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"The Long-Run Endogenous Money Supply "

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THE LONG-RUN ENDOGENOUS MONEY SUPPLY

by

Gary R. Evans[1]

Introduction

Much of the debate in recent years over the efficacy of monetarism has concerned itself with the connection between the money supply and the level of nominal spending in the economy. A good part of the literature either assumes explicitly or implies that the money supply is exogenous - meaning, in this context, that it can be controlled by the Federal Reserve System and is not, instead, determined by economic factors over which the Federal Reserve has no direct control. As was pointed out recently by Kaldor and Trevithick [1981] monetarist policy proposals have no validity unless it can be shown that the money supply is exogenous, so the assumption of the exogenous money supply is a necessary component of monetarism.

Many economists critical of monetarism have been inclined to challenge this assumption. An endogenous money stock has for a long time been implied in the writings of such prominent Keynesians as Tobin [1970] and Kaldor [1970, 1980], and is an integral part of some of the theories of Minsky [1957]. Recently the hypothesis of the endogenous money stock was directly made by Moore [1979, 1980a, 1980b] with some empirical corroboration by Zannoni and McKenna [1981].

This article offers a number of theoretical and institutional reasons to support the hypothesis that the money supply should be considered endogenous in

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[1]Department of Humanities and Social Sciences, Harvey Mudd College, Claremont Ca. 91711. I would like to thank James Earley, Nai-Pew Ong, Ken Woodward, and Chris Niggle for their helpful suggestions.

the long run. The argument is made that policies that fail to recognize this are likely to be ineffective in the long run.

Although the distinction between 'long' and 'short' is arbitrary, a short-run response implies that certain economic parameters that are very slow to change must be regarded as constants when considering the impact of some event upon economic variables during the time immediately following the event. Over a much longer time, a much wider range of economic adjustment is possible.

As shall be shown, that the money supply is endogenous in the long-run implies that, given time, private entrepreneurs can circumvent the policy goals of their central bank by creating new monies. Money substitutes that eventually serve full monetary functions are created. This is not an activity that can be classified as an immediate response to central bank policy. Private money creation is a long-run phenomenon.

Below it is argued that the list of financial liabilities that are money (or perform at least partial if not full monetary functions) occassionally change. The change is normally the result of private innovation and is sometimes the consequence of efforts to circumvent contractionary monetary policies. In the United States the regulatory authorities, able to strongly influence only certain financial instruments because of regulatory restrictions and inflexible operating procedures, find a growing component of the money supply outside their control.

First, some detailed reasons are given for why the money supply should be considered endogenous in the long-run. The theoretical legacy of this idea, which goes back at least as far as Adam Smith, is also discussed. Historical examples are provided of private monetary innovation in the past, in some cases in opposition to official efforts to keep monetary expansion moderate. Recent examples of monetary innovation are then discussed, and the article concludes

with the policy implications of the long-run endogenous money supply.

Some reasons for long-run lack of control of the money supply

Since Adam Smith there has always been a group of economists who believe that over time the expanding commercial activities of businesses will draw forth an amount of money necessary to accomodate their intentions. With expanding commerce, some device that can function as a medium of exchange or a source of liquid finance will be necessary. If the central bank refuses to accomodate this impulse, then innovative entrepreneurs will eventually modify the institutional structure and produce a private instrument that begins to serve as money.

If, for example, during a period of prosperity or speculation,the demand for credit is high and rising, upward pressure will be put on interest rates if the central bank refuses to accomodate the growth in credit demand with a monetary expansion. Such a set of circumstances create a fertile environment for the sort of financial innovations that lead to the development of close money substitutes by entrepreneurs. If the need arises, such substitutes may begin to circulate and serve as a medium of exchange. They become money and are at least initially beyond the control of the central bank. Indeed, they appear explicitly for the purpose of circumventing central bank control.

This theory of financial innovation, described in modern times by Kaldor [1970] and Minsky [1957] relies heavily upon the notion of financial entrepreneurship. Ironically, it is those who share the monetarist enthusiasm over the sanctity of markets who should be most inclined to accept the role played by the financial entrepreneur. Instead, monetarists, who are devout believers in laissez-faire, impute to entrepreneurs a remarkable capacity for innovation, except in the area of financial innovation, where they become unimaginative and uninspired victims of the caprice of the central bank.

Financial innovation of this sort would not take place all of the time.

There would not be a steady stream of new monetary instruments. There is no need for such innovation if either the demand for credit and liquidity is growing slowly, or if the central bank is accomodating growing demand with conventional monetary policy. Hence, during times when either of these two conditions are present, one would not expect to find the appearance of new forms of money. Because of this, evidence of this kind of financial innovation in the half-century beginning with and including the 1920s up until the late 1960s would be unlikely. Either conventional monetary expansion was ample (in the 1920s, 40s and 50s) or credit demand was depressed (in the 1930s). The environment since 1970, however, has been quite fertile for such innovation and, as shall be shown below, innovation is indeed occurring.

The theoretical legacy

As mentioned, the notion of the endogenous money stock goes back at least as far as Adam Smith and The Wealth of Nations [see Humphrey, 1981]. Smith describes a situation in Scotland where merchants have been unsuccessful in soliciting bank loans. In response, the merchants drafted short-term (typically 90 day) bills of exchange and used them among themselves to finance trade. The practice of "kiting" - where a Bill of Exchange is redeemed, just prior to maturity, with a newly written bill - is described as very common. Smith tells his readers that the "practice of raising money in this manner has been long known in England," and was "said to have been carried on to a very great extent." [1776, Book II, Ch. 2, pp. 292-300]

With David Ricardo's acceptance of the quantity theory of money, the hypothesis of the endogenous monmey stock fell from favor. The idea was, in a way, resurrected primarily by Thomas Tooke and John Fullarton in the famous controversy between the Currency School and the Banking School (Tooke, Fullarton, and others) in the 1840s. In that debate, which concerned restric-

tive legislation affecting the Bank of England, Tooke and Fullarton claimed that bank money appeared only when legitimate transactions required it - that is why banks make loans or offer discounts. Business and commerce, inflationary or not, generates loan demand, and bank money appears in response to this impulse [Fetter, 1965, Ch.6]. After passage of the Bank Acts of 1844 and 1845, which essentially rejected the Banking School philosophy, the "fact" that the money supply was determined by the monetary authorities was accepted by concensus. Controversy turned to the merits of the gold standard and the proper role of the central bank.

The Cambridge emphasis on the demand for money in the Keynesian era established a perspective that made it easier to regard the money supply as endogenous. After all, this perspective makes it apparent that they money stock reflects the interaction of supply and demand forces. Although after Keynes the critical attention was focused on the demand for money, the dichotomy made it possible eventually to think about the supply of money.

As has recently been pointed out by Kaldor [1980], in The General Theory, Keynes accepted the hypothesis of rigid central bank control of the amount of money in circulation [see Keynes, pp. 230-231,234-236,247]. Many of those who have followed in his tradition, however, have brought back the notion of the endogenous money supply.

In the famous 1959 Report of the Radcliffe Committee, this attitude was made quite apparent. The committee insists that no sharp distinction can be drawn between money and other financial assets [see Sayers, 1960; Gurley, 1960; Kaldor, 1960]. According to the report, all financial assets have the monetary quality in varying degress. If attempts are made to restrict the liabilities of certain financial institutions (such as banks), innovations by private parties will allow new institutions to flourish and eventually their liabilities will

finance spending. Monetary authorities ultimately cannot "stop the private creation of money." Money, in fact, "is the creation of the public that chooses to impute certain qualities to certain claims."

Such a legacy constributed to the modern ideas of Tobin, Kaldor, Minsky, and Moore, which were cited earlier.

Other writers have done research in areas indirectly related to this theme. Hester [1981] developed the convincing hypothesis that financial innovations, partly induced by previous monetary policy decisions, have substantially diluted the effectiveness of policies that focus on controlling the growth rate of aggregates.

After Goldfeld's [1973] famous log-linear money demand function began to fail in its ability to correctly forecast the relationship between money and spending, monetary theorists, assuming an exogenous money supply made efforts to reestimate the misbehaving money demand functions [Cf. Feige and Pearce; 1977]. A more recent study by Judd and Scadding [1982] identified the probable cause of the breakdown of money demand functions as "innovations in financial arrangements." Although these writers concentrated exclusively on the behaviour of the demand for money, the unreliability of the traditional demand-oriented models may be indicative of the problems caused by the kinds of monetary innovations that make the money supply endogenous.

The evidence for the endogenous money stock

Kindleberger [1978] provides strong evidence of the long run endogenous money stock in his book on financial crises. He describes the liberal use of bills of exchange for monetary purposes in England during the late 19th century when the Bank of England was trying to restrict monetary expansion [pp. 9,10,59-67]. In normal practice such bills are used for the short-term finance of actual consignments of goods traveling over long distances. During periods

of credit stringency, firms began to issue bills linked to no particular shipment and used them as a medium of exchange. Such practice is described as very common. In the period from 1852 to 1857, Bank of England notes (paper money) circulation declined nine million pounds. Bills of Exchange over this same period grew from 66 million pounds to 280 million pounds.

Good examples of financial innovation are provided by the historical appearance of bank notes when specie was inadequate and checking accounts when paper money was insufficient to fulfill the needs of trade.

In early American history, the colonies were afflicted with a severe shortage of specie (gold and silver). Klebener [1974; pp. 17,50] estimates that the amount of specie per-capita was between three and four dollars and was about double that amount in 1850. Because this amount was inadequate, certain foreign coins were accepted as legal tender as late as 1857 [Holdsworth, 1911; p.53]. Such an environment encouraged the proliferation of privately-issued paper money and, according to Klebener, by 1819 paper currency in the United States was the most developed in the world.

Aside from the infamous Continental Currency, no paper money was issued by the United States government prior to the Civil War. Most paper money was issued as bank notes from private banks [Dewey, 1911]. Each bank issued its own type of note. By 1860, approximately 1600 banks in the United States has issued about $200 million in paper currency, an amount roughly equal to the amount of specie in the country [Myers, 1970; p.124]. By 1862, there were approximately 12,500 different <u>types</u> of notes in circulation, of which as many as 5,500 were fraudulent [Klebener; p.20]! Although such remarkable innovation was plagued with recurring financial crises, there is no doubt that this private creation of money handily accomodated the impressive commercial expansion in the prewar era.

Financial historians provide numerous examples of other types of monetary

innovation in the 19th century. The ubiquitous promissory note is described by Myers [p.89] as the usual form for settlement of accounts after the demise of the 2nd Bank of the United States. The promissory note was essentially a privately created unsecured promise to pay at some future date; as sort of IOU. The debt represented by the note was assignable, which meant that the note could be passed from party to party as a means of payment. The original issuer of the note would be liable to the bearer. Fritz Redlich [1970, 1977] identifies the promissory note as probably the most important credit instrument in America after 1800, and explains that it was especially used by small businessmen who did not have easy access to other sources of finance. The promissory note was so frequently used that books containing blank forms of promissory notes, which looked like modern check books, were quite common. Although these notes were frequently discounted at banks, they were created privately and in abundance by the tradesmen who used them, and they were not only a form of credit, but circulated as a medium of exchange in at least the circles that used them.

Fractional currency (notes with denominations less than one dollar), called shinplasters, rag money, and other derogatory names, issued not only by banks but by manufacturing companiess, cities, merchants, tavern keepers and even shoe blacks [Dewey, pp. 66,68,144,150; Myers, p.80; Klebener, pp. 18,19], were an integral part of small scale commerce until as late as the 1870's.

Checking accounts, which were not even "officially" considered money until this century, had a very early and growing importance in American monetary history. According to Klebener [p.23] checks were used for most intercity business payments and exceeded bank notes by 1856. By 1900 checks accounted for about four-fifths of total bank deposits, although they were not yet used commonly by consumers [pp.66-67]. Unger [pp.263-265] provides evidence that when the government intentionally initiated a note contraction after the Civil War,

the private sector overcame this contraction by expanding checking deposits. For example, during a note contraction between 1865 and 1875, checking deposits grew 30%.

Ironically, Friedman and Schwartz, in their epic book on monetary history [1963] provide ample evidence of an endogenous money supply in the United States after the Civil War. Civil War legislation eliminated state bank notes and the United States left the gold standard in 1861, not to return until 1879. After 1861, paper money consisted of the U.S. Treasury's legal tender notes (greenbacks) and national bank notes. The greenbacks were fiat money issued directly by the U.S. Treasury. Their issue approached $450 million by the end of the Civil War, and the amount outstanding was gradually contracted after that time. National bank notes were issued by member banks of the National Banking System (established in 1863). Member banks were required to deposit a special type of U.S. Treasury bond with the Comptroller of the Currency and then could issue bank notes worth up to 90% (raised to 100% in 1900) of the value of the bonds deposited [cf. Unger; pp.1-50]. By 1866, about $300 million in such notes were outstanding, and this amount rose to about $340 million in 1874. At the end of the war there was also in excess of $100 million in peculiar war-related monies such as interest-bearing notes and fractional notes (with denominations below one dollar) in circulation that were gradually withdrawn from circulation [cf. Friedman and Schwartz, pp. 16-25].

In the two decades after the Civil War and before the return of the gold standard (1879), legislative restrictions, the fear of fiat paper money, and the desire to return to the gold standard severely restricted the amount of paper money in circulation. As Dorfman [1949; Vol.III,pp.3-20] carefully documents, Treasury official - especially Hugh McCulloch, Secretary of the Treasury in Johnson's administration - were generally opposed to the expansion of paper

money and often argued strongly for a contraction.

Immediately after the war, the Treasury gradually withdrew the $100 million in interest-bearing notes, fractional notes and other peculiar monies from circulation. Although the amount of greenbacks in circulation fluctuated between $350 million and $385 million in these years, the long-run trend was downward, with only $347 million outstanding in May 1878. National Bank Notes were gradually contracted as well after 1874, partly because banks voluntarily restricted their issue, and partly because the Treasury notes held on deposit against them were being gradually withdrawn [Cf. Unger, p.263-264]. Consequently, these twenty years after the war were a period of severe official restriction. The "official" money stock (that which was recognized by the authorities as money - again Dorfman [pp.3-20,114-117] makes it clear that no one at the time considered checks to be money) actually declined over this whole period [cf. Friedman and Schwartz, pp.16-17,20-25,29-32,37,44,50-58]. Friedman and Schwartz calculate that the total currency held by the public was $585 million in January 1867 yet was only $520 million in February 1879 [Appendix A, Table A-1].

Despite this 'official' contraction, the economy between 1869 and 1879 experienced what Friedman and Schwartz describe as "an extremely rapid growth of output" [p.39]. Total output grew at a rate between 4.3% and 4.9% annually.

Had the business community restricted their medium of exchange to "official" money, it is unlikely this expansion ever would have taken place. They, of course, did not. Not only were promissory notes and other types of trade credit liberally used in this period, but additionally, demand deposits grew dramatically. According to the estimate of Friedman and Scwartz, all of the growth of the 'actual' money supply (which, of course, in retrospect, includes demand deposits), which averaged 2.7% annually between 1869 and 1879, can be

attributed to the growth in bank deposits [pp.37,50-58]. Klebener [pp.66-68] estimates that commercial bank deposits were equal to 55.8% of all money publicly held in 1867, and that this amount had grown to 88.2% by 1913.

Such expansion was due entirely to private innovation, receiving neither the government's blessing nor its condemnation. The banks provided such services because customers wanted them, regardless of the status of official monetary policy. The Treasury itself, in fact, did not accept checks until 1888 despite the fact they were commonly used in commerical circles long before that time [Myers, p.213].

The growth of the relative importance of checking continued up until the time of the Great Depression. Because the United States had returned to the gold standard and was subsequently blessed with receiving international payments surpluses, the official restriction effectively ended in 1879. The fifty years between 1879 and 1929 was a period of monetary expansion, whether considering currency plus deposits or currency alone. Between August 1879 and January 1929, currency grew from $574 million to $3.82 billion, and bank deposits (including time) grew from $1.2 billion to $42.4 billion! [Friedman and Schwartz, Table A-1].

The 1920's was a decade of especially easy money, a factor that undoubtably contributed to the wild speculation at the end of that decade and the subsequent crash [cf. Kennedy,1973;pp.10-15]. The easy money policy was partly due to the efforts of the Federal Reserve Bank of New York to assist England's attempt to return to the gold standard. In compliance with requests from the Bank of England, the New York bank tried to keep interest rates below London rates to encourage gold flows to England. The use of open market purchases for this endeavour provided banks with a rapidly growing pool of reserves. Monetary innovation was hardly necessary under such circumstances.

The crushing impact of the Great Depression curbed financial innovation until the 1950s. The financial system was altered drastically in the 1930s, but the alteration was due to the actions of regulatory authorities rather than private innovation. Even the changes through the 1950s and 1960s were not really monetary in nature. What occurred instead was the very rapid development of non-bank financial intermediaries, the importance of which was explained by Gurley and Shaw [1955,1960].

Recent developments

Beginning in the late 1960s and accelerating through the 1970s true monetary innovation began to reappear and is presently flourishing. As can be seen in Table 1 the demand for all forms of credit accelerated very sharply (the data, of course, represent supply and demand equilibria). The money supply growth rate over the same period was relatively modest, given the growth rate of nominal GNP and the runaway demand for credit. The surging credit demand and relative monetary restriction constributed to rising nominal interest rates and allowed an environment conducive to endogenous monetary expansion to appear.[3]

The 1970s, in fact, was a decade that witnessed dramatic and sweeping changes in financial practices in general. It was during these ten years that banks began to aggresively use liability management techniques, expanding the use of certificates of deposit, federal funds, repurchase agreements and other

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[2] Monetarists and others emphasize the role of inflationary expectations in explaining rising nominal interest rates. Generally the argument goes that

TABLE 1

AMOUNTS AND ANNUAL RATES OF GROWTH OF SELECT MONEY, CREDIT, AND OUTPUT VARIABLES

	M1 Stock		Corporate Debt Net Total		Consumer Credit		Total Funds owed by NF Sectors[1]		Total Bank Credit		Nominal GNP	
	Amount	%Δ	Amount	%Δ	Amount	%Δ	Amount	%Δ	Amount	%Δ	Amount	%Δ
1965	187.8		351.4		103.2		1049.5		309.9		691.1	
1966	192.0	2.2	386.6	10.1	109.7	6.3	1117.5	6.5	328.1	5.9	756.0	9.4
1967	207.0	7.8	417.9	8.1	115.4	5.2	1199.1	7.3	365.7	11.5	799.6	5.8
1968	221.9	7.2	469.8	12.4	126.9	10.0	1297.5	8.2	405.8	11.0	873.4	9.2
1969	229.8	3.6	523.4	11.4	137.7	8.5	1387.8	7.0	423.4	4.4	944.0	8.1
1970	242.2	5.4	564.0	7.8	143.1	3.9	1482.9	6.9	460.5	8.8	992.7	5.2
1971	259.8	7.3	612.3	8.6	157.8	10.3	1624.7	9.6	511.7	11.1	1077.6	8.6
1972	283.6	9.2	682.0	11.4	177.6	12.5	1791.6	10.3	587.0	14.7	1186.0	10.1
1973	301.1	6.2	793.9	16.4	203.7	14.7	1986.9	11.1	668.2	13.8	1326.4	11.8
1975	308.0	2.3	817.3	2.9	213.6	4.9	2172.0	9.3	732.8	9.7	1434.2	8.1
1975	326.6	6.0	856.8	4.8	223.2	4.5	2375.4	9.4	764.3	4.3	1549.2	8.0
1976	351.4	7.8	933.1	8.9	248.6	11.4	2638.5	11.1	830.6	8.7	1718.0	10.9
1977	381.7	8.6	1038.4	11.3	288.8	16.2	2972.3	12.7	920.5	10.8	1918.0	11.6
1978	414.3	8.5	1186.8	14.3	336.4	16.5	3367.0	13.3	1046.1	13.6	2156.1	12.4
1979	450.2	8.7	1370.3	15.5	382.7	13.8	3760.7	11.7	1164.2	11.3	2414.0	12.0
1980	470.7	4.6	1493.9	9.0	385.0	0.0	4117.0	9.5	1264.6	8.6	2626.1	8.8

Source: Federal Reserve Flow of Funds. Data are for the last quarter of the year listed.

1. Excluding equities.

liability "deposits" with low reserve requirements and no ceiling on interest rates [cf. Goodfriend, et.al.,1980, Luckett, 1980, and Hester, 1981]. The formation of bank holding companies became popular during this period. Watkins and West [1982] show that holding companies controlled only 13% of total bank deposits in 1965, and that amount had grown to 77% in 1980. Such growth occurred because new legislation allowed the holding companies to circumvent branch banking regulations, while allowing bank activities to expand to include trust, leasing, and insurance services. More recent legislation has allowed these same holding companies to engage in interstate mergers and acquire money market mutual funds, thrift institutions, and brokerage firms.

Because of the precarious plight of thrifts and other problems plaguing the finance industry, Congress passed the Monetary Control Act of 1980, which altered substantially some of the operating procedures of financial intermediaries in the United States [McNeill, 1980]. Among other things, the MCA mandates the removal of legislated interest rate ceilings (Regulation Q) by 1986; a goal largely accomplished by the end of 1982. It also requires all financial institutions (including savings and loans and credit unions) with federally insured deposits to hold reserves directly or indirectly with a Federal Reserve Bank, allows these institutions to borrow from the discount window, and additionally allows them to issue interest-bearing checking accounts to

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3 (continued)

suppliers of funds attach an inflation premium to their lending and borrowers reevaluate the true cost of borrowing. Acceptance of this hypothesis does nothing to undermine the endogenous money argument, however. The point to be made below is that rising interest rates, <u>whatever their cause</u>, creates an environment conducive to financial and monetary innovation.

consumers (but not businesses).

This long list of changes can be best described as structural innovation in the finance industry, some of it the result of private initiative and some of it the result of the necessary regulatory response to an enduring financial crisis. Only one component of it, the extension of checking privileges to non-bank financial intermediaries, can be described as a monetary innovation (where a new medium of exchange is introduced). Even this cannot be described as purely endogenous, since it was the consequence of action taken by Congress with the approval of the Federal Reserve System. It might be described as 'weakly' endogenous in the sense that failure to take action might have resulted in politically unbearable repurcussions in the thrift industry.

Nonetheless, one would expect in an environment of such wholesale structural change to find some better examples of purely monetary innovation. The examples are indeed there, in the form of the development of money market mutual funds and the expanding use of credit cards.

Recent purely monetary innovations

Consumer credit cards that allow revolving or open-ended credit (where the balance due is not amortized), and especially the cards offered by financial institutions that allow any expenditure up to a stipulated limit at most retail outlets, must be regarded as a medium of exchange. Such cards are as easy to use as checks (often easier) and have become an integral component of middle-class financial activity. Not only are they used in place of money, but they effectively displace the consumer's budget constraint, allowing, at least temporarily, a higher level of spending than would otherwise occur.

Credit card use is growing very rapidly. According to the 1977 Consumer Credit Survey published by the Federal Reserve System, 60% of American families used credit cards in 1977, as opposed to 50% in 1970. 34.6% used bank credit

cards, compared to only 16% in 1970. Credit cards are a ubiquitous feature of high-income families. In 1977, 90.2% of families with incomes higher than $25,000 used credit cards, and 68% used bank credit cards.

Additionally, 54% of all bank card users charged more than $25 in the month of the survey (26% charged more than $100), and 40% had outstanding balances greater than $100. This is partially indicative of the extent that credit cards were used to finance purchases in 1977.

Table 2 shows that credit card use has grown dramatically in recent years. Column one (revolving extensions) shows that credit cards financed approximately $140 billion in sales in 1981 (revolving credit is almost exclusively card credit). Column four shows the phenomenal growth in this type of credit, and close inspection seems to demonstrate a close connection between this kind of credit and inflation.

Using a credit card to buy gasoline, clothing, or even durable goods is scarcely different than writing a check or using a Federal Reserve note in terms of its effect on spending. As the check is now recognized as a medium of exchange, so may the credit card at some time in the future.

If credit cards serve as money, one would expect the growth rate of spending to chronically exceed the growth rate of household demand deposit balances. Summers [1979] shows that this, indeed, is the case. Disaggregating demand deposits into those held by households and those held by businesses, Summers shows that the growth rate of nominal GNP averaged 2.71% more than the growth rate of household demand deposits, and that household monetary velocity has been rising. Summers attributes this development to the more "efficient" use of household money balances and the idea that households have benefitted from "new cash management technology." Summers does state what that technology might be, but the credit card is undoubtably the major component of this new

TABLE 2

The Growth of Revolving Credit*

YEAR	(1) Revolving Extensions	(2) Revolving Liquidations	(3) Revolving Outstanding	(4) % Growth of (3)	(5) Total Installment	(6) (3)/(5)
1982			67.1	6.5	344.8	19.5
81	140.1	135.4	63.0	7.9	331.7	19.0
80	128.1	126.7	58.4	2.6	313.5	18.6
79	120.2	111.5	56.9	20.8	312.0	18.2
78	104.6	96.8	47.1	16.6	275.6	17.0
77	86.8	80.5	39.3	128.5	230.8	17.0
76	43.9	41.8	17.2	14.7	194.0	8.9
75	37.0	35.6	15.0		172.4	8.7

Source: Federal Reserve Bulletin

*Revolving credit now almost entirely involves the use of credit cards, and almost all credit card debt is classified as revolving credit. Amounts are for Decembers of the years listed.
Billions of dollars.

"cash management technology" that is distorting the relationship between spending and official forms of money.

Money market mutual funds (MMMFs) unambiguously are a new and important form of monetary innovation. These funds, which scarcely existed five years ago, are the fastest growing financial instruments that have ever existed. MMMFs totaled only $10.9 billion at the end of 1978. They grew to $45.2 billion by year-end 1979, to $74.4 billion by year-end 1980, and to $181.9 billion by year-end 1981. By August of 1982, they had swelled to $223.1 billion and were growing at the rate of $3 billion per week![3] In December 1983 the growth stopped because of the authorization of the new money market accounts that were effective substitutes for MMMFs, but by then their level had reached about $235 billion.

These funds appeared because existing consumer savings channels such as time deposits were unable to provide competitive market interest rates on saved funds. Regulation Q restricted interest rates on time deposits and conventional money market instruments such as Treasury bills had denominations too large to be afforded by the typical consumer. The MMMF pools consumer funds, accepting initial deposits as small as $1,000 and subsequent deposits of virtually any size, and uses the funds to purchase directly such money market instruments as Treasury bills, certificates of deposit, commercial paper, and repurchase agreements. The yields are passed on to the customers (which now include a large number of institutional investors). Most of the funds allow checking privileges. Those that do restrict the checks to a minimum amount and put a limit on the number that a single customer may use in a given time period. Despite these restrictions, the checkable accounts are as liquid as a bank demand depo-

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[3] Federal Reserve Bulletin, Table 1.21.

sit and are probably regarded by the funds customers as such. The funds are essentially unregulated and uninsured.

The MMMF provides a perfect example of monetary innovation. They appeared in response to user demand in a period of high interest rates and were designed to circumvent the existing regulatory apparatus. They also provided users with a medium of exchange.

Additionally, it is very likely that the new yield-bearing checking accounts authorized in December 1982 were allowed so soon because of the onerous threat posed by MMMFs to traditional financial intermediaries. If so, this provides an example of how private innovation forces the Congress and the Federal Reserve System to make regulatory changes that might not otherwise be made. This might be described as "weak endogeneity" - a forced monetary change caused by the relentless pressure of private competition.

Summary and policy implications

In this article it has been argued that the money supply is endogenous in the long run. Under certain circumstances, financial innovators will develop new financial instruments that gradually assume monetary functions. These instruments are often outside the control of the regulatory authorities. Conditions tend to be most suitable when the demand for credit is high and the regulatory authorities are unwilling to allow a high level of monetary or credit expansion.

The historical appearance of bank notes and checks and the common use of bills of exchange and promissory notes unrelated to particular transactions are prime examples of private money creation in the past. From the 1920s to the 1970s, private innovation was unnecessary either because the Federal Reserve made credit conditions easy or because credit demand was low. As the Federal Reserve began to shift to tighter money control policies in the 1970s, however,

the environment for private innovation again became fertile. The structure of finance completely changed in the 1970s and included considerable monetary innovations. This included new monetary forms such as credit cards and money market mutual funds, and made necessary the sweeping provisions of the Monetary Control Act of 1980 as a response.

The policy implications of this hypothesis are rather important. They imply that efforts to control the money supply might be rather ineffective in the long-run. Monetarist policies that rely on an inflexible monetary 'rule' (with a constant growth rate of the money supply) are likely to be the least effective of the policy options. If the private markets are dissatisfied with the money growth rate established by the rule, there will be innovation of new money forms designed explicitly to circumvent the rule. Ironically, the very inflexibility of the rule would tend to expedite and strengthen counterproductive private trends that destroy the effectiveness of monetary policy.

To the extent that this argument is correct, modern policy must accept the possibility of the endogenous money supply. Policies that rely upon the control of money aggregates (M1, M2, etc.), whether inflexible or discretionary, are likely to have their effectiveness diminished.

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