

SHORT-TERM INVESTMENT POOLS

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Over the last decade numerous types of short-term investment pooling arrangements (STIPs) have emerged in the nation's financial system. The most well-known and widely publicized form of STIP is the money market mutual fund (MMF). However, MMFs are only one of at least eight types of STIPs that were operating in the United States at the end of 1979. While the various types of STIPs differ in some respects, such as the kind of asset held or the type of investor, they are all alike in their basic function, which is to purchase large pools of short-term financial instruments and sell shares in these pools to investors. In almost all instances discussed in this article, the pool allows participants to invest a much smaller amount of money than would be necessary to directly purchase the individual securities held by the pool.

This paper examines the STIP phenomenon. Section I describes the various forms of STIPs and provides estimates of (1) the growth and total assets of STIPs and (2) the proportion of various money market instruments held by STIPs at the end of 1979. Section II deals with the question of why this type of financial intermediary proliferated and thrived in the 1970's. Some implications of STIPs for the financial markets are explored in Section III.

I.

SHORT-TERM INVESTMENT POOLS

Characteristics of different STIPs are summarized in Table I. While all STIPs basically function as intermediaries for short-term securities, they can differ in several ways. First, some STIPs are open to a wide variety of investors while others cater only to a narrow group. Second, some STIPs hold many different money market instruments while others confine their investment to one type of security. Third, some STIPs are "open-end" arrangements that allow investors to purchase and redeem shares of an ever-changing pool of underlying securities. In other STIPs investors buy shares of a specific pool of securities. Other features that vary among STIPs include minimum investment size, expense ratios, and methods of investing and withdrawing funds.

Money Market Mutual Funds Because MMFs were discussed in great detail in two earlier articles in this *Review* [4, 5], the discussion here will be brief. The general operating characteristics of MMFs are fairly standard. Minimum initial investments usually range from \$500 to \$5,000, although a very small number of funds require no minimum and others, designed for institutional investors, require minimums of \$50,000 or more. With the exception of the small number of funds that limit their investors to institutions, MMF shares are available to any type of investor. Most funds have a checking option that enables shareholders to write checks of \$500 or more. Shares can also be redeemed at most MMFs by telephone or wire request, in which case payment by the MMF is either mailed to the investor or remitted by wire to the investor's bank account.

MMFs are open-end investment companies that vary considerably in both the type and average maturity of securities they hold. A large percentage of most MMFs' holdings are in domestic and Euro-dollar CDs, commercial paper and Treasury bills, but various other high grade money market instruments are also commonly purchased. A small number of MMFs have restricted their investments to government securities, apparently to attract more risk-averse investors, and an equally small number have invested very heavily in Eurodollar CDs.

Because MMFs are generally "no-load" mutual funds, investors purchase and redeem MMF shares without paying a sales charge. Instead, expenses of the funds are deducted daily from gross income before dividends are declared. The difference between the yield earned on a MMF's assets and the yield earned by the shareholders is the MMF's expense ratio. (Alternatively, this can be measured as the ratio of total expenses on an annual basis to average assets.) In 1978 the expense ratio for different MMFs ranged from .4 percent to 1.4 percent [4]. The weighted average expense ratio for the industry as a whole was .55 in 1979.¹

¹ The weighted average expense ratio for MMFs is calculated from expense data for 55 MMFs, with fiscal years ending near the end of 1979, presented in *Lipper-Directors' Analytical Data*, May 1980.

The first MMF started offering shares to the public in 1972. By the end of 1974 there were 15 MMFs and by the end of 1979, 76 were in operation. Total MMF assets at the end of 1979 were \$45.2 billion.²

Short-Term Tax-Exempt Funds Short-term tax-exempt funds (STEFs) are the tax-exempt counterpart to MMFs. STEFs invest primarily in securities issued by state and local governments ("municipals"), which pay interest income that is exempt from Federal income taxes. The first short-term tax-exempt fund offered shares to the public in 1977 and several others were formed in 1979. By mid-1980 there were at least 10 STEFs operating with combined assets of over one-and-a-half-billion dollars.

As a result of the type of financial assets they purchase, STEFs appeal to investors in high Federal income tax brackets. More specifically, an investor facing the choice between two investments that are alike in every respect except that one offers a yield that is subject to Federal income taxes, Y_T , while the other's yield is tax-free, Y_{TF} , will choose the alternative that offers the highest after-tax return. That is, the investor will choose the tax-free investment option if $Y_{TF} > Y_T(1-t)$, where t is the investor's marginal Federal income tax rate. Thus, by examining the ratio of short-term tax-exempt yields to short-term taxable yields it is possible to determine at what minimum marginal tax rate an investor would be better off investing in a STEF than in a MMF. While this ratio varies considerably over time, available evidence suggests that an investor probably has to have a marginal Federal tax rate of more than 50 percent to achieve a higher after-tax yield in a STEF than in a MMF.³

While after-tax yield comparisons might indicate that an investor with a very high marginal tax rate

² Much of the data used in this article is available only on a year-end basis. Consequently, for purposes of comparison and for uniformity, year-end 1979 data are used throughout the article for all STIPs. In the six-month period following the end of 1979, MMF assets grew to a level of \$76.7 billion.

³ The ratio of short-term tax-exempt to short-term taxable yields varied from .421 to .492 in 1979 [8]. This implies that a marginal tax rate of somewhere between 50.8 percent and 57.9 percent would have been necessary to make an investor indifferent between the choice of taxable and tax-exempt instruments if no costs were associated with investment. If both the MMF and the STEF had the same expense ratio, ER , the true marginal tax rate which leaves the investor indifferent is

$$1 - \frac{Y_{TF} - ER}{Y_T - ER},$$

which implies that an even higher marginal tax bracket is necessary to make the STEF the preferable alternative.

would be better off in a STEF than in a MMF, one major qualification must be added. Largely because of the small quantity of very short-term municipal securities available for purchase, STEF portfolios have generally been of longer average maturity than MMF portfolios. To the extent that STEF portfolios have longer maturities than MMF portfolios, the variation in the STEF's share price and in the STEF investor's principal will be somewhat greater than for MMF shares. For some investors this may lessen the relative attractiveness of STEFs.

In order to minimize the perceived problem of a varying share price, most STEFs have opted, like most MMFs, to maintain an average maturity of 120 days or less in order to gain exemptive orders from the Securities and Exchange Commission permitting the use of accounting policies that should enable the maintenance of a constant net asset value.⁴

As a means of achieving shorter average maturities, some STEFs have retained the right to use a "put option" technique. Under this arrangement, the fund would purchase municipal securities, often at a higher price (lower yield) than it would normally pay for these securities, at the same time acquiring the right or option to sell the securities back to the seller at an agreed-upon price on a certain date or within a specified period in the future. The primary advantage of this technique is that it may allow the fund to tailor a shorter term portfolio. The major disadvantage is that the fund is dependent on the ability and willingness of the seller to buy back the securities. Furthermore, there are also thorny legal issues yet to be resolved, such as the appropriate method of valuing securities purchased under put options and the tax status of securities purchased under put options.

Unlike the yield curve for taxable securities, the yield curve for municipals is almost always upward-sloping throughout the entire range of maturities, i.e., a higher yield is paid for securities of longer maturity. Consequently, the tradeoff encountered in trying to maintain a very short average maturity in a municipal portfolio is generally a lower yield on the portfolio. For this reason some STEFs retain the option of holding an average maturity of one year or over.

Short-Term Investment Funds Short-term investment funds (STIFs) are collective investment

⁴ These funds obtain a stable share value by using amortized cost or "penny-rounding" methods of share price determination. These concepts are described in Cook and Duffield [5].

Table I

CHARACTERISTICS OF SHORT-TERM INVESTMENT POOLS

	<u>Year First One Started</u>	<u>Type of Investors</u>	<u>Minimum Investment</u>	<u>Assets</u>	<u>Maturity End of 1979</u>	<u>Type of Pool</u>	<u>Redemption Methods</u>	<u>Annualized Expense Ratio (basis points)</u>
Money Market Funds	1972	anyone	\$1,000 to \$5,000 is most common; some funds for institutions require \$50,000 or more	wide range	weighted average maturity of 34 days	open-end	wire, check-writing, mail	weighted average ratio of 55
Short-Term Tax-Exempt Funds	1977	investors desiring income free of Federal taxes	varies from \$1,000 to \$25,000	tax-exempt securities	120 to 150 days	open-end	wire, check-writing, mail	similar to MMF expenses
Short-Term Investment Funds	1968(?)	accounts of bank trust department	negligible	wide range; mostly commercial paper	n.a.; by regulation very short	open-end	daily transfer on request	n.a.
Local Government Investment Pools	1973	state and local government bodies	usually none	wide range	varies greatly (see text)	open-end	wire, checks in some cases (usually 24 hours notice needed for withdrawals of greater than \$1 million)	n.a.
Credit Union Pools	1968	credit unions	n.a.	mainly Treasury bills and Federal agencies	varies	open-end	wire, draft	n.a.
Short-Term Investment Trusts	1974	anyone	\$1,000	primarily Eurodollar CDs	6 months	unit investment trust	funds returned at maturity; can sell prior to maturity subject to a charge	140
Shares in Bills	n.a.	anyone	\$1,000	Treasury bills	3 or 6 months	similar to unit investment trust	funds returned at end of 3- or 6-month investment; can sell prior to maturity subject to a charge	varies inversely with maturity and with size of investment; expense ratio for a \$5,000 investment in 6-month bill would be 90

funds operated by bank trust departments. A collective investment fund is an arrangement whereby the monies of different accounts in the trust department are pooled to purchase a certain type of security, such as common stocks, corporate bonds, tax-exempt bonds, or, in the case of STIFs, short-term securities. The first STIF was started no later than 1968.⁵ By the end of 1974 there were over 70 STIFs with total assets of \$2.7 billion. STIF assets grew rapidly in 1978 and 1979 and by the end of 1979 total STIF assets were over \$32 billion.

STIFs function just like MMFs and offer the same advantages to the accounts of the trust department. In particular, the minimum investment is usually a negligible amount and funds can be put in and withdrawn without transaction fees.

That STIFs and MMFs provide virtually the same services to their customers is illustrated by the fact that many trust departments use MMFs rather than establish STIFs. The decision to set up a STIF or to use a MMF for its customers' short-term assets is largely dependent on the size of the trust department. The larger the trust department, the more likely it is to have a STIF. Survey data from 1978 (presented in [5]) revealed that of the trust departments with assets of \$100 million or less, fewer than 1 percent had established STIFs and of the trust departments with assets of \$100 million to \$500 million, only about 10 percent had STIFs. In contrast, almost 40 percent of the trust departments in the survey with assets of \$500 million to \$1 billion had STIFs and about 65 percent of the departments with assets of \$1 billion or more had STIFs. Most bank trust departments without STIFs use MMFs.⁶

Both the type and maturity of assets held by STIFs reflect the Comptroller of the Currency's Regulations on the portfolios of STIFs. The two key regulations are that:

- (1) at least 80 percent of investments must be payable on demand or have a maturity not exceeding 91 days, and

⁵ This is the earliest date for which the authors are aware of the existence of a STIF. It is possible that other STIFs were formed prior to 1968.

⁶ Cook and Duffield [4] argue that the explanation for the use of MMFs by small- and medium-sized bank trust departments is that both MMFs and STIFs are subject to decreasing average costs as assets increase. Consequently, a small- or medium-sized bank trust department can get a higher yield net of expenses for its accounts by investing in a MMF than by setting up a relatively small STIF. It should also be noted that some agency accounts of bank trust departments are not eligible to invest in STIFs but may invest in MMFs.

- (2) not less than 40 percent of the value of the fund must be cash, demand obligations, and assets that mature on the fund's next business day.

As a result of these regulations, STIFs hold a substantial amount of variable amount notes (also called master notes), which are a type of open-ended commercial paper that allows the investment and withdrawal of funds on a daily basis and pays a daily interest rate tied to the current commercial paper rate. In addition, STIFs hold a large amount of standard commercial paper and a much smaller amount of time and savings deposits and Treasury securities. A very small number of STIFs invest primarily in short-term tax-exempt securities.

Typically, only the audit expenses of STIFs are charged directly against the income earned by the STIFs and it is only this expense that appears in the STIF annual report. Other expenses are covered by fees charged to the accounts of the trust department. Consequently, it is impossible to calculate the expense ratio of STIFs from published reports.

Local Government Investment Pools Local government investment pools (LGIPs) were in operation in 11 states by the end of 1979.⁷ These pools have been set up to enable local government entities (such as counties, cities, school districts, etc., and in all but two states, state agencies) to purchase shares in a large portfolio of money market instruments. The primary purpose of state legislation establishing the pools has been to encourage efficient management of idle funds.

Since many local government bodies have relatively small sums of money to invest, they would seem to benefit most from LGIPs. However, in many LGIPs the majority of assets represent state funds. Surprisingly, through 1979 only a small percentage of eligible local government bodies were investing in the pools. Duncan [6] reports that in July 1979 the percentage of eligible participants contributing to LGIPs ranged from less than 1 percent in Illinois to 35 percent in Massachusetts.

Except for the LGIPs of Massachusetts and Illinois, the pools are administered by the state treasurer's office, often in conjunction with the state investment board and a local government advisory council. The Illinois pool is administered by a bank

⁷ These states are California, Connecticut, Florida, Illinois, Massachusetts, Montana, New Jersey, Oregon, Utah, West Virginia, and Wisconsin. In addition, legislation was recently passed in Oklahoma providing for the creation of a LGIP.

trust department, while the Massachusetts LGIP is run by an investment management firm.

In most respects, the operating characteristics of LGIPs are identical to those of MMFs. Funds may be invested by wire or check and withdrawn either by telephone request, with payment sent by wire, or in some cases by check. Funds may generally be invested and withdrawn on a daily basis, although several LGIPs require 24 hours' notice prior to the withdrawal of \$1 million or more. While there are usually no minimum investment or withdrawal constraints, small transactions are often informally discouraged. Interest is earned daily, except in one LGIP which distributes income quarterly.

The pools invest in a broad range of securities many of which would not be legally available to the participants if they invested their funds individually. That is, many LGIP participants are legally prohibited from directly investing in some of the types of securities which the pool is authorized to purchase.

LGIPs in different states have followed widely differing maturity strategies. Whereas at the end of December 1979, the longest average maturity of any MMF was less than three months, several LGIP portfolios had average maturities in the 1-to-3-year range. Others maintained average maturities as short as those of MMFs.

Credit Union Pools Two short-term pools have been established for the investment of surplus funds of credit unions. The government securities pool of the Credit Union National Association (CUNA), a service organization representing more than 90 percent of the 22,000 credit unions in the U. S., represents one of the nation's earliest short-term pooling arrangements, having commenced operations in 1968. This pool had over \$1 billion in assets and more than 10,000 participating credit unions at year-end 1979. The other pool was created in 1976 by the National Association of Federal Credit Unions (NAFCU).

Both pools are operated as common trust funds by bank trust departments. In most respects they are identical to other open-end STIPs. Investments and withdrawals may be made daily. Participating credit unions may request withdrawals by telephone with funds remitted by wire or they may write a draft on their pool account and deposit it at their commercial bank. Drafts may not be used for third-party payment.

CUNA's pool invests solely in U. S. Government and Federal agency securities. The average maturity of its portfolio was seven-and-one-half-months at the end of 1979. The NAFCU pool can invest in any

type of security eligible for purchase by a Federal credit union. Thus, in addition to U. S. Government securities, the pool may purchase domestic certificates of deposit but is prohibited from investing in Euro-dollar CDs, commercial paper and bankers acceptances. The NAFCU pool has maintained a very short average maturity, 30 days at the end of 1979.

Short-Term Investment Trusts Short-term investment trusts (STITs), or short-term income trusts, are a type of unit investment trust that invests exclusively in short-term financial instruments. These funds are put together by groups of brokers that sell shares in units of \$1,000 to their retail customers. Unlike MMF shares, these shares represent a claim to part of a specific set of securities. Hence, when these securities mature, the fund is terminated. The first eight series of STITs were sold in 1974, all by one broker group. No more STITs were sold until September 1978 when the same broker group again began to offer STITs. A second broker group began to market STITs in January 1979. From September 1978 through the end of 1979, 47 separate series of STITs totalling \$6.1 billion were sold to the public. At the end of 1979 there were 35 series of STITs outstanding with total assets of \$4.6 billion.

The maturity of all but two of the STIT series sold through 1979 was six months. The assets of the STITs put together by the first broker group have been composed of (1) CDs of foreign branches of U. S. banks, (2) CDs of foreign banks, (3) CDs of U. S. branches of foreign banks, and (4) CDs of domestic banks. Of these, the first two categories, which are "Eurodollar CDs," comprised 72.1 percent of the total assets of the STITs offered by this group in 1979. The second broker group has generally included in their STITs only CDs of foreign branches (specifically, London branches) of domestic banks.

On an annualized basis the expense ratios of the STIT series sold in 1979 generally ranged from 140 to 150 basis points.⁸ (This is calculated as the sales charge plus expenses of the Fund divided by the offering price and annualized.) This calculation assumes that the STIT share is held to maturity. The share can be sold prior to maturity subject to an

⁸ The term "expense ratio" is used broadly here to encompass all expenses, including sales charges, that lower the investor's net yield. There are two possible reasons why the STIT expense ratio is higher than the MMF expense ratio. First, the labor expenses of a STIT may be greater because it requires a large network of dealers to actively market the STIT shares. Second, the size of the average STIT, is much smaller than the size of the average MMF, so that MMFs may benefit more from economies of scale.

additional charge, in which case the investor's effective expense ratio would be somewhat higher.

Other Types of STIPs In addition to the six types of STIPs discussed so far, there are a small number of STIPs for which data were not collected for this article. These fall into two categories.

Shares-in-Bills One organization of brokers and dealers has established a program whereby investors can purchase shares in specific three- and six-month Treasury bills. From the investor's point of view, this program is similar to a unit investment trust that invests exclusively in bills. The minimum purchase requirement is \$1,000. According to the program's advertising literature, it has been in operation since 1969. However, only recently has the program been widely advertised, suggesting that it was relatively insignificant prior to 1979.⁹

The annualized expense ratio of a bill purchased through the program is inversely related to the size and maturity of the investment. An investment of \$5,000 in a three-month bill has an annualized expense ratio of 120 basis points while a \$5,000 investment in a six-month bill has an expense ratio of 90 basis points.

Other Open-End STIPs Lastly, at least one other type of financial intermediary—life insurance companies—is already operating open-end STIPs and a second—savings and loan associations—will probably begin to do so in the early 1980's. Life insurance companies provide investment services for various types of thrift and pension plans. In the past, insurance companies have offered these plans such alternatives as investing in commingled bond or stock accounts. Recently, some life insurance companies have also begun to offer short-term investment commingled accounts.¹⁰

The Depository Institutions Deregulation and Monetary Control Act of 1980 gives federal savings and loan associations the authority to provide trust services. As noted above, most small- and moderate-sized bank trust departments use MMFs while large trust departments generally set up their own STIFs.

⁹ Interestingly, unlike a STIT, the shares-in-bills program is not organized as an investment company. Hence, no prospectus or annual report is published and no information on the size of the program is readily available. The authors were unable to get this information from the sponsor.

¹⁰ The authors became aware of the existence of life insurance company STIPs late in the preparation of this article. Consequently, no attempt was made to gather data for this type of STIP.

The savings and loan associations who compete in the market for trust services will have these same options. It is probable that some of the larger associations will establish their own short-term investment pooling arrangements.

STIP Growth and Percentage Holdings of Various Money Market Instruments The growth of assets of each type of short-term investment pool and the growth of aggregate STIP assets from 1974 through 1979 is shown in Table II. Total STIP assets grew rapidly in the high interest rate period of 1974. Asset growth leveled off in 1976, when interest rates reached a cyclical trough, and accelerated sharply from 1977 through 1979, a period of rising interest rates. Almost all types of STIPs participated in this rapid growth. Assets of the six types of STIPs for which data were available totaled \$88.5 billion at the end of 1979. MMFs held slightly over half of this total.

Table III shows the composition of STIP assets by type of STIP and calculates the percentage of various types of money market instruments held by STIPs at the end of 1979. As the table illustrates, by the end of 1979 STIPs in the aggregate held significant proportions of some types of money market instruments. In particular, STIPs held 36.5 percent of total commercial paper outstanding, 11.2 percent of total bankers acceptances outstanding, and 8.4 percent of total CDs (i.e., all large time deposits greater than \$100,000).

Tables II and III confirm that STIPs have become a significant intermediary in the financial system. The reasons for this development are discussed in the following section.

II.

FACTORS CONTRIBUTING TO THE GROWTH OF STIPS

This section explores the reasons underlying the emergence of STIPs in the late 1960's and their subsequent rapid growth. Most public discussion of STIPs has focused on MMFs, explaining their rapid growth as a reaction to the impact of Regulation Q deposit interest rate ceilings at commercial banks and thrift institutions. Specifically, this explanation for MMF growth is that when market rates have risen above Regulation Q ceiling rates, depositors without sufficient funds to meet the minimum purchase requirements necessary to invest directly in the money market have turned to MMFs as a means of getting a market yield on their funds. According to this

Table II
ASSETS AND NUMBERS OF VARIOUS FORMS OF STIPs

(end-of-year)

	Money Market Funds		Short-Term Tax-Exempt Funds		Short-Term Investment Funds ¹		Local Government Investment Pools		Credit Union Pools		Short-Term Investment Trusts		Total Assets (\$ mil.)
	Assets (\$ mil.)	Number (funds)	Assets (\$ mil.)	Number (funds)	Assets (\$ mil.)	Number (funds)	Assets (\$ mil.)	Number (states)	Assets (\$ mil.)	Number (pools)	Assets (\$ mil.)	Number (sponsors)	
1974	1,715	15			2,660	73	394	4	1,224	1	846	1	6,839
1975	3,696	36			3,986	102	890	4	1,947	1		0	10,519
1976	3,686	48			3,427	92	2,034	6	1,816	2		0	10,963
1977	3,888	50		2 1	8,409	136	3,044	10	1,151	2		0	16,494
1978	10,858	61		30 1	25,125	na	3,845	11	1,074	2	665	1	41,597
1979	45,214	76		350 3	32,277	251 ²	4,779	11	1,237	2	4,614	2	88,471
Sources:	Investment Company Institute		data gathered by authors from funds		Common Trust Fund Surveys; ABA Collective Investment Funds Survey Report (1978)		data gathered by authors from funds		data gathered by authors from funds		prospectuses		

¹ The STIF data for 1978 is year-end data from a special American Bankers Association, Collective Investment Funds Survey Report. The STIF data for 1974-77 is from the Common Trust Fund Survey. Prior to 1979, the Survey was conducted by the Comptroller of the Currency. Banks that were not national banks reported on a voluntary basis and there appear to be a number of large trust departments not reporting in those years. In addition, assets were reported prior to year-end by some banks. Hence, the 1974-77 data should be regarded as estimates which are on the low side. In 1979, the Common Trust Fund Survey was incorporated into the Trust Assets of Insured Commercial Banks survey conducted jointly by the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Federal Reserve Board. The 1979 data is year-end and covers all trust departments.

² These 251 STIFs were operated by a total of 155 bank trust departments and 5 trust companies owned by bank holding companies.

Table III

COMPOSITION OF STIP ASSETS AND PERCENTAGE OF MONEY MARKET INSTRUMENTS HELD BY STIPs

(end of 1979)

	U. S. Treasury Less Than 1 Year		U. S. Treasury Greater Than 1 Year		Federal Agencies		Domestic CDs		Eurodollar CDs	
	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets
Money Market Funds	1,621	3.6	—	—	4,020	8.9	13,053	28.9	5,076	11.2
Short-Term Tax-Exempt Funds	—	—	—	—	—	—	—	—	—	—
Short-Term Investment Funds ¹	1,323 ²	4.1	65	0.2	—	—	3,195 ³	9.9	—	—
Local Government Investment Pools	96	2.0	397	8.3	1,262	26.4	946	19.8	—	—
Credit Union Pools	511	41.3	—	—	277	22.4	37	3.0	—	—
Short-Term Investment Trusts	—	—	—	—	—	—	1,060	23.0	3,554 ⁴	77.0
Total Held by STIPs	3,551		462		5,559		18,291		8,630	
Amount Outstanding (Dec. 1979)	255,252		275,479		n.a.		217,900 ⁵		43,412 ⁶	
Percent Held by STIPs	1.4		0.2				8.4		19.9	

	Commercial Paper		Bankers Acceptances		Tax-Exempt		Other (includes RPs)		Total
	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	Amount (\$ mil.)	Percent of Assets	
Money Market Funds	14,453	32.0	4,845	10.7	—	—	2,146	4.7	45,214
Short-Term Tax-Exempt Funds	—	—	—	—	343	97.9	7	2.1	350
Short-Term Investment Funds ¹	26,112	80.9	—	—	—	—	1,582	4.9	32,277
Local Government Investment Pools	784	16.4	215	4.5	—	—	1,080	22.6	4,779
Credit Union Pools	—	—	—	—	—	—	412	33.3	1,237
Short-Term Investment Trusts	—	—	—	—	—	—	—	—	4,614
Total Held by STIPs	41,349		5,060		343		5,227		88,471
Amount Outstanding (Dec. 1979)	113,282		45,321		n.a.		n.a.		
Percent Held by STIPs	36.5		11.2						

¹ Data on STIF asset composition was not collected in the 1979 Common Trust Fund Survey. Consequently, the asset percentages from the 1978 Survey were applied to 1979 total assets to get an estimate of 1979 assets.

² May include some Federal agency issues.

³ May include a small amount of savings and small time deposits.

⁴ Includes some CDs of domestic branches of foreign banks.

⁵ Includes all large time deposits greater than \$100,000 at commercial banks and thrift institutions.

⁶ Includes only London Eurodollar CDs, which at the end of 1979 were almost all of the Eurodollar CDs outstanding.

Sources: Sources for fund data are same as in Table II. MMF breakdown for domestic and Eurodollar CDs is calculated from Donoghue's Money Fund Report. Total outstanding Treasury securities, domestic CDs, commercial paper, and bankers acceptances are from the Federal Reserve Bulletin. London Eurodollar CDs are from the Bank of England.

view "the entire money market fund industry would not exist without that one regulation (Regulation Q)."11

In this article MMFs are viewed as part of the wider phenomenon of STIPs. Another explanation for the rapid growth of STIPs stresses technological advances in the computer and telecommunications industries that have altered the production process, improved the product and lowered the operating costs of STIPs. According to this view, "new technologies like telecommunications and data processing have provided means to give everyone equal access to the free money markets and inflation is furnishing the incentive to go there."12

The question of what has caused the growth of STIPs is not only of interest in itself, but also has implications for the future of the nation's financial system. The Depository Institutions Deregulation and Monetary Control Act of 1980 phases out interest rate ceilings on deposits over a six-year period. If STIPs have thrived only because they are a means of circumventing those ceilings, then they would not be expected to survive as a financial intermediary in the long run.13

The Demand for STIP Services In order to provide a framework for discussing the introduction and growth of STIPs, it is useful to set up a simple model of the demand for and supply of STIP services. As a first approximation, investment in a STIP is considered solely as an alternative to direct investment in the money market. (This is a simplification, since, as will be discussed below, STIP shares are also an alternative to financial products offered by other types of financial intermediaries.)14 Thus,

11 This view was expressed by William Poole March 25, 1980 in a statement before the Subcommittee on Domestic Monetary Policy of the Committee on Banking, Finance and Urban Affairs of the U. S. House of Representatives, reprinted in the July/August 1980 issue of the Federal Reserve Bank of Richmond **Economic Review**.

12 This statement was made by Walter Wriston in an address at the 1980 annual meeting of the Reserve City Bankers Association, reprinted in the April 11, 1980 edition of the **American Banker**. It should be noted that Wriston also cited Regulation Q as a factor contributing to STIP growth.

13 This raises the question of why it matters whether a new form of financial intermediary, such as STIPs, survives. The third section of this article argues that STIPs have had significant implications for the financial markets.

14 While STIPs do compete with other financial intermediaries, they specialize in providing one type of service: short-term investment intermediation. Thus, in terms of their risk and expected return characteristics, STIPs are most clearly a substitute for direct investment in the money market.

an investor with a given quantity of funds to invest in short-term assets can either manage his own portfolio or place these funds in a STIP which, in turn, will invest in money market instruments.

The investor's decision to invest directly in the money market or indirectly through a STIP will depend primarily on the relative costs of each alternative. These costs, which will vary with each investor, are summarized in Table IV, where they are shown as the wedge between the gross yield paid by the ultimate borrower of funds and the net yield received by the direct or indirect investor in money market instruments.15

The top line in Table IV summarizes the costs of direct investment in the money market. The first category consists of the brokerage costs of producing a money market instrument and selling it to the initial investor. The broker in this transaction may be an independent agent or an agent of the ultimate borrower or the borrower himself. In any case, these brokerage costs drive a wedge between the gross yield paid by the borrower and the yield received by the investor. An important aspect of these brokerage costs is that on a per dollar basis they are inversely related to the size of the debt instrument. At very low levels, per dollar brokerage costs are so high that debt units are not produced. Per dollar brokerage costs fall with increasing unit levels and gradually approach a constant.

The direct investor's net yield is further reduced by a number of costs that are specific to each investor. These "individual-specific" costs include the costs of managing the portfolio of money market instruments, the costs of recordkeeping, and whatever transportation and inconvenience (i.e., personal time) costs are involved in carrying out transactions. These individual-specific costs of direct investment are also generally inversely related on a per dollar basis to the amount of funds the investor has to invest because of economies of scale in portfolio management and recordkeeping activities.

The right-hand side of Table IV shows that the final commodity held by the direct investor is simply a group of one or more money market securities representing the debt of one or more borrowers and maturing on one or more dates. Here again the attractiveness of the end "product" is in two im-

15 The general analytical approach taken in this section follows Benston and Smith [2]: "Essentially, we view the role of the financial intermediary as creating specialized financial commodities. These commodities are created whenever an intermediary finds that it can sell them for prices which are expected to cover all costs of their production, both direct costs and opportunity costs."

Table IV

THE COSTS ASSOCIATED WITH DIRECT AND INDIRECT INVESTMENT IN THE MONEY MARKET

	Yield Paid by Ultimate Borrower	Brokerage Costs	Intermediary Operating Costs	Intermediary Regulatory Costs	Individual- Specific Costs	Lender's Net Yield	Financial Commodity
Direct	R	covers packaging and sale of debt units	none	none	portfolio management record keeping transportation time (inconvenience) information costs	R _D	one or a group of short-term money market instruments
Indirect	R	covers packaging and sale of debt units	account administration sales administration portfolio management trading administration	licensing and supervision interest rate ceilings reserve requirements	transportation time (inconvenience) information costs	R _S	a one-day instrument backed by a diversified portfolio of money market instruments

portant ways inversely related to the size of the investment. The investor with a larger amount of capital can enjoy greater diversification through holding the debt of several issuers. He also has more liquidity since with a large number of securities he can schedule the rate of maturity of the portfolio at a more regular and steady pace to meet expected and unexpected needs.¹⁶

The second row of Table IV summarizes the costs of investing in money market instruments indirectly through a STIP. As in the case of direct investment, the first costs are brokerage costs. However, because the STIP's size enables it to purchase money market instruments in large units, these costs per dollar of investment will be lower than those incurred by most investors in the money market.

The next costs associated with indirect investment are the intermediary's operating and regulatory costs. Operating costs include account administration, sales administration, portfolio management and all other labor and capital costs of operating a short-term intermediary. Potential regulatory costs include two types. The first are licensing and reporting expenses. The second are those related to government controls, such as interest rate ceilings and reserve requirements. (An example of this type of regulation affecting STIPs is the special deposit requirement imposed on MMFs in March 1980.) That is, if the yield passed on to the ultimate investor is below what would be paid in the absence of government controls, then this difference can be thought of as an additional "cost" to be absorbed by the investor.¹⁷

The third type of costs absorbed by the indirect investor are individual-specific costs. These costs will be less than or equal to the individual-specific costs of direct investment in the money market, pri-

¹⁶ Actually, the greater liquidity and diversification of a larger portfolio are fundamentally a result of the high brokerage costs per dollar involved in offering small units of debt. If brokerage costs were zero, a small portfolio could have liquidity and diversification equal to that of a large portfolio.

¹⁷ This statement assumes that the increased regulatory costs are absorbed by depositors. In certain cases, such as binding interest rate ceilings, the regulatory costs might create excess profits which in a competitive environment could be offset by other actions of the intermediary. For instance, part of the increased regulatory costs of binding interest rate ceilings at the deposit institutions may have been offset through such avenues as gift premiums, which increase the true yield of a deposit, and increased branch offices, which decrease the individual-specific costs of using a deposit institution. However, the pattern of disintermediation in periods when market rates have risen above Regulation Q ceilings, such as 1969, 1973, and 1974, suggests that such responses have not fully offset the regulatory costs imposed by Regulation Q on depositors.

marily because most expenses related to portfolio management and recordkeeping will be absorbed by the STIP. Other potential individual-specific costs associated with using a STIP—e.g., the search costs in choosing a STIP and the costs of communication—will remain. These costs will be discussed below.

As shown on the right-hand side of Table IV, the investor who invests indirectly in the money market through a STIP acquires a different financial commodity than the direct investor. This commodity is essentially a one-day instrument backed up by a diversified portfolio.¹⁸ Here too, the extent of the difference between the products is a function of the size of the investor's capital. The smaller the capital, the greater the gain in liquidity and diversification achieved by indirect investment in the money market through a STIP.

In this framework the decision to use a STIP depends on whether the costs of intermediation are less than the resulting savings in brokerage and individual-specific costs plus the gain in diversification and liquidity. Algebraically, the investor will use a STIP instead of investing directly in the money market if

$$(1) \quad OC_s + RC_s < (BC_D - BC_s) + (SC_D - SC_s) + \rho$$

where

OC_s = operating costs of STIP

RC_s = regulatory costs of STIP

BC = brokerage costs of direct (D) or indirect (S) investment

SC = individual-specific costs of direct (D) or indirect (S) investment

ρ = value placed on increased liquidity and diversification achieved through investment in STIP¹⁹

This relation will differ for each investor, because all items on the right-hand side—(1) the brokerage cost savings of using a STIP, (2) the individual-

¹⁸ This characterization of the STIP product applies only to open-end STIPs. These STIPs, however, hold 95 percent of total STIP assets.

¹⁹ This framework focuses on the difference in costs, and hence expected net return, of investment in a STIP relative to direct investment. The potential increase in diversification and liquidity achieved through investment in a STIP does not fit easily into this one-dimensional framework. However, imputing a value to these factors simplifies matters and provides a good approximation of reality.

specific cost savings of using a STIP, and (3) the value placed on any additional diversification and liquidity of using a STIP—are inversely related to the amount of funds available for investment. Each decline in $OC_s + RC_s$ will result in additional investors (with greater and greater amounts to invest) using STIPs. Consequently, the demand for STIP services with respect to the "price" of intermediation, $OC_s + RC_s$, will be downward sloping.

The relative brokerage costs, $BC_D - BC_s$, the relative individual-specific costs, $SC_D - SC_s$, and ρ are all parameters of the STIP demand curve. Any development that affects one of these three items will shift the curve. For instance, if the individual-specific costs of using a STIP were reduced then the demand curve would shift to the right.

This discussion is oversimplified by treating the demand for STIP services only as a substitute for direct investment in the money market. In actuality, STIP shares are also a substitute, although not a perfect one, for financial products offered by other less specialized intermediaries such as commercial banks. Consequently, factors affecting the relative attractiveness of these financial products to STIP shares will also affect the STIP demand curve.

The Supply of STIP Services An individual STIP will supply short-term financial intermediation when that service can be sold at a price that covers the STIP's average costs. These costs include both operating costs and regulatory costs. The STIP will choose the mix of labor and capital at each level of output that minimizes its operating costs. This mix will be a function of relative prices and will change over time as these relative prices change.

An earlier study by the authors [4] found that the long-run average cost curve for MMFs was downward sloping up to a certain level of assets (i.e., \$50 to \$100 million) and then flattened out. There was no evidence of increasing unit costs (i.e., decreasing returns to scale) within the asset size range of the 40 MMFs studied. Since other STIPs fulfill the same function as MMFs, they should have similar operating characteristics and expenses.²⁰ The aggregate long-run STIP supply curve is a horizontal line

²⁰ For simplicity this discussion assumes that all STIPs offer the same product and hence have the same costs. As discussed in Section I, however, STIP features do vary somewhat. Furthermore, for some investors certain STIPs are not acceptable substitutes for other STIPs. Nevertheless, since the discussion here concerns the factors affecting the STIP industry as a whole, these product differences are ignored.

at the point where unit costs of the individual STIP stabilize at a constant level.²¹

Factors Potentially Increasing STIP Assets
Table V contains a summary of developments that might increase STIP assets. Items listed under (1) and (2) simply summarize the discussion up to this point. The third category makes the additional point that other intermediaries—such as banks and savings institutions—offer financial commodities that are close substitutes for STIP shares, notably time and savings deposits. If increased operating or regulatory costs at the depository intermediaries widen the wedge between market yields and the deposit yields offered by these intermediaries, the demand for STIP services will shift to the right.

While the most common explanation for the growth of STIPs is that they are solely a reaction to the impact of Regulation Q on other financial intermediaries, Table V shows that numerous other factors could have contributed to this growth. Several developments in the past decade lend support to the view that some of these other factors have been significant. The rest of this section discusses the explanations for STIP growth in the context of the framework developed above.

The Effect of Deposit Interest Rate Ceilings on the STIP Demand Curve In several periods, beginning in the 1960's, short-term interest rates have risen well above Regulation Q deposit interest rate ceilings at the deposit institutions. During these periods, the spread between market rates and Regulation Q ceiling rates has increased the regulatory costs borne by those investors with insufficient funds to invest directly in the money market (i.e., to disintermediate). The argument that STIPs are a result of Regulation Q is that the increased regulatory costs at the deposit institutions have created the opportunity for STIPs, which are not subject to Regulation Q, to provide short-term intermediation services to investors at a lower cost (or price) than the deposit institutions.

In terms of the simple model developed above, when market rates rise above deposit interest rate ceilings, the increased regulatory costs of investment

²¹ The horizontal long-run supply curve follows from the assumption that after a certain asset level is reached, average unit costs of the firm are constant as output increases. Some smaller MMFs with costs above the industry expense ratio nevertheless supply MMF services. They waive some of their expenses in order to be competitive with larger MMFs, with the goal of growing to an asset level where costs can be fully passed on to shareholders. See Cook and Duffield [4].

Table V

POTENTIAL FACTORS INCREASING THE QUANTITY OF STIP ASSETS

- (1) Factors Causing the STIP Supply Curve to Fall
 - (a) a fall in the cost of inputs used in STIP operations
 - (b) a fall in the regulatory costs imposed on STIPs
- (2) STIP-Related Factors Causing a Rightward Shift in the STIP Demand Curve
 - (a) a decrease in individual-specific costs associated with investing in a STIP
 - (b) an increase in the value placed on liquidity and/or diversification
 - (c) a fall in the brokerage costs of large versus small debt units, causing a decline in STIP brokerage costs relative to the brokerage costs of direct investment
- (3) Factors Related to Other Financial Intermediaries Causing a Rightward Shift in the STIP Demand Curve
 - (a) an increase in the operating or regulatory costs of other financial intermediaries
 - (b) an increase in the individual-specific costs of using other financial intermediaries

in a deposit institution cause a rightward shift in the STIP demand curve and an increase in the quantity of STIP assets. The extreme form of this view of STIP growth is illustrated in Figure 1. In this case when deposit interest rate ceilings are not binding, the demand curve for STIP services does not even intersect the supply curve (i.e., STIPs can not sell their services as a short-term intermediary at a price that covers their costs). Only when money market rates rise above the deposit rate ceilings does the demand curve for STIP services shift far enough to intersect the supply curve. An implication of this view is that when market rates fall below the deposit rate ceilings, funds flow back into the deposit institutions and STIPs are no longer an economically viable intermediary.

The pattern of STIP growth supports the view that binding Regulation Q ceilings have been an important determinant of STIP growth. As shown in Table I, STIPs grew at a rapid pace in 1974-75 when market rates rose well above Regulation Q deposit ceiling rates. Similarly, in the 1978-80 period of very high differentials between money market rates and deposit ceiling rates, STIPs again grew at a rapid pace.

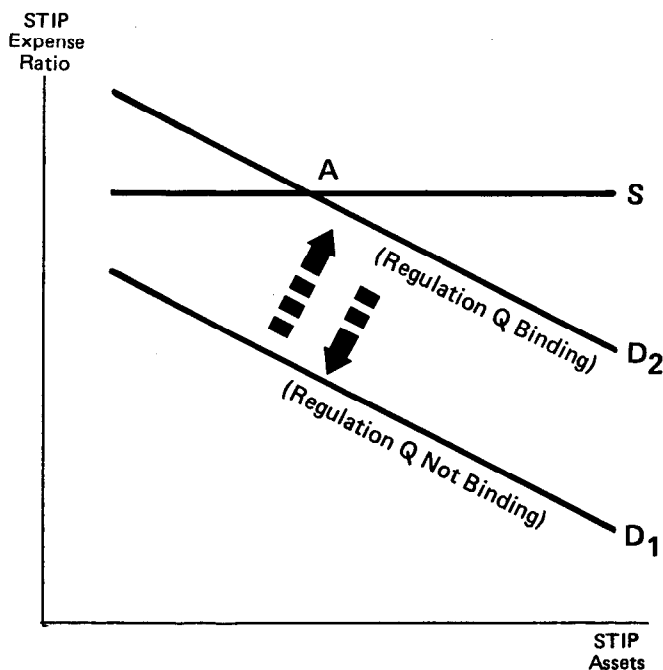
While Regulation Q interest rate ceilings have undoubtedly contributed to the growth of STIPs, there are several possible criticisms of the view that Regulation Q alone has been responsible for STIPs. First,

on closer inspection the timing of STIP growth is not totally compatible with the Regulation Q explanation. No MMFs emerged in the 1969-70 period despite very large spreads between money market rates and Regulation Q ceiling rates. Furthermore, when money market rates dropped below deposit ceiling rates in 1976 and 1977, STIP assets were in general stable while the number of some types of STIPs in operation actually increased. In addition, the Regulation Q explanation offers no insight into why some types of STIPs, such as at least one STIF and one credit union pool, were in operation years prior to the first MMFs.

A second, and more important, criticism of the view that Regulation Q alone has been responsible for STIP growth is that it ignores other possible factors listed in Table V that could have influenced the equilibrium level of STIP assets. A related criticism of the Regulation Q argument is that it assumes STIPs are solely a substitute for deposits. In fact, STIPs specialize in the intermediation of short-term funds. As shown above, investors with sufficient funds to invest directly in the money market will nevertheless invest indirectly through a STIP if the costs of intermediation, adjusted for the gain in liquidity and diversification, are less than the resulting savings in brokerage and individual-specific costs.

Figure 1

THE EFFECT OF INTEREST RATE CEILINGS AT THE DEPOSIT INSTITUTIONS ON THE DEMAND FOR STIP SHARES



Many STIP investors have sufficient funds to invest directly in the money market and are using STIPs as an alternative to direct investment, not simply as a substitute for deposits.²² These investors include corporations, local governments, pension funds, and other institutional investors. They also include individuals with relatively large sums to invest, especially some customers of brokerage firms who find MMFs a convenient place for funds pending direct investment in other financial instruments.

A final criticism of the position that Regulation Q alone is responsible for STIPs is that it can not explain the emergence of some types of STIPs, such as STEFs and STITs, that are not close substitutes for bank deposits. STEFs provide tax-free income, which deposit institutions cannot do. And STITs provide access to the Eurodollar CD market. Eurodollar CD rates are generally higher than domestic CD rates and the spread between Eurodollar and domestic CD rates has typically risen in high interest rate periods. In such periods STITs provide indirect investment in Eurodollar CDs.

Effects of Technology on STIP Operations and on the STIP Supply Curve The position that Regulation Q alone is responsible for STIP growth fails to consider technological developments over the last several years that have significantly lowered the operating costs of short-term financial intermediaries.

As they are presently operated, STIPs are extremely capital intensive intermediaries for which computers and sophisticated telecommunications systems play a pervasive role.²³ Computers are essential to the STIP accounting system. Given the large number of securities held in the STIP portfolio and the rapid portfolio turnover of STIPs, the daily valuation of the portfolio and the calculation of the daily dividend would be extremely difficult without computers. An even more important function of computers is the administration of shareholder accounts. Computers handle such diverse functions as the crediting of daily dividends to each account, the writing and mailing of monthly dividend checks and account statements, and the recording of every transaction. Some bank trust departments even employ automated accounting systems which provide for

²² Evidence that for many investors MMF shares are not merely a substitute for deposits is given in Cook and Duffield [5].

²³ This assertion and the following discussion are based on conversations with STIP officials, and examination of STIP computer software descriptions and other literature put out by various types of STIPs. See, for example, the ABA's *Trust Software Buyer's Guide* [1].

daily unassisted transfer of excess cash (above a small minimum amount) from eligible accounts to the STIF. Some STIPs, such as MMFs, STEFs, and STITs, also use computers as an important tool in sales administration. Newspaper advertisements are monitored for sales and cost effectiveness with the aid of computers. Computers also print and mail letters to prospective shareholders, often in a sequence timed by the computer.

STIP expenses for labor to manage portfolios are also quite low, because most STIPs confine their assets to prime, low-risk money market instruments. As a result, STIP portfolio management is generally guided more by rules defining the type of instrument eligible for purchase than by labor intensive study of issuers whose debt is being purchased. For instance, the majority of MMFs restrict their purchases of commercial paper to the highest quality category, rated A-1 by Standard & Poor's or P-1 by Moody's, and most of the remainder restrict their purchases to the two highest quality categories, rated A-1 or A-2 by Standard & Poor's or P-1 or P-2 by Moody's.

It is important to note that the use of computers by financial organizations that operate STIPs, such as mutual fund groups and bank trust departments, has increased greatly over the last ten to fifteen years. In December 1969, the Securities and Exchange Commission surveyed 41 mutual fund groups on the extent to which they used computers for different functions. The results, shown in Table VI, indicate that, for each of the four functions shown, only about half of the mutual fund groups were using computers. If the same survey were taken today, the results would show the use of computers by virtually 100 percent in each case.

The increase in the use of computers since 1969 (and earlier) resulted from the sharp declines in computer costs that occurred over that period. Computers perform three major services for STIPs: they (1) make calculations, (2) store data, and (3) print information. The unit cost of each basic service has fallen sharply. The decline in costs is shown in Table VII for two of the three services.²⁴

A second and related technological development affecting the cost of STIP operations was the development of sophisticated telecommunications systems such as Inward Wide Area Telecommunications Service ("800" numbers) and computerized switchboards. This technology was important because the vast majority of investors in STIPs do business over the phone, mostly by long distance. Long distance calls are the rule because STIPs have to pool large amounts of funds to achieve economies of scale and this necessarily makes them an "out-of-town" financial intermediary for most investors.

By lowering the costs of communication with customers, technological developments in the telecommunications industry have lowered the operating costs of STIPs and enabled them to provide short-term financial intermediation at a lower price. Of particular importance is the Inward Wide Area Telecommunications Service, which was initially made available in the late 1960's. Since 1970 the cost of the Inward WATS has fallen significantly.²⁵

²⁴ The authors were unable to locate time series data for the cost of a line of printed output. However, discussion with people in the computer industry indicates that the cost of this service also dropped sharply.

²⁵ In nominal terms the cost in Virginia of a full period zone 5 Inward WATS service dropped from \$2,225 per month in 1970 to \$1,675 per month in 1980.

Table VI

**FUNCTIONS FOR WHICH COMPUTERS WERE BEING USED
IN DECEMBER 1969 BY MUTUAL FUND GROUPS**

Size of Firm	Number of Firms in Sample	Percentage of Firms Using a Computer	Percentage that Employed Computers for Tasks Specified			
			Account Administration	Trading Administration	Sales Administration	General Administration
Large	27	89	63	52	52	59
Small	14	57	43	29	36	43
Total	41	78	56	44	46	54

Note: Large fund groups are those with \$100 million or more in assets.

Source: Institutional Investor Study of the Securities and Exchange Commission.

Table VII

THE DECLINE OF COMPUTER COSTS

Monthly Rental Cost Per Million Bytes of Main Memory	Monthly Rental Cost Per Million Bytes of Direct Access Storage	Cost of Data Processing (cost per 100,000 calculations)
1957 \$105,600	1956 \$153.00	1958 \$.26
1964 28,800	1964 75.00	1964 .12
1976 3,800	1970 8.30	1972 .02
1979 430	1973 4.85	1979 .01
	1979 1.35	

Source: IBM Data Processing Division.

Additional evidence of the impact of technological progress in the computer and telecommunications industries on STIP costs comes from a comparison of the share turnover rates and costs of STIPs to those of intermediaries for long-term financial assets. Table VIII shows the share turnover rates (i.e., annual redemptions divided by average assets) of MMFs, which are operated by mutual fund groups, and STIFs, which are operated by bank trust departments, and the share turnover rates of long-term bond funds operated by the same sectors. The table illustrates that the account turnover activity at STIPs is roughly 15 times greater than that of intermediaries for long-term financial instruments.

Clearly, this difference in turnover activity results in a far greater amount of administrative and record-keeping activity for MMFs than for bond funds. Nevertheless, as was shown in Table I, the weighted average expense ratio for MMFs in 1979 was only 55

Table VIII

ANNUAL SHARE TURNOVER RATES OF STIPs AND BOND FUNDS

	(1979)	
	Mutual Fund Groups	Bank Trust Departments
STIPs	2.84	2.77
Bond Funds	0.19	0.15

Note: Share turnover rates are calculated as annual redemptions over average assets.

Source: Mutual fund data are from the Investment Company Institute's "Trends in Mutual Fund Activity." Bank trust department estimates are the average of the share turnover rates of collective investment funds of 12 bank trust departments reported in their annual reports. (No other annual reports were collected by the authors.)

basis points. This is comparable to the expense ratio of no load mutual bond funds.²⁶ It is inconceivable that the MMF expense ratio would be so low if the heavy recordkeeping and administrative functions of MMFs were performed manually instead of by computer.

To the extent that technological progress has altered the production process and reduced the costs of STIPs, the STIP supply curve has shifted downward. As shown in Figure 2, this has lowered the STIP expense ratio, and increased the quantity of STIP assets.²⁷

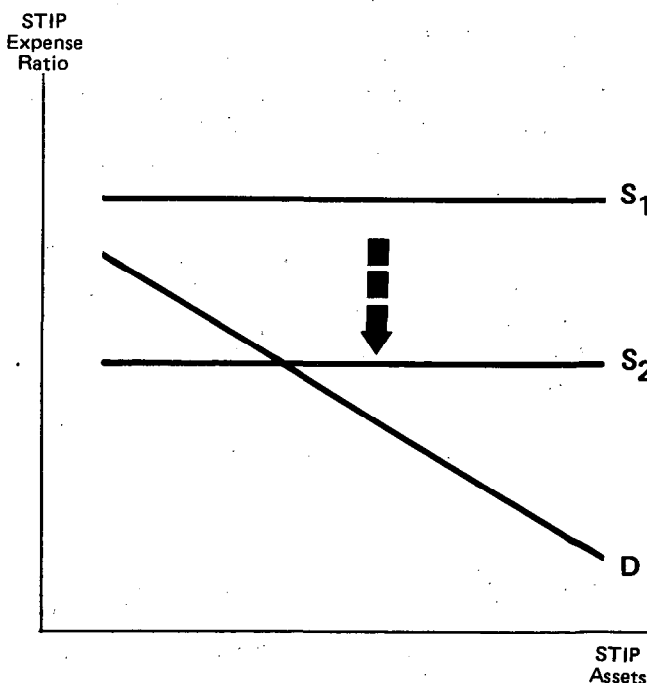
Effect of Technology on the Demand for STIP Services It can also be argued that technological factors have increased the demand for STIP services

²⁶ This statement is based on a survey of 18 no-load corporate bond funds and no-load tax-exempt bond funds in Weisenberger [12]. The average expense ratio of these no-load bond funds in 1978 was 78 basis points. This expense ratio is not directly comparable to the MMF expense ratio because (1) bond funds probably spend more resources on portfolio management and (2) the average size of bond funds is much smaller than that of MMFs. Both of these factors bias the expense ratio comparison in favor of MMFs.

²⁷ Dunham [7] stresses the contribution of MMFs to the goals of multiproduct firms, such as mutual fund groups, as an additional factor increasing the supply of MMFs beginning in 1974.

Figure 2

THE IMPACT OF DECLINING COMPUTER COSTS ON THE STIP SUPPLY CURVE



by decreasing the individual-specific costs of using a STIP. The most important development in this regard is the widespread availability among most types of STIPs—especially MMFs and STEFs—of the toll-free 800 number. As noted above, because STIPs are generally out-of-town intermediaries, virtually all business is conducted over the phone, mostly over long distance. With the availability of 800 numbers, investors can get information about a STIP, inquire about yields, or purchase or redeem shares by simply picking up the phone. There are no financial costs, and other individual-specific costs would appear to be negligible. With respect to the history of STIPs, it is important to realize that the use of 800 numbers by mutual funds is a fairly recent phenomenon. In 1972, for example, only a few small mutual funds made 800 numbers available to investors. By 1974-75 the number had grown to about a dozen. By the spring of 1980, however, almost all money market mutual funds and many other types of mutual funds had 800 numbers.²⁸

It is interesting to note that the convenience of obtaining all one's financial products at one financial intermediary has been thought to be so significant that savings and loan associations and mutual savings banks have been allowed by law to pay a differential of at least 25 basis points over what banks can pay on time and savings deposits. In the framework of this section, the reason for this differential is to offset the marginal individual-specific (i.e., transportation and inconvenience) costs of inducing an investor to do business with a second financial intermediary (i.e., in addition to banks, where the investor has his checking account). For STIPs the toll-free long distance number has made these costs fairly insignificant. To the extent that toll-free long distance numbers have lowered the individual-specific costs of a STIP investment, the demand schedule for STIP services has shifted permanently to the right.

Other Factors Affecting the Demand for STIP Services A nontechnological factor that also may have lowered the individual-specific costs of investment in STIPs is the establishment of STIPs by intermediaries that are already providing other types of financial services. These include (1) brokers, which offer shares in MMFs, STEFs, and STITs, (2) mutual fund groups, which offer shares in

²⁸ These statements are based on a survey of various issues of the *Mutual Fund Directory* published by Investment Dealers Digest and Donoghue's *Money Fund Directory* of Holliston, Massachusetts. In the spring of 1980, 64 of the 78 MMFs and STEFs listed in the *Money Fund Directory* had 800 numbers.

MMFs and STEFs, and (3) bank trust departments, which provide MMF and STIF services to their accounts.

The use of STIPs by brokerage firms, mutual fund groups, and bank trust departments decreases the individual-specific costs of using a STIP for some investors by lowering the information costs associated with choosing a STIP, and by increasing the convenience of using a STIP. This point is significant because the assertion that in the absence of Regulation Q, STIP money would flow back into the deposit institutions typically assumes that individual-specific factors such as convenience, information costs, and transportation operate in favor of the local deposit intermediary. However, this may not be the case for investors who use STIPs in conjunction with other financial services offered by brokers, mutual fund groups, and bank trust departments.

The 1969-70 Period: The Possible Impact of Blue Sky Laws An interesting question is why MMFs did not start up in 1969 and 1970 in reaction to the large spreads between money market rates and Regulation Q ceiling rates prevailing in that period. One possible explanation is the impact of state "Blue Sky Laws" regulating mutual funds, that for years have set maximum mutual fund expense ratios. If these maximums were below the expense ratios needed for MMFs to cover their costs, then MMFs would not form even in reaction to very large spreads between money market rates and deposit ceiling rates, such as appeared in 1969-70. In such a case a downward movement in the MMF supply curve would be required to get an expense ratio that was both economically viable and legally permissible.

In fact there is some evidence that Blue Sky Laws might have been a binding constraint on the ability of MMFs to serve as a money market intermediary at a price that covered their costs. An Investment Company Institute survey conducted in January 1976 found that 26 states had formal or informal limits on the expense ratios that could be passed on to shareholders.²⁹ Fourteen of these states had limits of 1½ percent of assets, eleven had limits of 2 percent of the first \$10 million of assets, 1½ percent of the next \$20 million and 1 percent of the balance, and one had a limit of 1½ percent of the first \$30 million of assets and 1 percent of the balance. In practice, virtually

²⁹ In a follow-up Investment Company Institute survey in October 1979, 10 of these 26 states had eliminated or suspended the limitations on expense ratios and another six states indicated that they would grant waivers.

all MMFs limit their expense ratios to be no higher than the lowest expense ratio permitted in any state in which the MMF is doing business. Data on MMF expenses indicate that in 1977-78 several MMFs had expense ratios near or at the limit imposed by Blue Sky Laws.³⁰ This suggests that in the 1969-70 period, when the expense ratio necessary to cover costs was almost certainly much higher, Blue Sky Laws may have prevented MMFs from forming in reaction to the large spreads between money market rates and deposit ceiling rates at that time. This possibility is also supported by the fact that two other types of STIPs, which are not subject to Blue Sky Laws, were in operation in 1968.

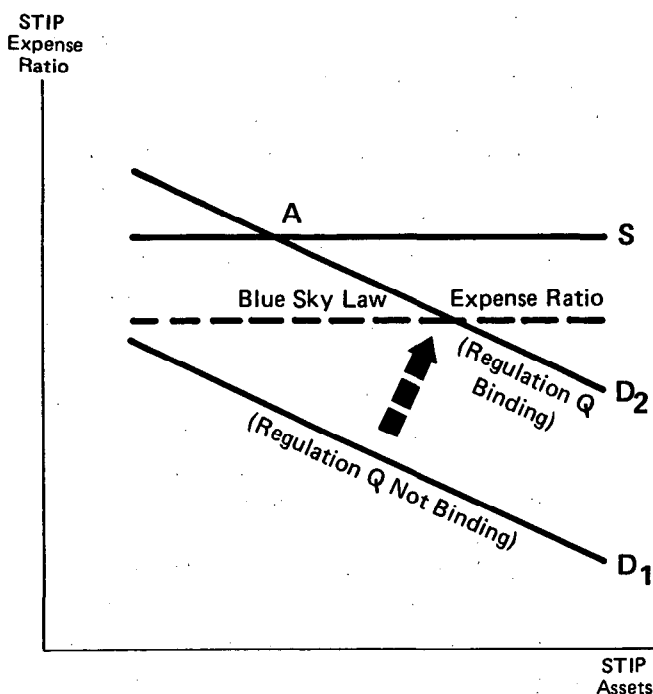
One possible set of conditions that may have characterized the 1969-70 period is shown in Figure 3, which assumes the same initial situation of no intersection between supply and demand curves as shown in Figure 1. When market rates rise above deposit ceiling rates, the MMF demand curve shifts to the right and intersects the MMF supply curve at point A. However, at point A the Blue Sky Law expense ratio is below the MMF supply curve so that MMFs can not cover their costs. Consequently, there is no response by potential MMFs. If this set of circumstances characterized the 1969-70 period, it would be an interesting case of one government regulation (Regulation Q) creating an economic incentive for a new financial intermediary, but another government regulation (Blue Sky Laws) preventing that intermediary from operating.

Of course, it is possible that MMFs would not have started in 1969-70 even without Blue Sky Law expense ratio limits. The absence of the 800 number, which is a development that was much more important to the success of MMFs than to STIFs or credit union pools, may have limited the rightward shift in the MMF demand curve when Regulation Q became binding. Furthermore, mutual funds may have viewed the large spreads between MMF rates and Regulation Q ceiling rates as a short-run aberration which did not justify the costs of starting up a MMF. Finally, certain aspects of the mutual fund industry itself, such as the emphasis on equities and the near total reliance on the "load" form of distribution, may have worked against the starting of MMFs. Consequently, it is impossible to positively attribute the absence of MMFs in the 1969-70 period to the Blue Sky Laws. In any case, without the decline in com-

³⁰ Expense data for 40 MMFs collected by Cook and Duffield [4] covering the 1977-78 period indicated that 18 had expense ratios (before expense waivers) greater than 1 percent and 9 had expense ratios greater than 1¼ percent.

Figure 3

THE EFFECT OF BLUE SKY LAWS ON THE MARKET FOR STIP SHARES



puter costs and the increased use of computers prior to the mid-1970's, Blue Sky Laws would have hampered the growth of MMFs in 1974 and thereafter.

In summary, both government regulation and other factors have contributed to the growth of STIPs. However, the position taken here is that even in the absence of government regulations affecting the deposit institutions, developments over the last 10 to 15 years would have created the economic incentive for a specialist in short-term financial intermediation. In particular, technological developments in the computer and telecommunications industries have influenced both the supply of and demand for STIP services. On the supply side technological progress has altered the production process and lowered the operating costs of STIPs. As a result many STIPs can operate at annual expense ratios as low as 40 to 50 basis points. On the demand side, 800 telephone service has lowered the individual-specific costs of using a STIP. In addition the widespread use of STIPs by financial service organizations such as mutual funds, brokerage firms, and bank trust departments also has lowered, for many investors, the individual-specific costs associated with a STIP investment.

III.

FINANCIAL MARKET IMPLICATIONS OF STIPS

Before considering the financial market implications of STIPs, it is necessary to review the three short-term investment options available to investors prior to the emergence of STIPs. First, they could hold deposits in a bank or other financial intermediary. These deposits generally required little or no minimum investment, but were subject to Regulation Q interest rate ceilings that were frequently below market interest rates. The second option was purchase of Treasury bills, which has required a minimum of \$10,000 since early 1969. The third option was purchase of private sector money market instruments, such as CDs, commercial paper, or bankers acceptances.³¹ These securities are generally only available in minimum denominations of \$100,000, although a few issuers will sell commercial paper in amounts as small as \$25,000 and bankers acceptances less than \$100,000 are sometimes issued.

In this environment investors could be divided into three groups by the amount of funds they had to invest in short-term financial instruments. One group with less than \$10,000 had access only to small denomination time and savings deposits. A second group with \$10,000 but less than \$100,000 had the additional option of purchasing Treasury bills. The final group with at least \$100,000 could also invest in private sector money market instruments.

The fundamental importance of STIPs is that they have made this distinction among investors largely meaningless. Because all forms of STIPs have minimum purchase requirements as low as \$1,000 and sometimes lower, all three investment options are effectively available to all types of investors, regardless of the amount of short-term funds at their disposal. This increased access to the money market through STIPs has several implications for the financial markets which are discussed below.

The Impact of STIPs on the Administration of Regulation Q Interest Rate Ceilings Deposit rate ceilings under Regulation Q originated with the Banking Act of 1933 and were initially applied only

³¹ This categorization is a slight oversimplification. Some short-term Federal agency issues are also sold in relatively small denominations and a small number of corporations market commercial paper in small denominations through the mail to individuals.

to rates paid on commercial bank time and savings deposits. The purpose was to prevent "excessive" rate competition for deposits among banks that might encourage risky loan and investment policies, thereby leading to bank failures. The passage of the Interest Adjustment Act in 1966 expanded the coverage of deposit interest rate ceilings to thrift institutions.

The implicit assumption underlying Regulation Q through the mid-1970's was that most deposit holders were relatively small investors who were locked into deposits as the only available short-term investment option. As a result, if market rates were to rise above fixed Regulation Q ceiling rates, there would not be a massive flight of funds out of the deposit institutions into other financial assets. That this reasoning was largely correct can be seen by examining the behavior of savings deposits at the deposit institutions in 1973 and 1974, when short-term market interest rates rose to levels over twice as high as the Regulation Q ceiling rate on these deposits. While the growth of savings deposits slowed markedly during this period, total savings deposits actually increased despite the huge positive differential between market rates and Regulation Q ceiling rates.

The emergence of STIPs, by providing access to money market yields to virtually all investors, severely damaged the ability of the deposit institutions to raise funds at below market interest rates. As a result, after interest rates began to rise above Regulation Q ceiling rates in 1977, regulators fundamentally altered the application of Regulation Q. This alteration came in June 1978 when the Regulation Q ceiling rate on 6-month deposit certificates ("money market certificates") was tied to the 6-month Treasury bill rate. Subsequently, Regulation Q ceiling rates on 4-year and then 2½-year deposit certificates were also tied to market rates of comparable maturity U. S. Government securities.

One suggested response to the emergence of STIPs as a competitor to the deposit institutions was to expand the coverage of Regulation Q ceiling rates to MMFs. That response ignores the many other forms of STIPs that are either perfect or close substitutes to MMFs. If binding Regulation Q ceiling rates were placed on MMFs, the major effect would probably simply be to shift funds from MMFs to other forms of STIPs. For instance, for bank trust departments STIFs are virtually perfect substitutes for MMFs. If Regulation Q were placed on MMFs, many bank trust departments that now use MMFs

would start STIFs. Similarly for many individuals STITs are close substitutes for MMFs. If Regulation Q ceilings were imposed on MMFs, many individuals would undoubtedly shift their funds out of MMFs into STITs. As a result STITs would probably develop for additional types of money market instruments, such as commercial paper.

The Depository Institutions Deregulation and Monetary Control Act of 1980 calls for a total phase-out of deposit interest rate ceilings over a 6-year period. Developments other than the growth of STIPs, such as changing regulatory attitudes, may have also played a part in the decision to end fixed deposit interest rate ceilings.³² However, the view taken here is that even without these other factors, STIPs would have led to the termination of deposit rate ceilings. It is interesting to recall the conclusion from Section II that technological progress in the computer and telecommunications areas contributed to the growth of STIPs. It follows from this conclusion that the ultimate demise of Regulation Q ceiling rates can be partly attributed to these technological developments.

The Monetary Aggregates Since the early 1970's, the Federal Reserve has used various definitions of the money supply—the "monetary aggregates"—as targets of monetary policy. Specifically, it has periodically specified desired growth rates of M-1 and M-2 as a means of attempting to achieve its macroeconomic objectives. In practice, these target growth rates have changed little over time.

Prior to a redefinition of the monetary aggregates in early 1980, no form of STIP shares was counted as part of the money supply. However, as shown in Section I of this article and summarized in Table I, the basic characteristics of STIP shares are very similar to the characteristics of savings and small time deposits of commercial banks, which have always been included in M-2. Shares of open-end STIPs, such as STIFs and LGIPs, are virtually identical in liquidity to savings deposits in that both can generally be withdrawn on demand. Shares of STITs are as liquid as small time deposits (i.e., deposits less than \$100,000) at banks in that they mature in six months or less. Shares of all forms of STIPs are available to investors in minimum denominations as low as \$1,000.

³² See Snellings [11].

In 1978 the Federal Reserve concluded that numerous developments in the financial markets had altered the meaning and reduced the significance of the monetary aggregates as then defined. As a result, the definitions of the monetary aggregates were thoroughly reviewed, and in early 1980 the aggregates were redefined.³³ The redefinition attempted to combine similar kinds of monetary assets at each level of aggregation. In particular, the new M-2 was defined to include small time and savings deposits of banks *and* thrift institutions. In addition, other short-term deposit-like liabilities such as overnight repurchase agreements and money market fund shares were included in the new M-2.

STIP shares other than MMF shares were not included in the redefinition of the monetary aggregates. However, the information presented in this article—i.e., the low minimum denomination and short maturity of shares of all kinds of STIPs—suggests that shares of *all* forms of STIPs logically belong in M-2 under the new definition.

In fact, some other STIPs are virtually perfect substitutes for MMFs. The best example is STIFs. STIFs and MMFs are almost identical in function and organization and provide almost identical services and liquidity to the accounts of the bank trust department.³⁴ Nevertheless, under the new definition of the monetary aggregates, the \$12 to \$15 billion of bank trust department funds invested in MMFs are included in M-2, while the \$32 billion of trust department funds in STIFs are excluded. The same type of anomaly arises when a local government invests money in a MMF or in a LGIP. In the former case the funds are included in M-2, while in the latter case they are not. Yet the government unit receives the same liquidity in either case.

Because MMF assets at the end of 1979 constituted only about one-half of total STIP assets, the new M-2 excludes roughly one-half of total STIP assets, all of which should logically be included. This definitional problem could worsen if the growth of non-MMF STIPs continues to accelerate as it did in the 1978-79 period.

³³ The proposal to redefine the monetary aggregates and the resulting redefinition are described in Simpson [9, 10].

³⁴ The similarity of the turnover rates for MMFs and STIFs, shown in Table VIII, supports the view that these different forms of STIPs provide roughly the same liquidity to their investors.

The Impact of STIPS on Short-Term Yield Spreads Figure 4 shows the spread between the three-month prime CD rate and the three-month Treasury bill rate. The figure shows that the spread between the CD rate and the bill rate has risen in periods when market interest rates have been high relative to Regulation Q ceiling rates, such as 1969, 1973, and 1974.

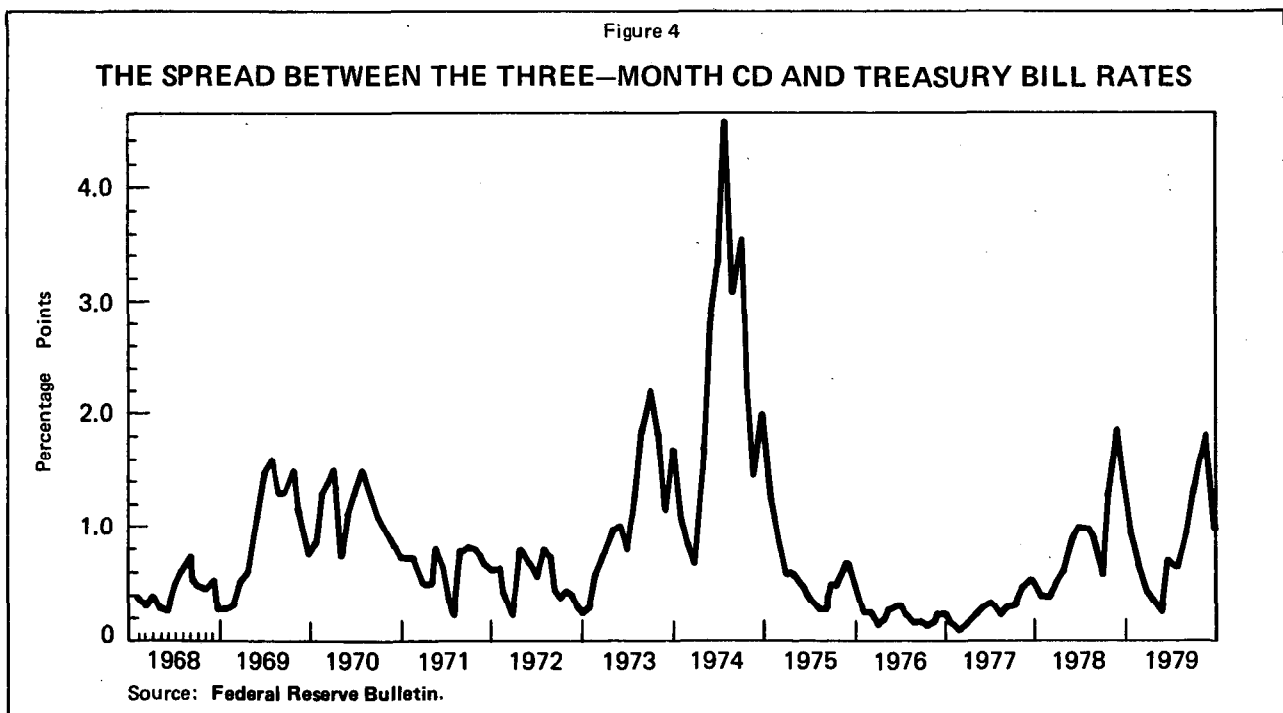
To understand this relationship it is useful to focus on the three investor categories described above, especially the group with sufficient funds to buy bills but not other money market instruments. When interest rates are above Regulation Q ceilings, many deposit holders with sufficient funds withdraw these funds from deposit institutions (i.e., "disintermediate") to invest them directly in higher-yielding money market instruments. Prior to the late 1970's the bulk of such investment was directed towards Treasury bills, because of the much larger minimum amounts of funds required to purchase private-sector money market instruments such as CDs and commercial paper.

The massive purchases of Treasury bills by individuals in periods of disintermediation has driven down bill rates relative to the rates on other money market instruments. This phenomenon had its peak effect in mid-1974 when the spread between private sector money market rates and bill rates reached a level as high as 400 basis points. The inability of most individuals to meet the minimum purchase re-

quirements necessary to acquire private-sector money market instruments prevented them from reducing this large differential by switching their purchases from bills to these instruments.³⁵

The rapid growth of STIPs in the late 1970's (along with the introduction of floating Regulation Q ceiling rates on 6-month money market certificates) has fundamentally changed this situation, because STIPs have effectively broken down the minimum investment barriers that have prevented many individuals from acquiring money market instruments other than Treasury bills. In periods of rising spreads between private sector rates and bill rates, the yields earned by most STIPs will rise relative to the yield on bills. In these circumstances households

³⁵ This explanation for the spread between bill rates and other money market rates prior to the late 1970's along with data on Treasury bill purchases is given in detail in Cook [3]. The explanation rests critically on the fact that sectors other than households—such as commercial banks and state and local governments have been willing to hold bills despite large spreads between bill and other money market rates. This willingness occurs because for numerous reasons other money market instruments are not viewed as perfect substitutes for bills by these sectors. For instance, banks have used bills to (1) satisfy pledging requirements for state and Federal deposits, (2) satisfy reserve requirements in some cases, (3) make repurchase agreements with businesses and state and local governments, and (4) influence the ratio of equity to risky assets, a ratio used by bank regulators to judge a bank's capital adequacy. Private sector money market instruments, such as commercial paper, are not perfect substitutes for bills for any of these purposes.



and all other investors have the option of switching out of bills into STIPs. Furthermore, most STIPs are highly sensitive to yield spreads. Consequently, the aggregate substitution of private-sector money market instruments for bills in periods of rising spreads should be greater than in the past. As a result the presence of STIPs should prevent the spread between bill rates and private sector money market rates from ever again reaching the levels of 1974. The evidence to date provides some support for this view. As shown in Figure 4, in the 1978-79 period of rising interest rates the spread between the CD and Treasury bill rates rose only moderately despite a huge increase in the spread between market rates and the passbook savings ceiling rate.³⁶

IV.

SUMMARY

Over the last decade numerous types of short-term investment pooling arrangements have emerged in the nation's financial system. These pooling arrangements allow participants to invest a much smaller amount of money than would be necessary to directly purchase the individual securities held by the pool. While the first STIPs were started as early as 1968, rapid growth in STIPs did not occur until 1974. Aggregate assets of STIPs surged from a small amount at the beginning of 1974 to \$88 billion by the end of 1979.

Both government regulation and other factors, especially technological developments, have contributed to the growth of STIPs. A principal conclusion of this paper is that technological developments alone, especially the sharp decline in computer costs and the introduction and widespread availability of 800 numbers, would have been sufficient to induce many STIPs to begin operating even in the absence of deposit ceiling rates. If this conclusion is correct, then STIPs will survive the end of Regulation Q deposit rate ceilings.

Because STIPs generally have minimum purchase requirements of \$1,000 or even lower, they provide access to the money market to virtually all investors. This increased access to the money market has had several implications for the financial markets. First,

³⁶ In March 1980 the spread between the CD rate and the bill rate jumped sharply. However, the rise in the spread followed the imposition on March 15, 1980 of a 15 percent reserve requirement on assets above a base level at money market funds. The data on noncompetitive bids at Treasury bill auctions indicates a sharp rise in the purchase of bills by individuals over the same period.

by providing small investors an alternative to deposits, STIPs have played a major role in forcing the termination of Regulation Q deposit rate ceilings. Second, STIPs have increased the liquidity associated with a given volume of outstanding money market instruments. As a result the shares of one type of STIP—MMFs—were included in a redefinition of the monetary aggregates in 1980. For consistency, the shares of other types of STIPs should also be included in the monetary aggregates. Third, the presence of STIPs has increased the aggregate substitution from Treasury bills to other money market instruments in periods of widened differentials between private money market rates and bill rates. This increased substitution should prevent the spread between private money market rates and bill rates from rising to past peak levels.

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