AVERAGE COSTS OF
MONEY MARKET MUTUAL FUNDS

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This article presents a discussion and analysis of the expenses of money market mutual funds (MMFs). The primary motivation of the study is to consider a possible explanation for the extensive use of MMFs by bank trust departments. A bank trust department has at least three options in managing the short-term funds of its separate accounts. First, it can invest the short-term funds of each account individually in time and savings deposits and, if the account has sufficient funds, money market instruments. Second, the trust department can operate a collective investment fund for money market instruments called a "short-term investment fund (STIF)." Under this arrangement, short-term funds of various accounts managed by the trust department are pooled and invested collectively. As a third alternative the trust department can place the short-term funds of its accounts in a MMF. With some minor differences, STIFs and MMFs provide the same services to the accounts of the bank trust department. In particular, both types of funds serve as financial intermediaries for short-term funds, thereby enabling investors to earn prevailing market rates of return on large money market instruments.

The decision to establish a STIF appears to be largely dependent on the size of the bank trust department. The larger the trust department, the more likely it is to have a STIF. Survey data presented in the accompanying article [5] demonstrate this relationship convincingly. Of the trust departments in the survey 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.

Many, if not most, bank trust departments without STIFs use MMFs. A possible 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. If so, a small- or medium-sized bank trust department could get a higher yield *net* of expenses for its

accounts by investing in a MMF than by setting up a relatively small STIF. In order to evaluate this explanation using MMF expense data, the argument is made in this paper that MMFs and STIFs are subject to most of the same expenses and that the behavior of the relevant MMF expenses with respect to asset size can be used as a proxy for the behavior of STIF expenses.

A second motivation of the paper is to provide additional evidence on the question of the existence of economies of scale in the operation of financial intermediaries.[1] Economies of scale are present when the long-run operating costs per unit of output of a business fall as output increases. MMFs provide a unique opportunity to investigate economies of scale of financial institutions because the "output" or "product" of MMFs is more homogeneous than the output of other financial intermediaries such as commercial banks. For the purpose of this paper MMFs are assumed to produce one output: the service of intermediation in the investment of short-term funds.[2] That output is measured in the paper by the dollar volume of funds for which the MMF is serving as an intermediary.

I. TYPES OF MONEY MARKET FUND EXPENSES

To investigate the two issues raised above, expense data were gathered from the annual reports and prospectuses of 40 money market funds.[3] The general format under which expense data are reported

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[1] For a summary and discussion of previous evidence with regard to economies of scale of financial intermediaries, see Benston [2].

[2] Of course, there are some minor variations across MMFs in the nature of services provided to shareowners. For example, most, but not all, offer checking privileges and the share redemption policies of some funds are more sophisticated than others. In general these differences were too difficult to identify and quantify and, in any case, were thought to have a negligible effect on expenses. In one instance discussed later in the article an attempt was made to capture variations in the extent of a service provided.

[3] Initially, the prospectuses and annual reports of 57 money market funds were collected. In order to avoid the possibility of including startup or organizational expenses in the data, no fund was included in the study if the beginning of the expense period reported was also the starting date of the fund. This criterion eliminated

by MMFs is fairly standard. This format is illustrated in Table I, which presents expense data reported by one of the MMFs. In the table expenses are grouped into two broad categories and seven subcategories, consolidating 35 different items reported by one or more of the MMFs. The grouping by items is listed in the Exhibit at the end of the article.

The two broad expense categories shown in Table I are operating and nonoperating expenses. (This classification is made for the purposes of this paper and is not found in MMF reports.) Operating expenses include all expenses incurred by the MMF in its operations as an intermediary for short-term funds. In this role it pools money from various investors and invests that money in short-term money market instruments. The expenses considered here to be operating expenses of the MMF are all expenses related to management and administration of the fund, the selection and storage of securities, and transactions and communications with shareowners. Nonoperating expenses are those expenses not incurred in the MMF's operation as a financial intermediary. The expenses included in this second category are either government expenses, such as registration fees and taxes, or expenses resulting from government regulations and requirements, such as auditing expenses.

The division of total expenses into operating and nonoperating expenses is necessary to investigate the issues raised above. First, by definition, the presence of economies of scale depends on the behavior of operating costs. Consequently, it is necessary to measure and analyze these costs separately. Second, in order to use MMF expenses as a proxy for STIF expenses, it is necessary to identify which MMF expenses are incurred by STIFs. Since STIFs and MMFs fulfill the same function, they should have similar operating expenses. Hence, the behavior of this category of expenses is of particular interest. A third reason for making the division between oper-

ating and nonoperating expenses is that since, as will be shown later, the two categories of expenses behave quite differently as MMF asset size increases, examining them separately aids in an understanding of the behavior of total MMF expenses.

The largest operating expense is "management and advisory fees." Under the organizational structure common to virtually all MMFs, the fund is run by an "administrator" or an "advisor" who provides certain services to the MMF for a fee, which is specified as a percent of the total assets of the fund. While there is some variation in the services covered by the fee, these services usually include: (1) administration and management of the fund and (2) investment advice and portfolio selection. In most cases the administrator provides both these services, although in some instances the investment advisory service is delegated to a second organization which is paid part of the management and advisory fees. The annual management and advisory fees, reported by all 40 funds, ranged from .32 percent to .625 percent of average assets, with 29 of the firms reporting fees equal to .50 percent of assets.[4] The management and advisory fees may also cover other services in addition to the two noted above. Because the services covered by the management and advisory fees vary across funds, the ratio of management and advisory fees to total operating expenses also varies considerably.

The second operating expense category shown in Table I is reports to shareowners, which covers expenses related to the production and mailing of shareowner reports.[5] (In some cases nothing is reported under this category, because these expenses are covered by the management and advisory fees.) The third operating expense category, other operating expenses, covers a number of items. The two major and most commonly reported items are expenses related to transactions with shareowners, including the distribution of dividends, and custodial expenses related to the storage and safekeeping of securities. Two of the 40 MMFs charge shareowners a direct

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12 funds, all of which started in 1977 or 1978. Four additional funds were eliminated because they did not report some expenses that were absorbed at cost by the administrator of the fund and one fund was eliminated because it was not a no-load fund. This left 40 funds. Of these, 39 started operations at least 6 months prior to the beginning of the period for which expenses were reported. The last fund was started 3 months prior to the expense reporting period. The data for 39 of the funds are annual data while the data for the other fund are annualized data reported for an eight-month period. The funds have different periods over which they report expenses and the lag between the end of that period and the annual report also varies. Consequently, the end points of the periods used in the study for the 40 funds vary from May 1977 to December 1978. In every case the latest available data were used.

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[4] Eleven of the funds had management and advisory fees schedules that declined as assets rose. These were not in all cases the same 11 funds that reported fees other than ½ of a percentage point. Some MMFs had fixed fees other than ½ of a percentage point, while others with declining fee schedules had not reached a high enough asset level for the declining fees to go into effect.

[5] It can be argued that "reports to stockholders" does not belong in the operating expenses category because these reports are a response to government regulations, not investor needs. However the position taken here is that even in the absence of these regulations, shareowners would demand information similar to that contained on the prospectuses and annual reports.

STANDARD EXPENSE REPORTING FORM OF MONEY MARKET MUTUAL FUNDS

	Account (thousands)	Percent of Average Assets
Operating Expenses	$202.7	.80
Management and Advisory Fees	127.6	.50
Reports to Stockholders	25.1	.10
Other Operating Expenses	50.0	.20
Other Expenses	105.1	.41
Professional Fees	40.5	.16
Directors' Fees	15.0	.06
Registration Fees, Taxes, Amortization	35.3	.14
Miscellaneous	14.3	.05
Total Expenses	307.8	1.21
Less Expenses "Waived" by Administrator	53.3	.21
Expenses Absorbed by Shareholders	254.5	1.00

monthly service fee. In this paper those fees are included in other operating expenses.

The second broad category of expenses includes all nonoperating expenses of the MMF. The first group of nonoperating expenses, professional expenses, covers auditing and legal expenses. The second, directors' (or trustees') fees, is self-explanatory. A third group of nonoperating expenses includes state and local taxes, state and SEC registration fees, and amortization expenses. Amortization expenses, which were reported by 14 of the 40 MMFs, were the most difficult item to categorize. Since several of those MMFs stated that part of the amortization expenses were related to initial SEC registration expenses, it was decided to include this item with taxes and registration fees. The last grouping is for miscellaneous expenses.

After calculation of total expenses, the administrators of 23 out of 40 MMFs "waived" or "reimbursed" to the fund part of these expenses. That is, part of total expenses were not absorbed by shareowners of the fund. In some cases the waiver was part of an explicit commitment by the MMF's administrator to place a limit on the expenses of the fund absorbed by shareholders. In the example shown in Table I, for instance, the administrator placed a limit on total annual expenses absorbed by shareowners equal to 1.00 percent of the fund's average assets. In other cases the waiver is an informal management arrangement not described explicitly in the prospectus or annual report. In reports to stockholders the waiver is often couched in terms of

the administrator "foregoing" part of the advisory and management fees. In some instances the administrator has not only foregone all of the advisory and management fees but also absorbed other expenses of the fund. An important assumption made at this point is that the true measure of total costs of the fund is total expenses *before* the waiver. This assumption will be discussed in more detail later.

Table II lists the expenses in each of the categories described above for the 40 MMFs. The MMFs are arranged in Table II by average asset size. The table also lists the expense waivers and indicates the percent of total expenses covered by the waiver. The "share turnover rate," shown in the last column of the table, is the rate at which the MMF's shares turned over in the period for which its expenses are shown. It is measured as total redemptions of shares divided by the average dollar volume of shares outstanding. Total expenses as a percent of average assets of the 40 MMFs are graphed in Chart 1.

II. THE REGRESSION MODEL

This section specifies a regression model relating MMF costs to three other MMF variables. These three variables are (1) assets, (2) average account size, and (3) share turnover rate.

Assets The first variable related to costs is the size of the MMF, as measured by average MMF assets over the period for which expenses are mea-

Chart 1

AVERAGE COSTS OF MONEY MARKET MUTUAL FUNDS

Note: (1) Average costs are measured as the percent of total expenses to average assets over the period for which expenses are reported. (2) Assets scale changes at $100 million.

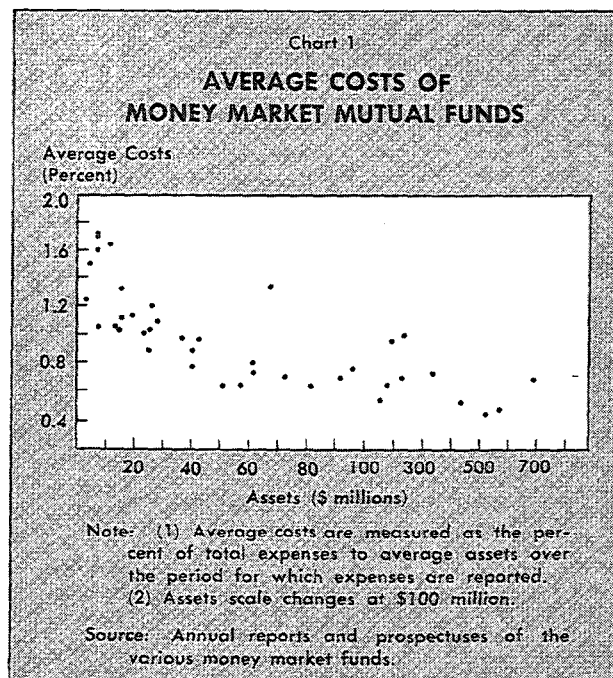Source: Annual reports and prospectuses of the various money market funds.

Table II

EXPENSES AND ASSETS OF MONEY MARKET MUTUAL FUNDS

($ thousands)

	Average Assets	Management and Advisory Fees	Reports to Share-owners	Other Operating Expenses	Profes-sional Expenses	Directors' Fees	Taxes, Registra-tion Fees, and Amor-tization	Miscel-laneous	Total Expenses	Waiver or Reim-bursement	Percent of Total Expenses	Share Turn-over Rate
1.	2,325	11.6	2.0	4.7	1.5	2.0	7.0	0.2	29.0	5.6	19.1	1.7
2.	3,911	24.2	4.1	2.4	9.8	—	17.0	1.1	58.5	19.4	33.2	3.1
3.	6,358	32.1	4.0	22.5	16.3	—	30.5	3.4	108.8	45.2	41.6	1.7
4.	6,474	32.4	5.4	8.7	7.7	0.7	6.6	7.5	68.9	26.8	38.9	2.5
5.	6,556	32.8	12.9	6.8	26.9	3.8	13.4	1.4	97.9	5.5	5.6	0.5
6.	6,762	33.9	11.0	33.9	19.9	4.1	—	11.6	114.4	33.9	29.6	2.1
7.	10,165	50.8	5.4	98.0	3.5	4.6	—	6.9	169.2	32.7	19.3	2.8
8.	12,647	63.2	2.7	50.4	13.6	—	3.4	0.4	133.7	112.0	83.8	7.8
9.	14,031	70.4	13.0	14.0	15.8	13.5	17.2	1.2	145.0	39.8	27.4	28.7
10.	14,436	72.2	21.5	25.7	18.1	3.9	15.8	4.5	161.7	89.6	55.4	2.2
11.	15,024	54.8	20.4	38.2	30.8	12.6	26.2	16.1	199.0	49.2	24.7	1.8
12.	18,443	92.2	11.9	46.5	29.0	4.2	14.7	12.5	211.0	72.7	34.4	1.4
13.	22,563	112.7	8.1	63.3	8.5	—	31.4	8.4	232.4	—	—	6.6
14.	24,294	121.5	15.1	28.3	16.0	9.2	18.5	7.5	216.1	116.5	53.9	2.8
15.	24,369	121.8	—	60.7	22.8	1.5	40.1	7.3	254.3	39.8	15.7	6.4
16.	25,451	127.6	25.0	50.0	40.5	15.0	35.3	14.3	307.8	53.3	17.3	3.6
17.	27,107	135.8	11.0	46.3	23.0	17.0	38.0	24.5	295.5	—	—	4.8
18.	35,707	178.6	4.6	84.5	38.9	8.1	27.5	9.5	351.8	33.5	9.5	7.7
19.	38,337	191.7	8.7	29.0	33.0	5.5	64.4	9.1	341.5	92.3	27.0	4.1
20.	39,539	196.7	14.0	24.5	23.0	2.5	40.3	7.4	308.4	155.9	50.6	2.5
21.	41,776	209.8	14.3	46.3	52.2	16.0	52.9	12.4	403.8	86.3	21.4	3.8
22.	49,876	199.7	18.2	23.6	26.8	2.5	48.0	0.4	319.2	—	—	3.3
23.	51,036	256.1	—	75.6	—	—	—	—	331.7	—	—	9.7
24.	59,919	300.3	—	107.7	55.3	6.4	2.1	13.6	485.3	—	—	2.7
25.	60,405	300.0	16.0	—	14.0	9.0	108.0	—	447.0	—	—	2.8
26.	66,580	333.9	78.0	413.9	12.0	14.4	41.2	—	893.4	74.5	8.3	8.0
27.	71,342	321.6	46.0	60.2	16.6	11.0	43.9	7.2	506.5	—	—	2.1
28.	80,636	302.5	9.1	42.6	39.5	44.9	63.1	11.0	512.8	45.1	8.8	3.8
29.	90,992	364.7	9.6	52.1	64.0	24.0	100.1	22.5	637.0	—	—	4.7
30.	95,488	479.1	41.0	64.1	30.9	14.1	93.4	3.0	725.7	—	—	3.9
31.	144,447	504.4	—	38.3	48.3	32.0	141.0	16.0	780.0	—	—	5.8
32.	170,224	685.1	—	97.5	189.1	16.2	89.7	28.7	1,106.5	—	—	4.1
33.	188,958	942.8	78.2	386.2	43.6	20.2	272.3	51.8	1,795.1	—	—	3.1
34.	221,348	1,109.9	29.0	169.7	42.8	11.5	94.5	92.0	1,549.4	—	—	2.1
35.	229,380	1,146.7	82.5	897.5	78.5	13.0	85.6	—	2,303.8	10.0	0.4	3.8
36.	328,705	1,578.5	32.0	197.6	57.3	14.9	519.3	—	2,399.6	—	—	3.7
37.	429,072	1,275.3	13.5	559.8	60.3	18.3	211.8	31.1	2,170.1	—	—	3.0
38.	508,887	1,645.0	24.8	261.7	122.5	66.5	58.1	9.5	2,188.2	—	—	2.5
39.	557,390	2,229.5	6.4	234.6	83.7	14.0	11.1	30.1	2,609.4	101.2	3.9	3.2
40.	681,582	3,403.5	64.7	780.4	60.5	26.5	264.1	35.0	4,634.8	—	—	2.3

sured. Many, if not most, MMF expenses are primarily a function of the size of the MMF portfolio. These expenses include the management and advisory fee and expenses related to security transactions and storage. As noted earlier, the key area of interest in the study is the relationship between expenses and assets as assets rise.

Average account size While the preponderance of MMF expenses are related to the size of the portfolio, others appear to be related to the number of shareholder accounts. Examples of such expenses

are reports to shareholders and transactions with shareholders. The variable used to capture the impact of these expenses on costs is average account size. If two funds have an equal amount of assets, it is postulated that the one with higher average account size will have lower costs.[6]

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[6] Alternatively, the number of accounts could be used instead of average account size. Average account size was chosen because the number of accounts is closely correlated with asset size, which is already in the regression.

Share turnover rate   Other things equal, one would expect administrative and shareholder servicing costs of a MMF to vary positively with the share turnover rate of its shares. In general the higher the share turnover rate of a given fund, the more the shareowners of that fund are using their shares for transactions purposes. As argued in the second article in this *Review*, the relatively low share turnover rates of MMFs indicate that MMF shares are more comparable to savings than to demand deposits. Nevertheless, to the extent that turnover rates do vary across MMFs, one would expect administrative and shareholder costs to vary accordingly.

In order to estimate the relationship between MMF expenses and MMF asset size, average account size, and share turnover rate, the following equation was specified:

$$(1) \quad C = aA^b AAS^c TR^d,$$

where C is total costs, A assets, AAS average account size, and TR share turnover rate. Equation (1), which is the specification most commonly used in cost studies of financial institutions, has the feature that the coefficient "b" is the elasticity of expenses with respect to asset size. If b is less than 1, a given percentage change in assets will result in a smaller percentage change in total costs.

Prior to the estimation of equation (1), both sides were divided by A, so that the dependent variable is average costs, the same measure shown in Chart 1:

$$(2) \quad C/A = aA^{b-1} AAS^c TR^d.$$

Equation (2) is nonlinear and, as such, cannot be estimated using ordinary least squares. In order to estimate the equation using ordinary least squares,

it is necessary to transform it into linear form by expressing the variables as logarithms. Accordingly, natural logarithms of both sides of (2) were taken:

$$(3) \quad \log(C/A) = \log(a) + (b-1)\log(A) + c \log(AAS) + d \log(TR).$$

In this equation the coefficient of log (A) is (b−1). Hence, the standard test of the hypothesis that (b−1) is significantly different from 0 is equivalent to the test of whether b is significantly different from 1.

III. REGRESSION RESULTS

Table III reports regression results with four different measures of expenses as the dependent variable.[7] Because average account size data for 3 of the 40 MMFs were not available, these funds were eliminated from the sample in the regressions reported in the table. Also in none of the regression results did the share turnover rate enter the equation with a significant coefficient. Consequently, the reported equations do not include that variable.

The first equation reported in Table III is for total average expenses (C/A). The regression results support the hypothesis that money market funds are subject to decreasing average costs as asset size increases. The estimate of (b−1) is −.183 and is

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[7] All data except the average account size were gathered from individual MMF stockholder reports. The average account size data were calculated using individual company asset size and shareholder accounts data from Donoghue [6]. These data were not available for three of the funds (1, 12, 24). For the other funds average account size was calculated for each month. These monthly figures were then averaged over the period for which each fund's expense data were used.

Table III

REGRESSION RESULTS: ALL MMFs

Dependent Variable	Constant	log (A)	log (AAS)	SE	$\bar{R}^2$	Elasticity of Costs With Respect to Assets
(1) log (C/A)	−2.436 (10.82)	−.183 (8.22)	−.092 (3.92)	.175	.770	.817
(2) log (OC/A)	−3.527 (13.15)	−.101 (3.81)	−.119 (4.26)	.208	.584	.899
(3) log (NOC/A)	−1.441 (2.51)	−.442 (8.37)		.445	.664	.558
(4) log (POC/A)	−2.963 (11.82)	−.146 (5.91)	−.108 (4.12)	.194	.690	.854

Note: All variables are measured in thousands of dollars. Equation 1 has 37 observations. Equations 2, 3, and 4 have 36 observations. C = total costs, OC = operating costs, NOC = nonoperating costs, POC = professional fees plus operating costs, A = average assets, AAS = average account size. Figures in parentheses are t-statistics.

highly significant. The implied estimate of the elasticity of expenses with respect to assets, .817, is shown on the right-hand side of the table. The coefficient of the average account size variable also has the expected sign and is highly significant.

The remaining regressions reported in Table I relate to the issues raised at the beginning of this article. One of these issues was whether MMFs experience economies of scale. Equations (2) and (3) in Table III break down total average expenses into average operating costs (OC/A) and average nonoperating costs (NOC/A), respectively.[8] The coefficient of assets in equation (2) is significantly less than 0 at the 1 percent level. The implied elasticity of operating costs with respect to assets is .899. Since this elasticity is less than 1, these results support the view that MMFs experience economies of scale in their operations as a financial intermediary for short-term funds.

Equation (3) in Table III reports the regression results for average nonoperating costs. The coefficient of log (A) is again highly significant. The implied elasticity of nonoperating expenses with respect to assets is .558. As would be expected, there is not a statistically significant relationship between average account size and nonoperating costs. The regression results in equation (3) indicate that the impact of unit nonoperating costs on total average costs drops sharply as asset size increases. This phenomenon is illustrated in Chart 2 which shows the average MMF total cost curve and the average operating cost curve implied by the regression results. The difference between the two curves represents average nonoperating costs. At low asset levels average nonoperating costs are a substantial part of total average MMF costs. As asset size increases, however, average nonoperating costs drop sharply. In contrast, the decline in average operating costs is much more gradual.[9]

Chart 2

AVERAGE COST CURVES OF MONEY MARKET FUNDS IMPLIED BY REGRESSION RESULTS

Note: Estimates are from equations (1) and (2) of Table III. Average account size was set at $20,600, the median average account size of the 37 MMFs used in Table III.

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[8] Fund 23 is excluded from the sample used in regressions (2), (3), and (4) in Table III because expenses of that fund were not reported in a way that they could be divided into the expense categories used in these regressions.

[9] Two aspects of the regression results should be mentioned at this point. First, Benston [2] has suggested that running the regression with log (C/A) biases the coefficient of log (A) because A is in the denominator of the dependent variable. To test for this possibility the regressions were rerun using log (C) as the dependent variable. The resulting estimates of the elasticities of cost with respect to assets were virtually unchanged, as were the coefficients of the average account size variable. Second, three of the funds used in the regressions have average account sizes much larger than the other funds. The reason for this is that in reporting the number of accounts these MMFs treat all the accounts of a bank trust department as one account. To see if these funds were having an impact on the regression
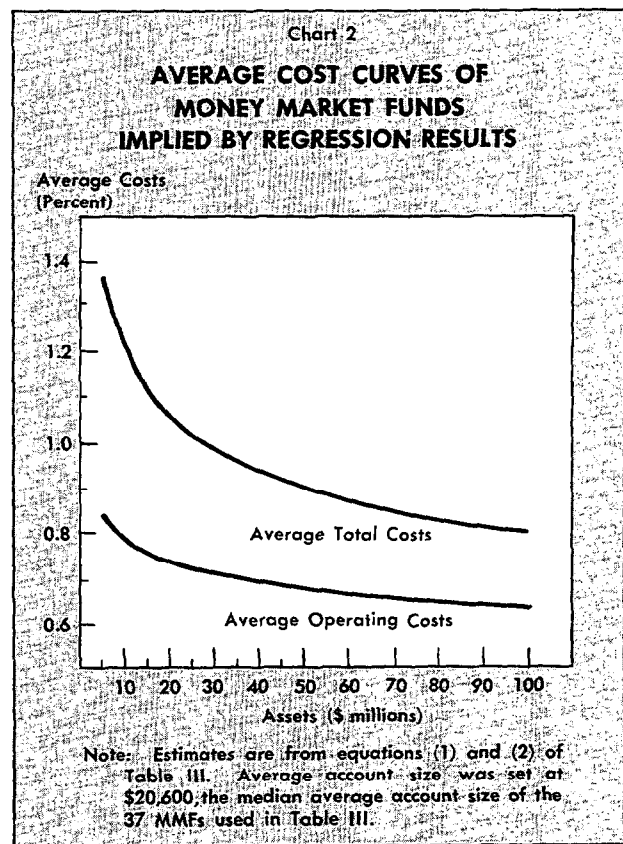
Bank Trust Department Behavior The major question raised at the beginning of this article was whether an examination of the expenses of MMFs could help explain the extensive usage of MMFs by small- and medium-sized bank trust departments. It was speculated that these bank trust departments might use MMFs to take advantage of the lower average expenses experienced by a larger intermediary for short-term funds. The regression results in Table III indicate that MMFs experience both declining operating costs and nonoperating costs in the management of short-term funds. If the cost behavior of MMFs is used as a proxy for the cost behavior of STIFs, these results explain why large bank trust departments set up STIFs, while smaller bank trust departments use MMFs.[10]

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results in Table III, the regressions were rerun without the data for these funds (28, 31, 38). The only effect was to raise the absolute value of the average account size coefficient. The t-statistics of all coefficients were little changed.

[10] It would be better to deal with the issue directly by analyzing the cost data of STIFs. However, these data would be extremely difficult to gather. More importantly, the data would be impossible to analyze because some STIF expenses are charged directly to the STIF while other expenses are charged to the bank trust department.

Is it reasonable to use the cost behavior of MMFs as a proxy for the cost behavior of STIFs? Since both STIFs and MMFs fulfill the same function—the intermediation of short-term funds—it seems quite reasonable to assume that the operating expenses of STIFs are similar to those of MMFs and exhibit the same behavior as MMF expenses with respect to asset size. True, STIFs do not have expenses related to transactions with shareholders, but they do have expenses related to transactions between the STIF and individual accounts of the bank trust department. In addition, STIFs are required to publish an annual report and a "plan" similar to a prospectus.

It is not clear to what extent the *nonoperating* costs of MMFs—professional fees, registration fees and taxes, and directors' fees—are incurred by STIFs. One exception is auditing expenses, which are clearly incurred by STIFs since, like MMFs, they are required to have an annual audit.[11] If it is assumed that STIFs are not subject to the other non-operating expenses of MMFs, then the appropriate aggregate MMF expense category to use as a proxy for aggregate STIF expenses is operating costs plus professional fees. A regression with average operating plus average professional costs (POC/A) as the dependent variable is shown as equation (4) in Table III. The estimate of the elasticity of costs with respect to assets is .854, again indicating declining average costs with respect to asset size.

MMFs of $50 Million or Greater As shown in Chart 1, while the negative relationship between average MMF costs and asset size appears quite strong at low asset levels, the relationship seems

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[11] See [4].

much weaker at high asset levels. A final question addressed in this section is whether MMFs are subject to decreasing average total costs and decreasing average operating costs at high asset levels. In an attempt to answer this question, the regressions in Table III were rerun with data for only those MMFs with assets of $50 million or greater.

The regression results for MMFs with $50 million or greater of assets are shown in Table IV. The coefficients of the average account size variable are significant and very close to those in Table III. The coefficient of the asset size variable is significant at the 10 percent level in the average total costs regression (1) and significant at the 1 percent level in the average nonoperating costs regression (3). In equations (2) and (4) which have average operating expenses and average operating plus professional expenses, respectively, as the dependent variables, the average asset size coefficient is not significantly different from zero, even at the 20 percent level. Consequently, the results in Table IV provide some evidence that average total MMF costs are negatively related to asset size even after $50 million. They provide minimal support for the presence of decreasing average operating costs (economies of scale) among MMFs with assets greater than $50 million. In light of the limited number of observations used in the regressions, the results should be viewed as tentative.[12]

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[12] There was very rapid growth in the MMF industry following the period over which the data for this article were collected. As a result, as of mid-1979 there were many more MMFs with assets of $50 million or greater. Consequently, a follow-up study would have a larger sample of funds to use in considering the question of economies of scale of MMFs with assets of $50 million or more.

Table IV
REGRESSION RESULTS: MMFs OF $50 MILLION OR GREATER

Dependent Variable	Constant	log (A)	log (AAS)	SE	$\bar{R}^2$	Elasticity of Costs With Respect to Assets
(1) log (C/A)	−3.263 (4.56)	−.116 (1.95)	−.087 (2.85)	.213	.386	.884
(2) log (OC/A)	−4.077 (4.38)	−.060 (.77)	−.108 (2.87)	.261	.310	.940
(3) log (NOC/A)	−.706 (.429)	−.503 (3.68)		.463	.440	.497
(4) log (POC/A)	−3.807 (4.45)	−.080 (1.12)	−.099 (2.86)	.240	.332	.920

Note: All variables are measured in thousands of dollars. Equation 1 has 18 observations. Equations 2, 3, and 4 have 17 observations. C = total costs, OC = operating costs, NOC = nonoperating costs, POC = professional fees plus operating costs, A = average assets, AAS = average account size. Figures in parentheses are t-statistics.

IV. THE EXPENSE WAIVER

As mentioned earlier, many MMF administrators "waived" part of the fund's total expenses in the reporting periods covered by this paper. That is, rather than passing on all of the MMF's expenses to the shareowners, the MMF's administrator absorbed some of these expenses. As a result expenses absorbed by shareowners were often less than total expenses. Throughout this article it has been assumed that the expense waiver is a waiver of true costs. The evidence strongly supports this interpretation.[13] Table II shows the waiver as a percent of total expenses. The table shows a clear division between MMFs with less than approximately $50 million of assets, and those with $50 million or more. Of the 21 MMFs with less than $50 million of assets, 19 had expense waivers and 13 had expense waivers of 20 percent or greater. Of the 19 MMFs with assets of $50 million or greater, only 4 had expense waivers and none had a waiver as high as 10 percent.

These data illustrate that the waiver is being used by the administrators of the small MMFs to enable them to compete more effectively with the large funds. To the extent that the approach is successful, a small MMF can grow to an asset level where average costs can be fully passed on to shareowners.

V. SUMMARY

This article has provided evidence that average costs of MMFs decline as assets increase, at least up to asset levels of about $50 million. This conclusion applies both to operating costs and nonoperating costs. It was argued that STIFs are subject to most of the same types of expenses as money market funds and that the behavior of MMF expenses could be used as a proxy for the behavior of STIF expenses. If so, then the results presented here offer an explanation for the large-scale use of MMFs by small- and medium-sized bank trust departments.

Lastly, it was shown that the amount of expenses waived by the administrators of MMFs is closely and inversely related to asset size. A reasonable interpretation of this relationship is that the waiver is a method whereby small MMFs can be competitive with larger funds until they reach an asset level where costs can be fully passed on to shareowners.

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[13] Actually, a special factor was responsible for the size of Fund No. 8's 83.8 percent waiver, which was easily the highest reported. This money market fund was being used as a "loss leader" to attract investors to other funds in its fund group. See Anreder [1].

References

1. Anreder, Steven S. "Liquidity Plus Return Adds Up to a Fresh Surge in Money Market Funds." *Barron's*, June 5, 1978, pp. 4-5.

2. Benston, George J. "Economies of Scale of Financial Institutions." *Journal of Money, Credit and Banking*, IV (May 1972): 312-41.

3. Bent, Bruce R. "Sorting Out the Money Market Funds." *Trusts and Estates* (June 1976), pp. 408-15.

4. Code of Federal Regulations. Volume 12, Section 9.18(b)(5).

5. Cook, Timothy Q., and Duffield, Jeremy G. "Money Market Mutual Funds: A Reaction to Government Regulations or a Lasting Financial Innovation?" *Economic Review*, Federal Reserve Bank of Richmond (July/August 1979).

6. *Donoghue's Money Fund Report* of Holliston, Mass. Various issues.

Exhibit

MMF EXPENSE CATEGORIES

	Times Reported
I. Operating Expenses	
A. Management and Advisory Fees	40
B. Reports to Shareowners	
Reports to Shareowners	18
Printing/Printing and Postage	13
Postage	2
Postage, Supplies, Printing	7
C. Other Operating Expenses	
Shareowner Services	11
Transfer Agent	14
Custodian	25
Custodian and Shareowner Services	5
Custodian and Transfer Agent	7
Accounting Services	3
Bookkeeping	2
General and Administrative	4
General and Administrative and Shareowner Services	1
Office Salaries	2
Promotion	1
Telephone	2
Rent	2
Equipment Maintenance	1
Interest	1
Service Fees	2
Bank Transaction and Checking Fees	1
II. Nonoperating Expenses	
A. Professional Expenses	
Audit	23
Legal	23
Audit and Legal	11
Professional Fees	4
Audit and Accounting	1
Legal and Filing	1
B. Directors' and Trustees' Fees	
Directors' Fees	26
Trustees' Fees	9
C. Registration Fees, Taxes, Amortization	
State and Local Taxes	17
Registration Fees	34
Amortization	14
D. Miscellaneous	
Miscellaneous	35
Insurance	3