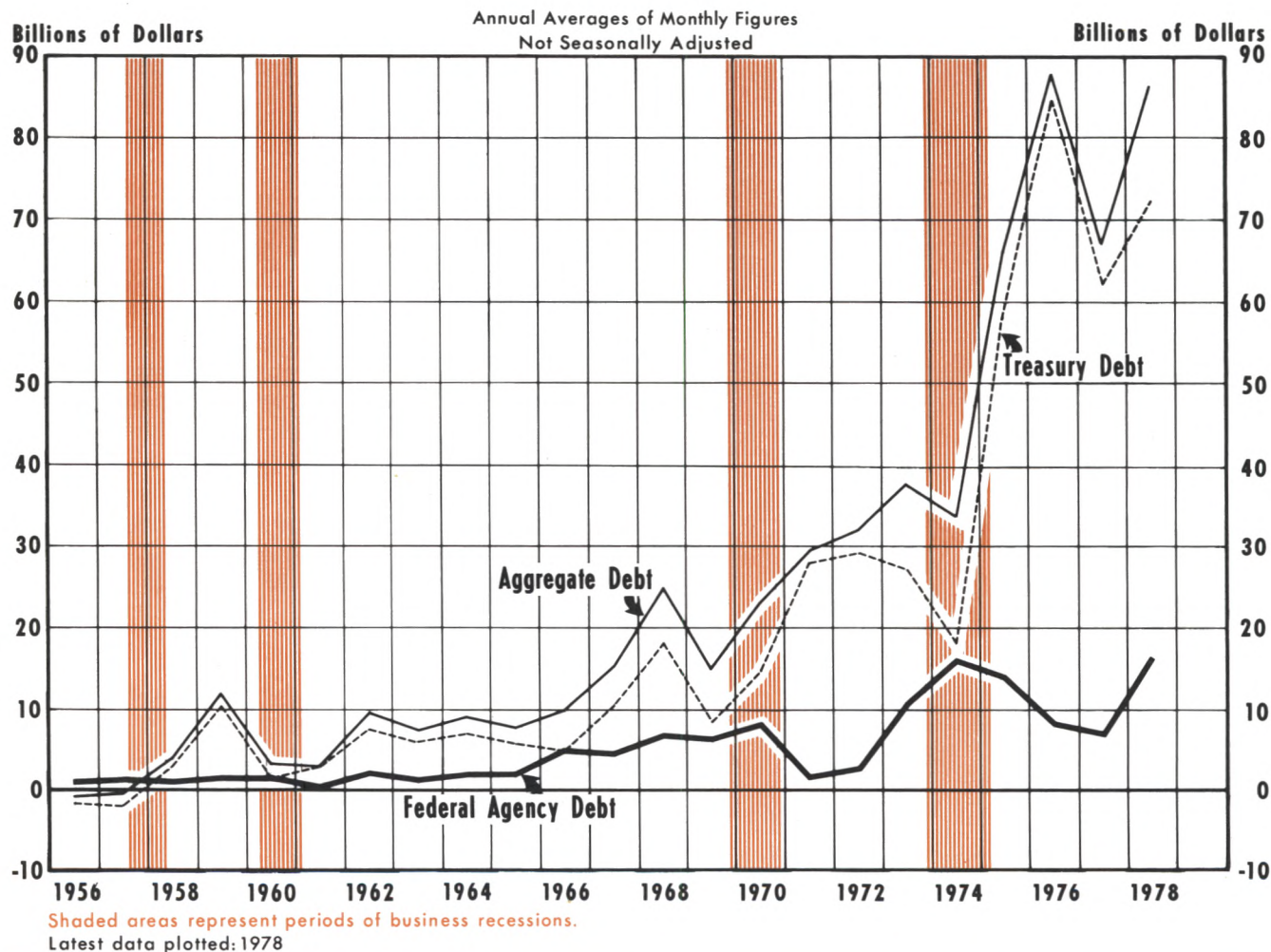
Table 2 reports the annual outstanding debt of the Treasury, of all agencies, and the sum of these two categories (aggregate federal debt) after netting out FFB debt financing. These data reveal a substantial increase in the outstanding debt of the agencies. (From here on, federally owned agencies and federally sponsored agencies will be referred to as "agencies.") From 1955 to 1978, outstanding agency debt grew at an annual rate of 17.5 percent while Treasury debt grew at the much slower rate of 4.4 percent. In 1955, agency debt constituted only about 1 percent of all debt raised under federal auspices. By 1978, it totalled more than 14 percent of all federally related debt.

Table 3 reports annual growth rates for the three debt categories. Comparing the growth rates of Treasury debt and aggregate federal debt reveals that aggregate federal debt grew faster in every year except 1971, 1972, and 1975-77.¹³

¹²Only FFB intermediation of agency debt needs to be netted out of the total, since FFB loan asset acquisitions, in effect, transform agency assets into Treasury indebtedness. In exhibit 3, adding agency debt and Treasury debt together would entail no double counting.

¹³A one-tailed t-test was performed on the mean difference between the two growth rates, calculated over the period 1956-78. The tests confirmed, at the .995 confidence level, that the growth of aggregate federal debt was significantly faster than the growth of Treasury debt.

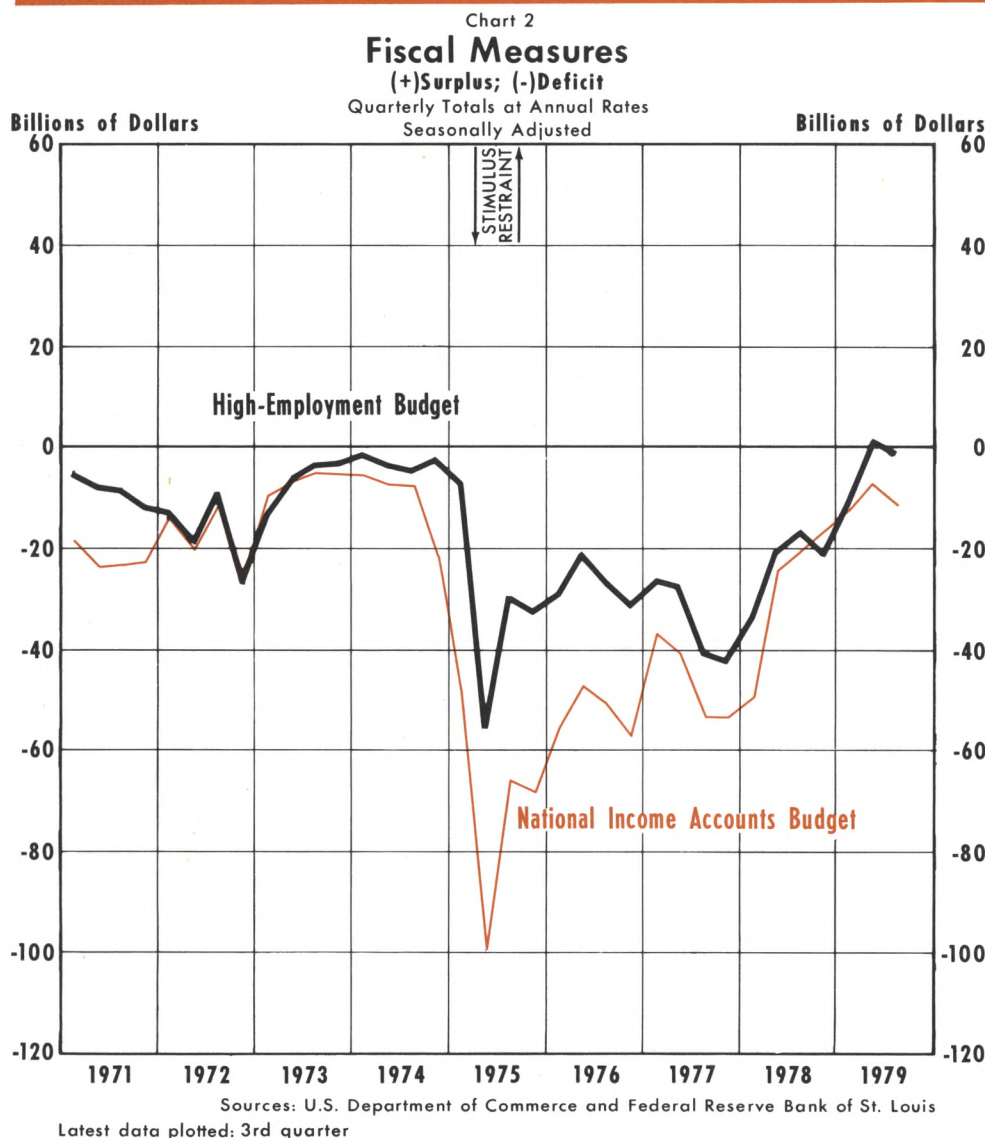
Chart 1
Change in Debt



The reversal of the growth trend from 1975-77 requires some explanation. The sharp deceleration of agency debt growth from 1975 to 1977 was accompanied by a sharp acceleration of Treasury debt growth. The annual growth rate of Treasury debt after 1974 is more than four times its growth rate for the entire period 1955-73. Since the post-1974 period spans the life of the FFB, the data suggest that the FFB has, in fact, transferred the debt financing operations from the agencies to the Treasury. However, the sharp acceleration in the growth rates of both Treasury debt and aggregate federal debt since 1974 can be only partially attributed to the effect of FFB financing, since even budgeted programs have required unusually large debt financing in this period.

When the impact of government debt is measured only by Treasury debt, a substantial portion of the

effect of federal programs on credit markets is overlooked. The potential consequences of this oversight can be illustrated with an example. The administration's recent energy proposal calls for the establishment of a "private" government-sponsored corporation to develop synthetic fuels. Estimates of the additional debt this corporation would issue run as high as \$80 billion over the next decade. The debt of this federally sponsored corporation alone would increase off-budget agency debt by more than 60 percent over present levels, yet would neither be included in commonly used measures of the federal debt nor be reflected in the official federal budget. Because the fund-raising activities of all programs under federal auspices affect capital markets, however, it is appropriate to examine the total of federally related debt when analyzing the government's impact on credit markets.



and since fiscal actions regarding federal expenditures and tax receipts are reflected in the budget deficit or surplus, changes in Treasury debt could be expected to vary countercyclically.

An important distinction between the activity of the Treasury and the agencies must be noted, however. Federally owned and sponsored agencies' activities frequently are directed toward allocating credit to specific sectors of the economy. In particular, a large portion of total agency debt is used to moderate cyclical fluctuations in the housing sector.

Near the peak of business cycle expansions, interest rates generally have risen to levels that approach or exceed regulatory ceiling interest rates on time and savings deposits. Consequently, financial intermediaries such as savings and loan associations and mutual savings banks have experienced difficulty in attracting the funds needed to maintain mortgage loan activity. Agencies such as the FHA, GNMA,

and FNMA have attempted to offset this effect by increasing their lending (or by purchasing loan assets) in the housing or mortgage markets. This activity has been financed by increasing the agencies' debt at or near business cycle peaks. This implies a tendency for agency debt to behave procyclically, in contrast to the countercyclical behavior of Treasury debt.

Changes in Treasury debt outstanding (chart 1) indicate that Treasury borrowing tends to follow changes in the budget deficit (chart 2), rising during recessions and declining near business cycle peaks. Agency borrowing, on the other hand, tends to rise just before the business cycle peak and to decline after the onset of a recession. Since Treasury borrowing has generally been substantially larger than agency

IMPLICATIONS OF AGGREGATING ALL DEBT RAISED UNDER FEDERAL AUSPICES

Federal Borrowing and the Business Cycle

When cyclical fluctuations in GNP growth are associated with similar fluctuations in private credit demands, the government can avoid amplifying the resulting interest rate cycle with its own debt operations. If increases in government debt are kept lower during business expansions than during contractions, pressures on interest rates from federal debt operations would be moderated over the business cycle. Since a major objective of federal fiscal policy is to counteract cyclical fluctuations in economic activity,

borrowing, changes in aggregate federal debt have tended to mirror changes in Treasury debt. Nevertheless, ignoring the behavior of agency debt leads to an overstatement of the degree to which government borrowing has been countercyclical.

The effect of agency borrowing on cyclical movements of interest rates is also important in examining the interaction of the federal government and the Federal Reserve System. Through open market purchases of government securities, the Federal Reserve can attempt to counteract the upward pressure on interest rates that can occur when the Treasury borrows. The extent to which Federal Reserve policy accommodates Treasury debt operations is a critical issue in the debate over the impact of government deficits on inflation. Note, however, that the Federal Reserve can undertake open market operations using both Treasury and agency securities. One might expect then, that when the Treasury and agencies increase their debt, the Federal Reserve would tend to increase its holdings of both types of debt. In fact, Federal Reserve holdings of agency securities have increased substantially in recent years, rising from less than \$1 billion in early 1972 to more than \$8 billion by August 1979.¹⁴ Consequently, studies of Federal Reserve responses to fiscal actions—such as the issue of whether larger government deficits are associated with higher money growth—should consider the expenditures and debt operations of both the Treasury and the agencies.

If off-budget agencies, especially the federally sponsored “private” corporations, continue to proliferate, agency borrowing as a proportion of all debt raised under federal auspices will become increasingly larger. Consequently, the behavior of aggregate federal borrowing over the business cycle could change significantly if the federal government continues to rely on these agencies to change the allocation of the economy’s resources while at the same time keeping their outlays out of the budget process.

The High-Employment Budget Concept

Since the early 1960s, many economists have emphasized that simple budget concepts overlook the impact of economic activity on the budget. Specific-

ally, during recessions the budget tends to fall deeper into deficit as unemployment insurance coverage and other social programs expand. Some economists argue, therefore, that the relevant measure of the budget’s impact on the economy is a *full-employment* or *high-employment budget* concept. This concept estimates the size of the budget deficit or surplus that would result if the economy were at a high level of employment. The high-employment budget deficit then measures the impact on the economy of the government sector alone.

Chart 2 plots both the actual and the high-employment budget measures. These budget measures are calculated on a national income accounts (NIA) basis rather than the unified budget basis. The chief difference between the two methods is that the NIA budget nets out all loan activity while the unified budget does not. The NIA high-employment budget concept is an unofficial measure that is used by the Council of Economic Advisors and others for assessing the impact of the government sector on economic activity.¹⁵ The rationale for netting out government loan activity is that such loans constitute a contingent liability and are not truly expenditures. This approach, however, overlooks allocational effects of such loans. Further, since the volume of such loans may vary over the business cycle, the NIA budget concept overlooks some important aspects of the relationship between government spending and economic activity.

Measures of the high-employment budget ignore the off-budget expenditures and receipts of both government-owned and -sponsored agencies. Consequently, the high-employment budget concept understates the economic stimulus attributable to the federal government. Since a major part of off-budget agency activity involves loans, which the NIA budget concept nets out, placing these agencies on budget would have little effect on the currently constructed high-employment budget. Any additional economic stimulus generated by off-budget programs still would not be taken into account when evaluating a high-employment budget measure.

Chart 2 shows that during the recent expansion (I/1975-II/1979) the high employment budget was, like the actual NIA budget, considerably in deficit.

¹⁴On February 15, 1977, the Federal Open Market Committee amended its guidelines for the conduct of Federal Reserve System operations in federal agency issues to take account of the FFB. Federal Reserve purchases of agency securities were limited to those agencies that are not eligible to borrow funds from the FFB, although securities issued by the FFB itself may be purchased. See Board of Governors of the Federal Reserve System, *64th Annual Report, 1977* (1978), pp. 189-90.

¹⁵Though the idea of the high-employment budget has a long history, it was first given prominence in a policymaking context during the Kennedy Administration. For a discussion of full-employment budget concepts and their application, see Alan S. Blinder and Robert M. Solow, “Analytical Foundations of Fiscal Policy,” in *The Economics of Public Finance*, (Washington, D.C.: The Brookings Institution, 1974), pp. 3-115.

During the latter part of this period, accelerating inflation accompanied a rapid growth of agencies' activity, as reflected in their debt. Thus, at least during the past year, the conventional high-employment budget measure is likely to have understated the effect of the government's overall impact on the economy.

Balanced Budget Proposals

Political pressure to contain government spending, especially deficit spending, has increased during the past few years. The most familiar proposals call for a constitutional amendment either to balance the budget, to limit federal spending to a specific percentage of GNP, or to limit tax revenues.

Debate on these issues has centered on a few key arguments about the desirability and practicality of such limitations. Both sides in this debate, however, have often overlooked the federally owned and federally sponsored programs that are not part of the budget. The existence of these programs and their potential for expansion raises serious questions about the effectiveness of constitutional amendments or legislation directed at containing government spending. For instance, Congress could satisfy requirements for balancing the budget by removing some agencies and their programs from the budget or by redesignating them "private" institutions, as was done with the Federal National Mortgage Association in 1968. Either action would improve Congress' ability to balance the budget, but would violate the amendment's intent. Ignoring these potential congressional actions reduces the likelihood that constitutional reforms, if adopted, will achieve their supporters' objectives.

SUMMARY AND CONCLUSIONS

While the function of federally owned and federally sponsored agencies primarily involves questions of microeconomic importance, these agencies also generate effects that are macroeconomic in nature. When fiscal policies are examined, the actions of these independent, off-budget agencies are frequently ignored. Aggregating these agencies' debt with Treasury debt is necessary to assess the full impact of federal programs on the economy, especially on credit markets.

The growth of off-budget spending, especially that financed indirectly by the Treasury through the Federal Financing Bank, underscores the importance of these agencies. In practice, the FFB permits some programs to be funded without undergoing congressional review through the budget process.

When analysts evaluate the government's cyclical impact on capital markets and the economy, they usually examine only the behavior of Treasury debt. This approach, however, could produce misleading conclusions since agency debt behaves differently over the cycle than Treasury debt. Agency debt tends to fluctuate procyclically, thereby dampening the countercyclical effects of Treasury debt operations. Disregarding agency activity could also lead to incorrect measurement of the fiscal impact contained in any given "full-employment" budget measure.

Agency debt activity also has important implications for recent proposals to balance the budget. If the alternative of financing federal programs through off-budget agencies is overlooked, proponents of a balanced budget may find that adoption of their proposals will fail to achieve their objectives.

