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Disentangling Monetary and Fiscal Policy

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Fiscal year 1982 began amid widespread concern that the Federal budget deficit would exceed the Reagan Administration's original estimate of $42.5 billion. This concern, which helped hold interest rates at historically high levels, was reinforced when the Administration itself announced new estimates of a $99 billion deficit in 1982, $92 billion in 1983, and $83 billion in 1983 and 1984. The projected deficit in 1982, for example would be around 3½ percent of a consensus forecast of GNP, the largest such percentage since World War II. However, this percentage is not large by comparison with those in some countries which have had comparatively low inflation and interest rates. In Japan, for example, the 1981 deficit also was about 3½ percent of GNP, while inflation was about 5½ percent, and money-market interest rates were around 7½ percent.

Why, then, the concern about deficits in the United States? Investors fear that future large deficits foreshadow a future acceleration of monetary growth, and in turn a reacceleration of inflation. Such expectations apparently held interest rates up through most of 1981. This fear that growing deficits will lead to rising inflation apparently did not operate in Japan because the monetary authorities there held monetary growth rates to noninflationary levels for years despite large deficits.

But is it even true that budget deficits and monetary growth have been in fact related in the United States? Surprisingly, the professional economics literature yields both yes and no answers to that question. This paper reexamines the question by introducing the concept of "fiat" money as a measure of monetary-policy actions, and as a way to disentangle monetary from fiscal-policy actions. Fiat money is that part of the total monetary base which is directly controlled by Federal Reserve actions. It is also that part of the monetary base which must increase if the Federal Reserve is going to finance Federal budget deficits directly.

The analysis of data for entire business cycles supports the view that deficits have led to faster money growth in the United States since World War II. Prior to 1970, the association between money and deficits occurred to some extent because *uncontrolled* sources of monetary growth were positively related to interest rates, which tend to rise with deficits, thereby inducing monetary growth. But since 1970, controlled sources of monetary growth (i.e. fiat money) appear to have been closely linked to deficits. Thus the Federal Reserve partly financed the large Federal government deficits during the 1970s through changes in its controlled policy variable, fiat money.

The paper also examines the effect of monetary and fiscal-policy impulses on nominal spending (GNP) growth in the U.S. economy. This analysis shows that high-employment government spending, a measure of fiscal-policy impulses, has had a significant long-run influence on nominal GNP, but mainly *through* an induced effect on monetary growth. In contrast, monetary-policy actions as measured by fiat money are shown to have exerted a significant *independent* effect on total spending. Thus, to prevent an automatic accommodation of deficits by monetary policy, the Fed must actively reduce growth in fiat money. It is important that the Fed do so over the next few years to prevent the possibility of another round of inflation being induced by the large government deficits currently projected.

Section I of this paper defines fiat money and

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discusses its relationship to the monetary base. Section II examines the historical relationship between Federal deficits and monetary growth in the United States on the basis of the concept of fiat money. Section III analyzes the impact of monetary fiscal-policy impulses on aggregate demand, and Section IV presents conclusions and policy implications.

I. Fiat Money and the Monetary Base

The monetary base consists of bank reserves plus currency held by the public, i.e., the net monetary liabilities of the Federal Reserve and Treasury held by the public and financial institutions. The monetary base is important for the conduct of monetary policy because growth in the base is closely associated with growth in the monetary aggregates, the main conduit of Federal Reserve policy.

Fiat money is essentially that part of the monetary base not issued against private liabilities or international monetary assets. Specifically, it is that part of the monetary base that is matched by the Federal Reserve's holdings of Treasury securities, plus Treasury currency outstanding (less deposits issued by the Fed to the Treasury and Treasury holdings of cash).[1] Most of the rest of the monetary base is matched by Fed and Treasury holdings of gold and the debt of foreign governments and the borrowings of U.S. commercial banks (see Table 1).

The concept of fiat money (as opposed to base money) is of interest, first, because it is part of the Federal government's budget constraint. When the government spends more than it collects through taxes and sales of assets, the resulting deficit *must* be financed either by selling interest-bearing securities to the public or by increasing fiat money. The latter is accomplished mainly when the Federal Reserve buys government securities through its open-market operations, issuing reserves to banks in exchange for government securities.

Second, fiat money is the main exogenous or controlled part of the monetary base: i.e., if a government deficit is financed by increases in fiat

Table 1
Fiat Money and the Monetary Base
Outstanding in Fourth Quarters
(Billions of Dollars)

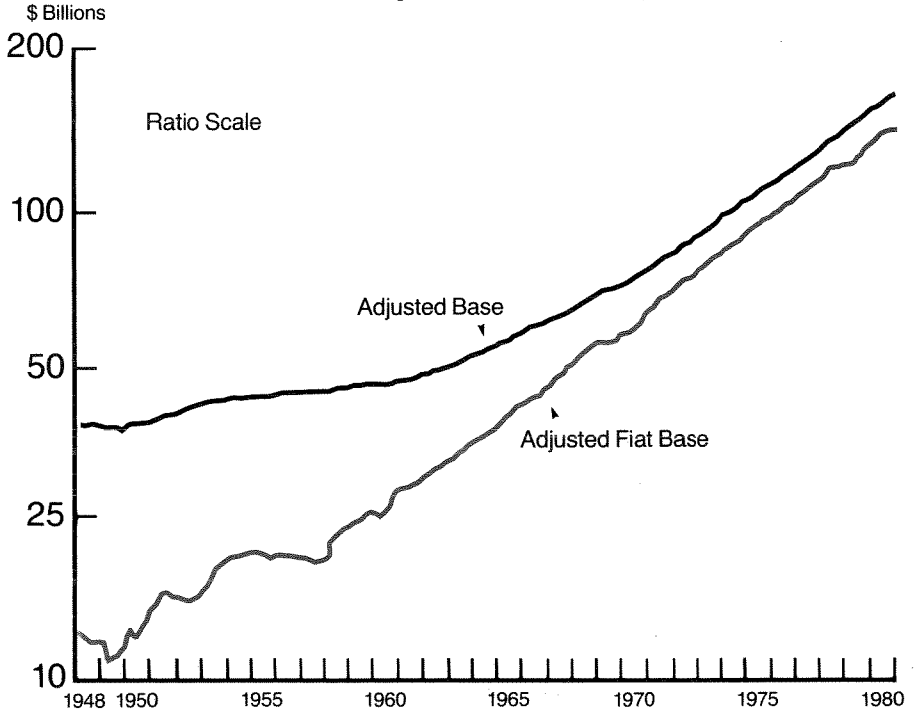
Sources of Fiat Money	1980	1970	1960
Federal Reserve Holdings of:			
U.S. Government Securities	$120.4	$60.5	$27.4
Federal Agency Securities	9.0	—	—
Treasury Currency Outstanding	13.4	7.1	5.4
Less:			
Treasury Deposits	3.0	.9	.5
Treasury Cash	.5	.4	.4
Fiat Money	139.3	66.3	31.9
Less: Reserve Adjustment Magnitude	1.9	5.4	4.0
Fiat Money Adjusted	$137.4	$60.9	$27.9
Other Sources of Monetary Base (not in Fiat Money)			
Gold Stock & Foreign Exchange Holdings of the Federal Reserve	$ 16.2	$10.9	$17.7
Loans to Commercial Banks	1.8	.3	—
Float	4.5	4.3	1.9
Foreign Deposits	.4	.3	.2
Miscellaneous	-1.5	-2.6	-2.1
SUBTOTAL	$ 21.4	$13.2	$17.7
MONETARY BASE	$158.8	$74.1	$45.6

money, this can be regarded as a conscious policy action of the Federal Reserve. The part of the base not included in fiat money, the "uncontrolled" portion, is positively related to interest rates. Thus government deficits also may induce increases in this endogenous part of the base by applying upward pressure on interest rates. These increases in the base can occur without a conscious policy action of the Federal Reserve.

The monetary aggregates will grow more rapidly in response to faster growth in either fiat money or the uncontrolled part of the base. Thus there is a potential direct link from deficits to fiat money to growth in the monetary aggregates, and an indirect link from deficits to higher interest rates to induced increases in the base and money growth. The latter linkage works more or less automatically. The former linkage need not work at all unless the Federal Reserve chooses to finance government deficits by increasing its holdings of government securities. Thus, deficits financed by increases in fiat money are "acts" of commission, whereas those financed by induced increases in the uncontrolled part of the base are "acts" of omission.

What are these induced or noncontrolled sources of growth in the monetary base? The part of base money not included in fiat money is about 15 percent of the monetary base, as compared with 39 percent in 1960 (see Table 1 and Chart 1). The uncontrolled items included in base money are mainly member-bank borrowing from the Federal Reserve, the international monetary-reserve holdings of the monetary authorities, and Federal Reserve Float. These noncontrolled sources vary directly and significantly with respect to interest rates.[2] First, a higher Federal funds rate relative to the discount rate induces banks to borrow more from the Federal Reserve. Second, attracted by comparatively high interest rates, foreign investors and governments would have an incentive to sell their currencies and gold to get dollars to buy U.S securities. If U.S. monetary authorities take actions to stabilize exchange rates, they would buy the foreign currencies in exchange for newly created

Chart 1
Fiat Money and Monetary Base



dollars of base money. Thus, an increase in a government deficit (and associated higher interest rates) tends to induce increases in the monetary base, which then lead to higher money growth.

In summary, it makes no difference in money-growth terms whether base money is created through the issuance of fiat money and direct financing of Federal deficits, or through induced increases in the uncontrolled part of base money. Both cause the money supply to grow faster, leading ultimately to more inflation. But for the purpose of evaluating Federal Reserve reactions to deficits, fiat money represents the principal magnitude that can be manipulated by the monetary authorities, and thus it may provide some clues about how monetary and fiscal policy have been related.

II. Federal Deficits and Monetary Growth

As noted earlier, there is no *necessary* association between deficits and monetary growth. Whatever the deficit, the monetary authorities could always take sufficiently contractionary actions in reducing fiat money to prevent monetary growth. This reduction could be accomplished by the Fed selling Treasury securities and thereby lowering bank reserves. The question is not whether mone-

Table 2
Federal Budget Deficits and Monetary Growth
in Business Cycle Expansions and Contractions

			Annual Rate of Change in		
	Federal Budget Deficit (DEF)* ($Billions)	DEF / PXF[1]	M-1B[2]	M-2[2]	A[2]
Contractions					
1948:4 - 1949:4	1.46	.53	- .55	- .18	- 1.44
1953:3 - 1954:2	8.73	2.38	.59	2.32	.48
1957:3 - 1958:2	4.50	.95	.49	3.72	1.52
1960:2 - 1961:1	- .03	- .01	1.41	4.11	1.77
1969:4 - 1970:4	9.10	.88	3.87	5.59	4.86
1973:4 - 1975:1	15.92	1.04	3.59	6.01	6.56
1980:1 - 1980:3	58.97	2.16	3.52	6.69	5.25
All contractions	12.19	1.08	1.89	3.99	2.82
Expansions					
1949:4 - 1953:3	- 1.74	- .65	3.68	3.83	3.29
1954:2 - 1957:3	- 2.72	- .62	1.62	2.61	.87
1958:2 - 1960:2	2.96	.63	1.84	2.25	.77
1961:1 - 1969:4	2.58	.39	4.06	6.49	4.70
1970:4 - 1973:4	15.25	1.33	6.25	9.17	6.94
1975:1 - 1980:1	42.27	2.24	6.64	8.50	7.53
All expansions	10.45	.60	4.27	5.96	4.49

* Quarterly average

[1] The Federal deficit relative to nominal high-employment output (PXF), i.e., real potential output times the implicit GNP price deflator.

[2] Definitions of monetary aggregates:

M-1B = Money narrowly defined to include currency, demand deposits, travelers checks, and other checkable deposits.

M-2 = Money defined to include currency plus demand deposits plus time deposits at commercial banks other than large negotiable CD's. Values for 1980 were extrapolated on the basis of the growth rates for newly defined M-2.

A = Adjusted monetary base = member-bank reserves plus adjustment for reserve-requirement changes, plus currency held by the public and non-member banks.

F = Fiat money = Federal Reserve holdings of U.S. government securities, plus Treasury currency outstanding, less Treasury deposits with the Federal Reserve Banks and Treasury cash holdings, plus reserve requirement adjustment.

tary growth and deficits have to be related, but whether they *have* been related in the United States.

The divergent cyclical movements in budget deficits and monetary growth have clouded the relationship. Monetary growth—as measured by M-1, M-2, and the monetary base—historically has been most rapid during business-cycle expansions, whereas the deficit has been largest during contractions (see Table 2). Such divergent patterns suggest a negative relationship in the short-run.

However, the long-run relationship is of most interest, because it takes a long-run increase in money growth to raise the underlying rate of inflation. Popular opinion contends that in the long-run, deficits increase the demand for credit and thereby put upward pressure on interest rates. To mitigate the impact of Federal borrowing on interest rates, the Federal Reserve buys government securities and increases monetary growth. However, the professional economics literature is not conclusive in this area.[3] As will be shown, data for the post-World War II period confirm the popular view that monetary growth and deficits have in fact been positively associated.

Secular Evidence

We have used data averaged over entire business cycles (i.e., peak-to-peak or trough-to-trough) to focus on the long-run relationship between deficits and monetary growth. These data allow us to abstract from the inverse relationship between deficits and money growth over business-cycle expansions and contractions, and thus to focus attention on the longer-run trends in both policies.

The data show a close association between monetary growth and deficits over the 1948-80 period (Table 3 and Charts 1-3). We show deficits both in absolute nominal magnitudes and as a percentage of nominal high-employment output (PXF). Monetary growth measures include M-1, M-2, A and F (the monetary base and the fiat monetary base, respectively, both after adjustment for required-reserve ratio changes).

The pre-1970 experience suggests at best a weak association between monetary growth and (relatively small) deficits. There were Federal budget surpluses or small deficits over the two cycles from 1948 through 1958 (Cycles 1 and 2 in Table 3). The money supply as measured by the standard aggre-

Table 3
Federal Budget Deficits and Monetary Growth
Over Complete Business Cycles

Complete Business Cycles	Federal Budget Deficit (DEF)* ($Billions)	DEF/PXF*	Annual Rate of Change in M-1B	M-2	A	F
Trough to Trough						
1949:4 - 1954:2	0.07	- .13	3.22	3.71	2.87	8.78
1954:2 - 1958:2	- 1.02	- .25	1.81	2.45	.88	1.64
1958:2 - 1961:1	2.55	.54	1.85	3.06	1.16	7.19
1961:1 - 1970:4	3.57	.47	4.13	6.51	4.84	7.65
1970:4 - 1975:1	16.09	1.23	5.40	8.17	6.82	7.76
1975:1 - 1980:3	44.70	2.27	6.82	9.00	7.90	8.11
1949:4 - 1980:3	11.43	.72	4.05	5.92	4.51	7.08
Peak to Peak						
1948:4 - 1953:3	- 1.22	- .48	2.81	3.02	2.27	6.73
1953:3 - 1957:3	- 0.58	- .06	1.48	2.69	.83	.45
1957:3 - 1960:2	2.73	.58	1.54	2.92	1.08	7.12
1960:2 - 1969:4	2.77	.34	3.89	6.38	4.52	8.14
1969:4 - 1973:4	13.30	1.16	5.91	8.66	6.74	8.44
1973:4 - 1980:1	36.07	1.94	5.97	7.94	7.31	7.47
1948:4 - 1980:1	9.70	.61	3.87	5.68	4.22	6.74

*Quarterly average
See Table 2 for definitions of monetary aggregates

gates M-1, M-2 and A increased roughly at a 3-percent annual rate over the 1948-54 cycle (2) compared with the previous cycle. Annual budget deficits rose to average $2½ to $3½ billion over the two cycles (3 and 4) in 1958-70. Average monetary growth increased somewhat in the 1958-61 cycle, but at a much faster pace in the 1961-70 period.

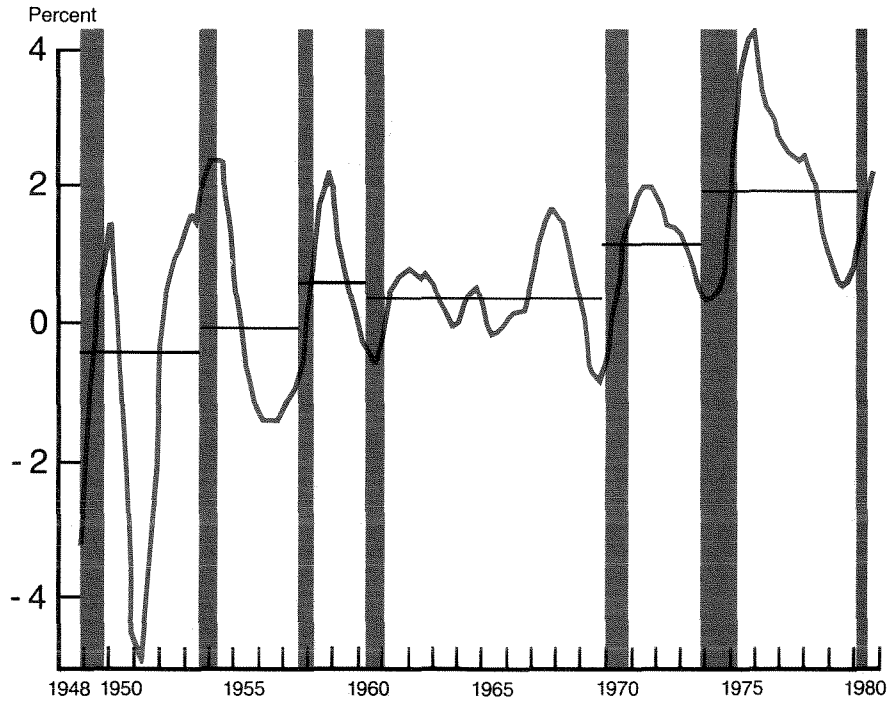
But the deficit and money-growth changes that occurred in the next two cycles reveal a strong association, not unlike what had been observed during World War I and World War II. Over 1970-74, the average deficit quadrupled and monetary growth accelerated further (see Charts 2 and 3). During the 1974-80 period, deficits increased an additional three-fold and monetary growth accelerated again. Regression analysis confirms the statistically significant relationship between deficits and money growth on a cyclical average basis.[4]

The analysis of quarterly data for the entire 1948-80 period reinforces the significant association between deficits and monetary growth (Table 4). The estimated money-supply model resembles the one estimated previously in the literature. Money growth is explained by a distributed lag on deficits, measured as a ratio to nominal high-employment output (PXF).[5] These estimates indicate a statistically significant relationship, with around 50 percent of the variation in money growth being explained by deficits.

This relationship has generally been attributed to the behavior of the monetary authorities in attempting to damp interest-rate movements associated with Federal deficits and changes in outstanding Federal debt.[6] But the longer-term data for fiat money-base growth suggest that this was not generally the case for the controlled part of money growth

Chart 2

Deficit/High-Employment Output



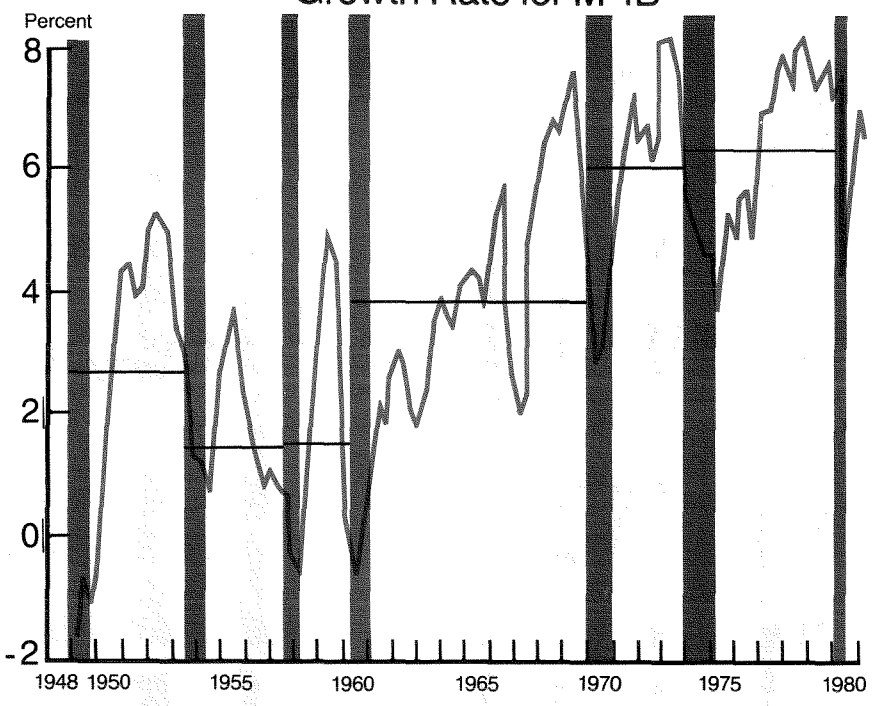
Shaded areas represent business cycle contractions as defined by National Bureau of Economic Research

Table 4
Federal Budget Deficits and Monetary Growth: 1948:3 - 1980:4
$M = Constant + a(DEF/PXF) + bM_{-1}$

Monetary Aggregate	Constant (T-value)	a (T-value)	b (T-value)	R^2 (SE)	RHO (T-value)	DW
M-1B	1.015	.287	.722	.423	- .246	1.998
	(3.46)	(2.76)	(12.03)	(2.380)	(- 2.88)	
M-2	1.705	.407	.678	.605	- .011	1.944
	(4.43)	(3.32)	(11.38)	(2.197)	(- .13)	
A	.707	.186	.831	.574	- .447	2.227
	(3.03)	(2.14)	(17.77)	(2.161)	(- 5.68)	
F	7.631	- .124	- .057	.101	.338	2.018
	(6.41)	(- .241)	(- .640)	(7.24)	(4.07)	

See Table 2 for definitions of monetary aggregates

Chart 3
Growth Rate for M-1B

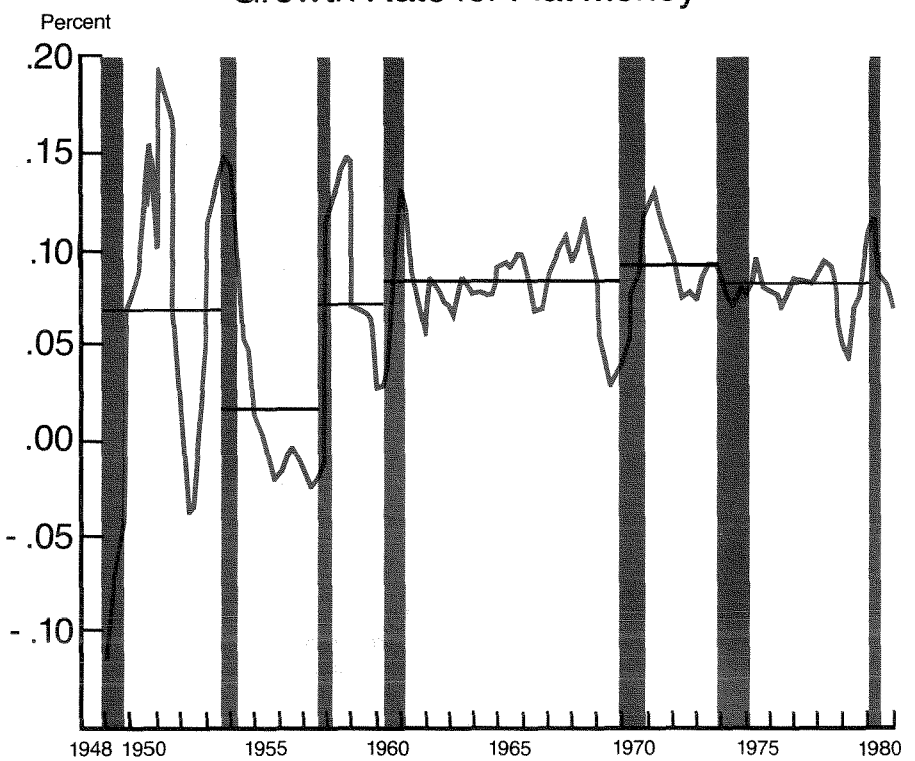


Shaded areas represent business cycle contractions
as defined by National Bureau of Economic Research

up to 1970. According to Table 3, fiat base growth was inordinately large relative to monetary growth and to real growth, both during cycles with comparatively small deficits, such as 1948-53 (Cycle 1) or 1957-60 (Cycle 3), and during cycles with comparatively large deficits, such as 1969-73 (Cycle 5) and 1973-80 (Cycle 6). From the late 1950s through 1971, the U.S. monetary authorities pumped in fiat money at a high rate, at least in part to prevent an undesired decline in the uncontrolled part of the monetary base (Chart 1). This decline resulted from sales of gold by the United States to foreign governments to preserve the fixed price of gold under the dollar-gold standard.

But with the relinquishing of the gold standard in 1968 and the adoption of floating exchange rates in 1973, the monetary authority no longer needed to sell gold or foreign exchange to peg the exchange rate. Fiat money growth itself became the main factor explaining high rates of growth in the standard monetary aggregates. This may reflect the Federal Reserve's desire to prevent interest rates from rising during a period of cumulating deficits and rising inflation. Ever since the end of World War II (with the exception of a brief period in the 1950s), fiat-money growth was a highly expansionary factor. But until the 1970s, fiat money growth was partly offset by flows of gold and foreign exchange, and thus was not nearly so expansionary as it subsequently proved to be.

Chart 4
Growth Rate for Fiat Money



Shaded areas represent business cycle contractions as defined by National Bureau of Economic Research

III. Impacts of Monetary and Fiscal Policy on Aggregate Demand

This section focuses on the effects of monetary- and fiscal-policy impulses on aggregate demand for goods and services (i.e., nonimal GNP). It examines estimates of so-called St. Louis equations in which the change in nominal GNP (Y) is related to current and past changes in a monetary aggregate (M); a fiscal-policy variable, high-employment government spending (EF); and an international-trade impulse, exports (EX). Increases in each would theoretically increase Y.[7]

The results obtained with certain monetary variables (M-1, M-2 and A) confirm that monetary growth has a permanent long-run impact on spending, whereas the effects of fiscal policy are only transitory (Table 5). This result implies that without monetary accommodation (i.e., with constant monetary-growth rates), larger government spending would not lead to higher inflation rates.

In contrast, the results obtained with a fiat-money monetary variable show a significant long-run effect of increases in the growth of government spending on the growth in nominal GNP. This is to be expected, since the uncontrolled sources of the monetary base are positively associated with interest rates. By implication, the money-supply function for a given setting of fiat money is positively

Table 5
Aggregate Equations: 1953:1 - 1980:4

$$Y_t = \text{CONSTANT} + \sum_{i=o} m_i M_{t-1} + \sum_{i=o} e_i EF_{t-1} + \sum_{i=o} x_i EX_{t-1}{}^*$$

	M-1B	M-2	A	F
Constant	2.351 (3.435)	.867 (.998)	3.203 (4.210)	1.855 (1.669)
Monetary Impulse: M				
m_0	.673 (5.550)	.290 (1.982)	.395 (1.888)	- .093 (- 1.497)
m_1	.217 (1.802)	.370 (2.071)	.310 (1.742)	.044 (1.348)
m_2	.242 (3.207)	.024 (.119)	.228 (1.781)	.106 (2.969)
m_3	.233 (1.827)	.304 (1.892)	.090 (.513)	.115 (3.958)
m_4	- .325 (- 2.194)		- .161 (- .760)	.094 (3.389)
m_5				.067 (1.965)
m_6				.056 (1.803)
m_7				.087 (1.541)
Σm_i	1.040 (6.624)	.988 (7.049)	.862 (5.168)	.475 (3.456)
Fiscal Impulse: EF				
e_0	.065 (1.779)	.050 (1.216)	.062 (1.434)	.149 (3.228)
e_1	.060 (2.621)	.058 (2.266)	.044 (1.573)	.111 (3.228)
e_2	.011 (.467)	.009 (.348)	- .004 (- .150)	.047 (1.549)
e_3	- .047 (-2.529)	- .056 (- 2.695)	- .057 (- 2.492)	- .017 (- .577)
e_4	- .083 (- 3.569)	- .099 (-3.782)	- .086 (- 3.082)	- .056 (- 1.641)
e_5	- .061 (- 2.691)	- .080 (- 3.165)	- .066 (- 2.409)	- .043 (- 1.009)
e_6	.051 (1.650)	.039 (1.131)	.030 (.790)	
Σe_i	- .003 (- .052)	- .078 (- 1.037)	- .078 (- .894)	.191 (2.504)
Trade Impulse: EX				
x_0	.041 (2.253)	.053 (2.797)	.040 (1.905)	.051 (2.447)
R^2	.566	.473	.394	.359
SE	.032	.035	.037	.039
DW	2.062	1.861	1.717	1.672

*Logarithmic first differences in:
Monetary aggregates (see Table 2 for definitions)

Y = Total spending, i.e., nominal GNP.

EF = High employment government spending.

EX = Exports.

Table 6
Changes in Nominal GNP, High-Employment Government Spending, Exports, and Various Monetary Aggregates: 1953:1 - 1980:4
Annual Rates of Change (Percent)

	Expansions	(Peaks)	Contractions	(Troughs)
Y	8.09	5.17	2.92	4.86
EF	7.66	6.47	6.65	7.65
EX	12.07	16.16	7.76	7.38
M-2	6.68	4.05	5.73	8.75
M-1B	4.54	2.38	2.91	5.50
A	4.90	3.15	4.36	5.24
F	6.81	7.99	9.75	12.37

Table 7
Impacts on Nominal GNP of Various Impulses — High-Employment Government Spending (EF), and Exports (EX): 1953:2 - 1980:4

Monetary Impulse	Expansions			Contractions		
	M	EF	EX	M	EF	EX
M-2	6.65	-.5	.34	4.83	-.60	.24
M-1B	4.46	.002	.34	3.58	-.07	.19
A	4.17	-.55	.32	3.52	.61	.18
F	3.52	1.36	.42	3.18	1.51	.24
	Peaks			**Troughs**		
	M	**EF**	**EX**	**M**	**EF**	**EX**
M-2	4.79	-.57	-.22	5.77	-.28	.43
M-1B	5.02	-.03	-.17	1.49	.21	.33
A	4.12	-.58	-.16	3.19	-.38	.32
F	2.43	1.64	-.21	4.24	2.13	.41

associated with the rate of interest. Thus one would expect an increase in government spending, which increases interest rates, to induce an increase in the quantity of money. This in turn would amplify the effect of an increase in government spending on total spending. If, instead, the induced increase in monetary growth had been offset by changes in fiat money, one would expect the expansionary effect of the increase in government spending to be offset at least in part by the contractionary effect of a decrease in fiat money.

As hypothesized, the total effect on nominal GNP of fiat money was smaller, and the fiscal effect was larger, than in the specifications including M-1, M-2 and A. With the fiat-money specification, there was some (although incomplete) crowding out of private spending by government spending; and a significant permanent effect of government spending on total spending was estimated. This result, together with the total fiscal crowding-out obtained with the M-1, M-2 and A monetary variables, suggests that fiscal policy has a permanent effect on spending only when accommodated by monetary growth. Otherwise the effects are transitory. Furthermore, to prevent such monetary accommodation, the Fed must actively use its controlled policy instrument (fiat money) to offset movements in the endogenous part of the money supply.

Policy Impulses and the Cycle

Government expenditures and monetary impulses also affect the pattern of business cycles (Table

6). The government spending data move positively with the business cycle, with average annual growth of 8.09 percent per quarter (at an annual rate) during expansions and 2.92 percent growth per quarter during contractions. With one notable exception, the monetary aggregates grew faster in expansions than in contractions—the familiar procyclical pattern. The exception occurred in the case of fiat-money growth, which was *more* rapid during contractions than during expansion—a countercyclical pattern. In other words, the actions of the monetary authorities, as measured by fiat money, were more expansionary during recessions than expansions, but not enough to change the procyclical pattern in other monetary aggregates.

It is tempting to credit monetary-policy actions for a countercyclical stance on the basis of these data. But this does not take into account lags in the effect of monetary and fiscal policy on nominal GNP. When we take these lags into account (Table 7), monetary and fiscal policy, by every measure, contributed to economic instability.

IV. Conclusions

First, there are two potential avenues whereby fiscal policy may affect monetary policy. Deficits may apply upward pressure on interest rates, and thus automatically induce increases in the uncontrolled part of the monetary base, leading to faster money growth. The other potential link may occur as the Fed attempts to prevent high interest rates by increasing the controlled part of the base (fiat money), leading to more rapid money growth.

Second, growth in the monetary aggregates, especially those parts directly controlled by the Fed, helped finance the large Federal government deficits in the 1970s to a (statistically) significant extent.

Third, without monetary accommodation via one or both of the above methods, fiscal policy would have had only a transitory effect on nominal GNP in the U.S. economy. Thus in order to prevent fiscal deficits from being inflationary, the Fed must use the controlled part of the money supply to offset the automatic accommodation of the deficits by the induced part of the money supply.

Fourth, with large budget deficits looming on the horizon, the Fed should restrict growth in fiat money sufficiently so that M-1 and M-2 growth do not finance a significant part of those deficits. Now that the Fed is no longer focusing on controlling interest rates, having switched more of its attention to the monetary aggregates, the likelihood of noninflationary deficits has improved.

FOOTNOTES

1. Reserve requirements also affect fiat money since the interest-bearing Federal debt in the hands of banks, the public, and foreign investors would tend to decrease if required-reserve ratios were raised. The reason is that deposit decreases otherwise associated with raising required-reserve ratios generally are offset by Federal Reserve open-market purchases of government securities. Such purchases generally decrease the net-interest-bearing Federal debt and increase fiat money enough to permit banks to meet the increased reserve requirements. A precise relationship exists that translates changes in required-reserve ratios into equivalent units of the monetary base that would have the same effect on deposits. Controlled sources of monetary growth thus include not only fiat money, but also the required-reserve adjustment magnitude (RAM), which is the change in base money that would have an equivalent effect on monetary growth as a change in required-reserve ratios. Fiat money adjusted is the sum of fiat money and RAM. It is a policy controlled variable and an important source of monetary growth.

2. This point is substantiated by the following ordinary least-squares regression.

Percent Changes in Noncontrolled Sources of the Monetary Base (N) and Long Term Government Bond Rates (R) Monthly, 1959-80.*

$N = -0.001 + 0.470\,R$

$R^2 = (00058) \quad (4.71)$

SE = 4.31

DW = 1.93

N = Monetary Base Less Fiat Money

R = Average U.S. Government Bond Rate with Maturity Greater than 10 Years (percent change in).

* A 16-quarter distributed lag yielded a slightly higher regression coefficient with respect to R, but the same 4.3-percent standard error of the regression.

3. The politics of the process was discussed in detail by Buchanan and Wagner. Nevertheless, in tests of this view, both Barro and Niskanen could not find a significant link between annual M-1 growth and the deficit over the post-World War II period. This finding was reversed when Hamburger and Zwick repeated the exercise for the period since

1960 when, according to Buchanan and Wagner, major changes occurred in the way macroeconomic policy is formulated. This result in turn was reversed when McMillan and Beard used revised GNP data in the calculations.

For these discussions, see D.R. Francis, "How and Why Fiscal Actions Matter to a Monetarist," **Federal Reserve Bank of St. Louis Review** (May 1974), 4-7; J.A. Buchanan and R.E. Wagner, **Democracy in Deficit: The Political Legacy of Lord Keynes**. New York: Academic Press, 1977; R.J. Barro, "Comment from an Unreconstructed Ricardian," **Journal of Monetary Economics** (August 1978), 564-81; W.A. Niskanen, "Deficits, Government Spending, and Inflation: What is the Evidence?" **Journal of Monetary Economics** (August 1978), 591-602; M.J. Hamburger and B. Zwick, "Deficits, Money and Inflation," **Journal of Monetary Economics** (January 1981), 141-50; W.D. McMillan and T.R. Beard, "Deficits, Money and Inflation: Comment," **Journal of Monetary Economics** (forthcoming).

4. This point is substantiated by the following ordinary least-squares regression.

Federal Budget Deficits and Monetary Growth Over Six-Post-World War II Business Cycles, 1948-80

$$M = a + b\,(DEF/PXF)$$

Monetary Growth Rate	Constant (t-value)	Coefficient (t-value)	R^2	SE	DW
		(Trough to Trough)			
M-1B	2.36	1.92	.77	1.15	2.00
	(3.87)	(3.64)			
M-2	3.65	2.50	.77	1.51	2.16
	(4.55)	(3.61)			
A	2.19	2.57	.74	1.69	2.11
	(2.45)	(3.33)			
F	5.97	1.20	.20	2.60	2.65
	(4.33)	(1.00)			
		(Peak to Peak)			
M-1B	2.54	1.72	.57	1.47	1.80
	(3.37)	(2.32)			
M-2	3.80	2.39	.61	1.9	1.96
	(3.91)	(2.51)			
A	2.23	2.53	.63	1.92	1.88
	(2.28)	(2.62)			
F	5.49	1.47	.19	3.00	2.40
	(3.58)	(.98)			

Note: **Significant at 95-percent level.
*Significant at 90-percent level.

5. See Hamburger and Zwick, 1981.

6. See, for example, S.E. Hein, "Deficits and Inflation," **Federal Reserve Bank of St. Louis Review** (March 1981), 3-10; and M.W. Keran and T. Babb, "An Explanation of Federal Reserve Actions (1933-68)," **Federal Reserve Bank of St. Louis Review** (July 1969), 7-20.

7. In this paper, the original St. Louis spending equation was modified by specifying the relationship in percent changes, by not constraining the ends of a third-degree polynomial lag distribution to zero, and by adding exports as an autonomous variable based on a spending equation that fit the experience of other countries as well as that of the United States.

See L.C. Andersen and K.M. Carlson, "A Monetarist Model for Economic Stabilization," **Federal Reserve Bank of St. Louis Review** (April 1970), 7-25; and L.C. Andersen and J.L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," **Federal Reserve Bank of St. Louis Review** (November 1968), 11-24.

Both Feldstein and Benjamin Friedman, in evaluating theoretical models that included not only bonds and money but also real capital, found that whether government deficits were inflationary or not (i.e., the degree of financial crowding out) depended on the comparative substitutability of money for bonds and bonds for real capital. If bonds resemble money, then deficits are inflationary and can be offset only by tax policies or debt-management policies that raise the net real yield on capital and lower real output and growth. See M. Feldstein, "Fiscal Policies, Inflation, and Capital Formation," **American Economic Review** (September 1980), 636-50; and B.M. Friedman, "Crowding Out or Crowding In? Economic Consequences of Financing Government Deficits," **Brookings Papers on Economic Activity** (1978), 593-641.

Wallace and Bryant have taken the extreme position that government bonds and money are perfect substitutes—and thus only deficits matter and open-market operations don't matter at all. J. Bryant and N. Wallace, "Open Market Operations in a Model of Regulated, Insured Intermediaries," **Journal of Political Economy** (February 1980), 146-73; and N. Wallace, "A Modigliani-Miller Theorem for Open Market Operations," **American Economic Review** (June 1981), 267-74. This paper's argument that fiat money (mainly open-market operations) independently affects total spending tends to refute the Bryant-Wallace proposition. That government spending (and hence the deficit) is estimated to exert an independent effect on spending for a given setting of fiat money tends to confirm the Feldstein-Friedman proposition—namely, that a deficit independently increases inflation and concomitantly raises real interest rates and induces growth in the standard monetary aggregates.

The best-fit spending equation was the one that included M-1B as the monetary impulse. The estimated larger spending effect of M-1B growth than F growth, and the better fit, both reveal that monetary growth (regardless of its source) affects spending. This result tends to disconfirm the Sargent-Wallace hypothesis that *only* fiat monetary growth increases spending growth and inflation. T.J. Sargent and N. Wallace, "The Real Bills Doctrine vs. the Quantity Theory: A Reconsideration," Federal Reserve Bank of Minneapolis, Staff Report 64 (January 1981); T.J. Sargent, "The Ends of Four Big Inflations," Federal Reserve Bank of Minneapolis Working Paper 158 (December 1980); and T.J. Sargent, "Stopping Moderate Inflation: The Methods of Poincaré and Thatcher," Processed (May 1981).