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# The Supply of Equity Securities, 1952-68

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THIS chapter describes trends in the supply of equity financing during the years 1952 to 1968 and trends in corporate financing over this period. An attempt is also made to identify the determinants of the volume of equity financing for nonfinancial corporations and for several subsectors within that group, namely, manufacturing, utilities, and communications. In addition, an effort is made to explain equity financing behavior by studying a sample of large manufacturing corporations, each of which made at least one issue of common stocks during the period. Finally, an attempt is made to identify the determinants of the volume of equity securities retired.

## 1. TRENDS IN THE SUPPLY OF EQUITY SECURITIES, 1952-68

During the period under study, domestic corporations issued \$58.3 billion of new equity securities and at the same time retired \$31.8 billion of outstanding equity securities. As a result net new issues over the period added \$26.5 billion to the stock of outstanding equity securities. Yearly data on new issues and retirements are presented in Table 4-1.

While the total market value of outstanding stocks of domestic corporations increased by \$983.4 billion between 1952 and 1968, net new issues accounted for only 2.7 percent of this increase, with the balance arising from appreciation of outstanding issues. Moreover, there has been a significant decline over the period in the contribution of net new issues to the growth in market value of equity securities. Between 1953 and 1959, 6.6 percent of the increase in market value was attributable to new issues

TABLE 4-1  
Domestic Corporate Securities Issued and Retired,<sup>a</sup> 1952-68

(\$million)

	1952	1953	1954	1955	1956	1957
<b>Issues</b>						
1. Cash issues	1,933	1,815	2,029	2,820	2,937	2,927
2. Conversions of debt into stocks						
a. Cash	194	125	213	203	169	55
b. Stock issued	541	366	752	802	694	277
3. Exchanges <sup>b</sup>	0	0	0	2	11	39
4. Other additions <sup>c</sup>	75	113	188	151	317	203
5. Deductions <sup>d</sup>	157	203	182	359	207	193
6. Total issues	2,586	2,216	2,999	3,619	3,920	3,309
<b>Retirements</b>						
7. Called for payment	98	115	397	590	187	42
8. Repurchases and other retirements <sup>e</sup>	46	170	712	1,008	1,112	507
9. Exchanges <sup>b</sup>	0	0	88	176	103	69
10. Deductions <sup>f</sup>	0	0	0	48	30	23
11. Total retirements	145	284	1,196	1,725	1,373	596
12. New issues less retirements	2,441	1,932	1,802	1,893	2,548	2,713

NOTE: Data prior to 1955 are not strictly comparable with the current period because of differences in coverage. Transactions reflecting mergers and liquidations, as well as adjustments for intercorporate transactions, were not covered.

SOURCE: Securities and Exchange Commission, Branch of Capital Markets.

\* Less than half a million dollars.

<sup>a</sup> Excluding investment company shares.

<sup>b</sup> Exchange transactions are covered only when they involve the issuance and retirement of different types of securities, e.g., debt issues for equity issues.

whereas they accounted for only 1.2 percent of the increase between 1960 and 1968.

The data in Table 4-2 show that over the period as a whole, manufacturing corporations accounted for almost 32 percent of gross new issues, while public utility corporations, communications corporations, and others (including mining, transportation, fire insurance, real estate, and commercial corporations) each accounted for between 23 and 24 percent

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
1,906	2,554	2,071	3,748	1,738	1,361	3,093	2,272	2,513	2,873	4,549
253	41	7	5	1	*	4	0	0	0	0
851	451	308	236	122	163	156	392	530	1,071	992
17	6	4	20	11	5	15	0	1	23	98
324	572	569	783	652	657	762	815	1,388	944	910
280	247	234	337	268	240	282	275	263	187	492
3,070	3,378	2,725	4,454	2,255	1,948	3,748	3,205	4,169	4,724	6,057
123	85	95	157	298	425	408	602	121	118	86
608	861	869	1,546	1,232	1,688	1,804	2,519	2,344	2,390	5,402
233	77	123	106	88	206	212	199	753	244	2,362
21	22	58	5	52	122	107	79	218	355	891
943	1,002	1,029	1,804	1,567	2,197	2,317	3,242	3,000	2,397	6,959
2,127	2,376	1,696	2,650	688	-249	1,431	-37	1,169	2,327	-900

<sup>c</sup> Includes issues such as sales by affiliated companies, private sales to foreigners, and sales to employees.

<sup>d</sup> Deductions are made for certain transactions, such as foreign issues sold in the United States, sales to other corporations, and estimated amounts of issues offered but not sold.

<sup>e</sup> Repurchases by public tender, open-market repurchases, and cash payments in connection with liquidations, reorganizations, and mergers.

<sup>f</sup> Retirements of issues held by other corporations and in items 8 and 9.

of gross new issues. However, there were some shifts in the roles of the individual sectors as sources of new equity securities between the 1950's and 1960's. Corporations both in manufacturing and in the miscellaneous group increased their share in gross new issues between these two periods, while the shares of both public utility and communications corporations declined. Additional detail on new issues and retirements by sector is given in Table 4-3.

TABLE 4-2

Distribution of Gross New Issues of Equity Securities by Industry, 1952-68

*(percent)*

	Manufacturing (1)	Utilities (2)	Communications (3)	Other (4)
1968	40.9	15.2	2.3	41.6
1967	50.7	15.7	10.6	23.0
1966	43.1	13.3	14.4	29.2
1965	37.6	18.7	17.4	26.3
1964	15.8	17.2	48.4	18.2
1963	27.4	22.2	25.8	24.6
1962	26.1	26.4	16.6	30.9
1961	25.8	16.9	33.3	24.0
1960	35.9	25.3	13.3	25.5
1959	29.7	31.6	13.5	25.2
1958	16.2	34.4	35.2	14.2
1957	51.1	25.3	6.5	17.1
1956	29.1	20.5	31.6	18.2
1955	30.3	24.5	24.5	20.7
1954	15.4	31.3	33.0	20.3
1953	8.7	50.7	28.6	12.0
1952	24.3	32.9	31.6	11.2
		<u>Annual Averages</u>		
1952-68	31.5	23.1	21.7	23.7
1960-68	33.7	19.0	20.2	27.1
1952-59	25.6	31.4	25.6	17.4

SOURCE: Calculated from the data in Table 4-3.

Throughout the period, the bulk of new issues apparently was rather small. Table 4-4 shows that individual issues of \$15 million or more accounted, on average, for only 30 percent of gross new issues, although the individual sectors exhibited considerable variation in this respect. Large issues accounted for slightly more than 50 percent of total issues by public utility corporations and comprised by far the largest share. Large issues by communications corporations accounted for an average of

30 percent of total issues by corporations in that sector, while the large issues have accounted for approximately 24 percent of the total in manufacturing and approximately 18 percent in the miscellaneous sector.

Perhaps the most striking trend in the supply of equity securities over the period has been the dramatic increase in the volume of retirements. The data in Table 4-5 indicate that with the exception of the earliest years of the period, a relatively small proportion of the retirements represents preferred stock called for payment. In particular, such retirements accounted for less than 5 percent of the total in the years 1966-68 when approximately 35 percent of the total amount of retirements during the period occurred. Most retirements fall into the category of repurchases by the issuing corporations and retirements associated with mergers and liquidations. Within this category there is some evidence that the bulk is accounted for by repurchases on the part of the initial issuer.

Table 4-6 shows estimates, derived by Leo Guthart, of the market value of shares repurchased by corporations listed on the New York Stock Exchange from 1954 to 1963. In six of the ten years these estimated repurchases accounted for over 50 percent of the retirements falling into the category of repurchases and retirements associated with mergers and liquidations. The balances listed as exchanges (i.e., exchanges of debt for equity securities) are probably closely associated with merger activity.

As can be seen by referring back to Table 4-3, it is manufacturing corporations which are responsible for most of the retirement of stocks. In most years such corporations account for somewhat more than half of all retirements and in only one year (1961) were they responsible for less than 45 percent of total retirements. Most of the balance of retirements are accounted for by firms in the extractive industries, in fire insurance and real estate, and in the commercial and other group. Retirements by firms in the utility, transportation, and communications groups generally account for a very small proportion of total retirements.

## 2. TRENDS IN CORPORATE FINANCING

The net supply of equity securities reflects, of course, corporate decisions as to uses and sources of funds. By far the largest corporate use of funds is capital expenditures. Table 4-7 shows that throughout the period under consideration over 60 percent of total funds used were allocated to capital expenditures. As is to be expected, the proportion spent varies closely with the level of business activity. Variations in the proportion of funds used for capital expenditures are offset primarily by compensating variations in the acquisition of financial assets. In most years capital expenditures

TABLE 4-3  
 Net New Issues of Corporate Stock by Industry, 1952-68  
 (\$million)

	1952	1953	1954	1955	1956	1957
<b>All industries</b>						
New issues	2,586	2,216	2,999	3,619	3,920	3,309
Retirements	145	284	1,196	1,725	1,373	596
Net change	2,441	1,932	1,802	1,893	2,548	2,713
<b>Manufacturing</b>						
New issues	629	193	463	1,096	1,140	1,690
Retirements	104	133	607	814	685	283
Net change	525	61	-145	282	455	1,407
<b>Extractive</b>						
New issues	n.a.	54	125	125	140	72
Retirements	n.a.	11	101	104	272	29
Net change	n.a.	42	23	22	-133	43
<b>Electricity, gas, and water</b>						
New issues	850	1,124	940	888	803	837
Retirements	4	54	146	40	7	22
Net change	845	1,069	794	849	796	815
<b>Railroad</b>						
New issues	1	—	5	7	1	*
Retirements	16	12	41	242	52	32
Net change	-15	-12	-35	-236	-51	-32
<b>Other transportation</b>						
New issues	42	6	5	46	62	48
Retirements	*	13	19	70	42	16
Net change	42	-8	-15	-24	20	32
<b>Communication</b>						
New issues	817	634	989	888	1,238	215
Retirements	*	12	7	8	42	26
Net change	817	622	982	879	1,196	189
<b>Fire insurance and real estate</b>						
New issues	129	177	366	483	473	374
Retirements	7	12	145	308	177	102
Net change	122	165	220	175	297	272
<b>Commercial and other</b>						
New issues	119	30	107	86	64	72
Retirements	14	37	130	139	95	86
Net change	165	-8	-23	-53	-31	-14

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
3,070	3,378	2,725	4,454	2,255	1,948	3,748	3,205	4,169	4,664	6,057
943	1,002	1,029	1,804	1,567	2,197	2,317	3,242	3,000	2,397	6,959
2,127	2,376	1,696	2,650	688	-249	1,431	-37	1,169	2,267	-900
496	1,004	977	1,147	589	534	593	1,204	1,798	2,365	2,477
542	562	515	733	831	1,198	1,109	1,774	1,767	1,532	4,319
-46	442	462	415	-242	-664	-516	-570	32	833	-1,842
81	44	47	57	48	43	89	75	78	139	318
10	9	76	619	282	276	468	100	532	27	52
72	35	-29	-562	-234	-233	-379	-25	-454	112	266
1,057	1,067	689	753	596	433	643	600	556	734	922
30	39	54	49	116	188	167	504	22	83	30
1,027	1,028	635	704	479	245	476	96	534	652	892
—	—	—	1	1	*	1	33	9	64	53
109	18	26	43	9	9	4	38	22	9	81
-109	-18	-26	-42	-8	-9	-3	-5	-10	55	-28
33	68	18	42	21	74	57	109	766	204	170
17	49	34	7	37	84	84	105	38	98	292
16	20	-16	35	-17	-10	-27	4	728	108	-122
1,080	457	363	1,483	374	502	1,814	559	600	494	167
10	12	8	26	17	55	115	41	27	28	46
1,070	445	356	1,457	157	447	1,699	518	573	466	-120
250	427	439	664	419	276	429	439	166	189	611
92	129	107	136	100	182	144	449	256	318	1,355
158	298	331	528	319	94	285	-10	-90	-121	-744
73	309	193	307	207	86	132	185	193	472	1,337
134	182	210	192	175	205	225	229	336	303	782
-61	127	-17	115	33	-119	-104	-45	-143	169	755

n.a. = not available.

SOURCE: Securities and Exchange Commission.

\* Less than half a million dollars.



TABLE 4-4

Large Equity Issues as a Percent of Total, by Sector, 1953-67

	Manufacturing and Extractive (1)	Utilities (2)	Communications (3)	Other (4)	Total (5)
1953	14.7	45.2	3.7	34.6	28.9
1954	20.6	27.0	—	43.0	19.4
1955	39.5	46.1	6.1	20.8	28.6
1956	18.2	34.9	48.7	39.9	35.5
1957	57.2	51.8	24.5	23.9	48.7
1958	14.0	3.7	4.2	12.9	22.7
1959	11.6	2.2	28.3	16.1	27.5
1960	8.4	42.9	6.2	3.4	15.4
1961	5.0	61.6	69.2	14.6	38.1
1962	4.9	62.5	—	3.0	18.8
1963	13.3	49.2	9.5	5.5	18.6
1964	—	50.6	79.3	17.0	49.9
1965	27.2	32.8	12.8	14.2	22.6
1966	44.3	73.5	16.9	7.0	34.0
1967	15.1	80.0	11.6	28.2	27.2
Annual average	23.5	50.6	30.4	17.5	30.3

SOURCES: Reports prepared by the Business Finance and Capital Markets Section Division of Research and Statistics, Board of Governors of the Federal Reserve System.

and the acquisition of financial assets together account for slightly more than 90 percent of total uses, and there is no apparent trend in this figure. Capital expenditures and acquisition of financial assets averaged 90.7 percent of yearly total uses during 1952-59 and 90.1 percent during 1960-68.

The remaining 10 percent of funds has been used for the retirement of outstanding debt and equity securities. Within this component of total uses there has been a noteworthy, if not dramatic, increase in the importance of retirements of equity issues. While, on average, such retirements accounted for 2.0 percent of uses during the years 1952-59, retirement of stock consumed 3.2 percent of funds annually during the period 1960-68.

TABLE 4-5  
 Distribution of Total Retirements by Type, 1952-68  
 (percent)

	Called for Payment	Repurchases and Other Retirements	Exchanges
1968	1.1	68.8	30.1
1967	4.3	86.8	8.9
1966	3.8	72.8	23.4
1965	18.1	75.9	6.0
1964	16.8	74.4	8.7
1963	18.3	72.9	8.9
1962	18.4	76.1	5.4
1961	8.7	85.5	5.9
1960	8.7	79.9	11.3
1959	8.3	84.1	7.5
1958	12.8	63.1	24.2
1957	6.8	81.9	11.1
1956	13.3	79.3	7.3
1955	33.3	56.9	9.9
1954	33.2	59.5	7.4
1953	40.5	59.5	—
1952	68.1	39.9	—

SOURCE: Calculated from the data in Table 4-1.

At the same time the annual average proportion of funds used for the retirement of debt securities declined from 7.3 percent in the fifties to 5.8 percent during the sixties.

The major proportion of funds used by corporations is internally generated, primarily from depreciation reserves and retained earnings. While internally generated funds exhibited short-run variation, they showed no apparent trend at this level. In most years such funds accounted for more than 60 percent of total sources. Over the years 1952-59 internally generated funds accounted for 64.8 percent of the funds used each year; they

TABLE 4-6

Market Value of Shares Repurchased by New York Stock Exchange Companies, 1954-63

	Estimated Repurchases by NYSE Companies (\$million)	Percent of Total Repurchases and Other Retirements
1963	1,302.9	77.2
1962	1,056.7	85.8
1961	793.6	47.8
1960	598.4	68.9
1959	647.5	75.2
1958	465.7	76.6
1957	382.3	75.4
1956	414.3	37.3
1955	387.8	38.5
1954	273.9	38.5

SOURCE: Leo A. Guthart, "More Companies are Buying Back Their Stock," *Harvard Business Review*, March-April 1965, Exhibit 1, p. 44.

accounted for 63.5 percent during the years 1960-68. As a consequence, the role of external financing, except for short-run variations, has remained relatively unchanged throughout the period.

The sources of external finance, however, show significant shifts over the period. In particular the roles of both debt and equity securities as sources have been markedly smaller in the 1960's than in the 1950's. While issues of debt securities provided, on average, 19.4 percent of total funds annually from 1952-59, this proportion fell to 16.1 percent during 1960-68. More dramatic is the reduced importance of new equity issues as a source. On average, such issues accounted for 7.5 percent of total funds from 1952-59 but for only 4.8 percent of total funds from 1960-68. These reductions in the role of securities have been offset by a marked increase in the proportion of funds supplied by other sources, primarily commercial banks. Bank debt and other sources, which provided, on average, 8.3 percent of total funds during the 1950's, supplied almost twice that, or 15.6 percent, in the 1960's.

Thus there are two trends in corporate financial behavior which have acted to limit the supply of equity securities during the period under study. On the one hand, corporations as a group have increased the extent to which funds are used to retire their outstanding equity issues. On the other hand, there has been a notable shift away from the issuance of new equity securities as a source of funds. Explanations for these two trends would, to a large extent, provide explanations for the behavior of the supply of equity securities during the 1950's and 1960's.

Before proceeding to examine some explanations for these trends, it would be desirable to examine corporate financial behavior on a less aggregative basis. This can be done for three broad sectors—manufacturing, electric and gas utilities, and communications. Information on uses and sources of funds, other than that relating to retirements and issues of debt and equity securities, is available from reports of various regulatory agencies. Thus data for manufacturing were calculated from the FTC-SEC Quarterly Surveys of Manufacturing; data for electric and gas utilities, from reports on class A and class B privately owned electric utilities and natural gas pipelines, and utilities filed with the Federal Power Commission; and data for class A telephone companies, from reports filed with the Federal Communications Commission. Such data do not cover all firms in these categories; and, particularly in the case of the FTC-SEC Survey of Manufacturing, changes in number and identity of reporting firms introduce additional errors. Nevertheless, included firms account for very high percentages of total activity in each sector. Furthermore, these data should provide reasonably reliable indicators of trends in the relative importance of various sources and uses of funds within each sector. Information on the financing behavior of a miscellaneous group of firms including those in transportation, mining, commercial and fire insurance, and real estate was obtained by subtracting the data for manufacturing, utilities, and communications from the flow of funds data for all nonfinancial corporations.

In Table 4-8, annual average percentage data on the uses and sources of funds are presented for each sector for the periods 1952-59 and 1960-68; yearly data for each sector are in Tables 4-9 through 4-12. The relative constancy of the proportion of funds used for reductions in liabilities which was observed at the aggregate level extends only to the manufacturing sector. Utilities and the miscellaneous group both exhibit a tendency toward increasing use of funds for the retirement of securities though the tendency is much more pronounced for the latter. In communications, however, there is a contrary trend toward a reduction in the use of funds

TABLE 4-7

Sources and Uses of Funds, All Nonfinancial Corporations, 1952-68

*(percent of total uses)*

	1952	1953	1954	1955	1956	1957
Total (\$billion)	33.2	29.3	32.6	55.2	46.8	43.9
Uses of funds (percent)						
Capital expenditures	73.5	84.0	66.3	57.1	76.7	79.0
Net average of financial assets	19.0	8.5	17.8	33.7	13.5	13.7
Retirements	7.5	7.5	16.0	9.2	9.8	7.3
Stocks	0.3	1.0	3.7	3.1	3.0	1.4
Bonds	7.2	6.5	12.3	6.1	6.8	5.9
Sources of funds (percent)						
Gross internal	63.9	72.0	71.5	52.9	61.8	69.7
External	36.1	28.0	28.5	47.1	38.2	30.3
Stocks	7.8	7.5	9.2	6.5	8.3	7.5
Bonds	22.0	22.9	23.9	13.8	16.7	21.9
Other	6.3	-2.4	-4.6	26.8	13.2	0.9

for retirements. Likewise, the trend toward a decrease in the proportion of funds used for the retirement of debt securities at the aggregate level does not extend uniformly to the individual sectors. While retirement of debt securities absorbed a decreasing proportion of funds in manufacturing and communications, utilities showed a slight increase, and the miscellaneous group exhibited no change. The one aggregate tendency which extends to each sector without exception is an increase in the proportion of funds used to retire outstanding equity securities. While the proportion of funds so used is still relatively minor in each sector, it has approximately doubled in the 1960's as compared to the 1950's in both the communications and the miscellaneous sectors, and has quadrupled in the utility sector. Thus, one of the important trends influencing the supply of equity securities has apparently been a general phenomenon throughout the corporate sector.

The absence of any substantial trend in the role of external financing at the aggregate level obscures more varied behavior at the level of the

1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
45.1	57.1	47.8	58.0	65.3	70.5	71.3	93.7	100.1	93.7	115.8
60.5	64.6	81.6	63.3	67.4	64.7	73.1	67.0	77.0	77.4	66.3
29.0	28.4	9.8	26.7	24.5	25.1	18.0	24.7	15.5	14.4	23.0
10.4	7.0	8.6	10.0	8.1	10.2	8.9	8.3	7.5	8.2	10.7
2.0	1.8	2.1	3.1	2.5	3.1	3.2	3.4	3.0	2.3	6.0
8.4	5.2	6.5	6.9	5.6	7.1	5.7	4.9	4.5	5.9	4.7
65.4	61.3	72.0	61.4	64.0	62.3	70.8	60.4	61.2	65.3	54.4
34.6	38.7	28.0	38.6	36.0	37.7	29.2	39.6	38.9	34.7	45.6
6.9	6.0	5.6	7.8	3.5	2.7	5.2	3.4	4.2	5.0	5.3
21.5	12.4	16.9	15.9	13.2	15.0	15.0	13.6	15.6	22.7	16.8
6.2	20.3	5.4	15.0	19.3	20.0	9.0	22.6	19.1	7.0	23.5

SOURCES: Calculated from *Flow of Funds Accounts 1945-1968*; *Federal Reserve Bulletin*, November 1969.

individual sectors. There has, in fact, been a dramatic increase in the role of external financing for manufacturing corporations, with 42.1 percent of funds coming from external sources on average over the years 1960-68 as compared with only 29.1 percent during 1952-59. At the same time there have been substantial reductions in the role of external funds in the utility and communications sectors, and a more minor reduction in their role in the miscellaneous group.

The trend toward decreasing reliance on equity issues as a source of funds was, nevertheless, common to all sectors other than the miscellaneous group, where there was an insignificant increase in the share of funds derived from new equity issues. Of the other three sectors, the decline in the role of equity financing was pronounced in communications, where the average annual share of new equity in total financing fell from 35.6 percent in the fifties to 23.7 percent in the sixties, and in the utility sector, where the fall was from 17.5 percent to 8.7 percent between the two periods.

TABLE 4-8  
Comparative Sources and Uses of Funds, Annual Averages, 1952-59 and 1960-68  
(percent of total uses)

	All Nonfinancial Corporations		Manufacturing		Utilities		Communications		Miscellaneous	
	1952-59	1960-68	1952-59	1960-68	1952-59	1960-68	1952-59	1960-68	1952-59	1960-68
Increase in assets	90.7	91.0	92.1	92.9	89.2	85.8	79.6	92.5	86.6	77.5
Retirement of debt securities	7.3	5.8	5.4	4.0	9.9	11.0	19.8	6.2	6.6	6.6
Retirement of equity securities	2.0	3.2	2.5	3.1	0.8	3.2	0.7	1.3	1.6	3.2
Net reduction in other liabilities	—	—	—	—	—	—	—	—	—	—
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Internal funds	64.8	63.5	70.9	57.9	27.7	38.4	22.5	34.9	75.8	79.3
External funds	35.2	36.5	29.1	42.1	72.3	61.6	77.5	65.1	24.2	22.7
Equity	7.5	4.8	4.3	2.8	17.5	8.7	35.6	23.7	2.9	3.0
Debt securities	19.4	16.1	14.9	9.7	41.0	34.5	40.3	32.8	14.5	16.2
Net increases in other liabilities	8.3	15.6	9.1	30.3	13.8	18.5	1.9	8.5	6.8	3.5

Sources: Calculated from the data in Tables 4-9 through 4-12.

TABLE 4-9  
Sources and Uses of Funds, Manufacturing Corporations, 1952-68  
(percent of total uses)

	Increase in Assets	Debt Retire- ment	Stock Retire- ment	Total Uses	Internal Funds	External Funds	Equity Securities	Debt Securities	Other
1968	91.4	3.0	5.6	100.0	45.9	54.1	3.2	8.8	42.1
1967	93.4	3.9	2.6	100.0	54.7	45.3	4.1	16.5	24.7
1966	94.3	3.0	2.7	100.0	52.0	48.0	2.8	9.6	39.6
1965	93.4	3.4	3.2	100.0	53.2	46.8	2.2	8.1	36.6
1964	93.1	4.0	2.9	100.0	63.0	37.0	1.6	7.4	30.6
1963	91.4	4.8	3.8	100.0	65.3	34.7	1.7	10.5	22.5
1962	93.0	4.3	2.7	100.0	63.9	36.1	1.9	8.7	25.5
1961	93.1	4.4	2.5	100.0	57.0	43.0	3.9	11.3	27.8
1960	92.9	4.9	2.2	100.0	65.8	34.2	4.1	6.6	23.5
1959	94.2	4.0	1.8	100.0	55.4	44.6	3.3	5.1	36.2
1958	89.9	6.7	3.4	100.0	84.8	15.2	3.2	20.6	-8.6
1957	94.2	4.5	1.3	100.0	72.1	27.9	8.0	12.9	7.0
1956	87.8	7.8	4.4	100.0	72.5	27.5	7.3	18.1	2.1
1955	93.2	4.2	2.6	100.0	53.8	46.2	3.5	6.6	36.2
1954	88.1	6.9	5.0	100.0	84.8	15.2	3.8	18.6	-12.9
1953	94.6	4.4	1.0	100.0	78.9	21.1	1.6	13.9	5.6
1952	95.0	4.3	0.7	100.0	65.0	35.0	4.5	23.1	7.4

SOURCES: Calculated from data in *FTC-SEC Quarterly Surveys of Manufacturing*.



TABLE 4-10  
Sources and Uses of Funds, Public Utility Corporations, 1952-67

(percent of total uses)

	Increase in Assets	Debt Retire- ment	Stock Retire- ment	Total Uses	Internal Funds	External Funds	Equity	Debt Securities	Other
1967	85.6	6.6	7.8	100.0	25.4	74.6	6.9	39.0	28.7
1966	91.0	6.5	2.5	100.0	44.4	55.6	6.2	36.1	13.3
1965	83.1	10.2	6.7	100.0	38.9	61.1	8.0	28.2	24.9
1964	86.4	11.0	2.6	100.0	47.8	52.2	9.9	32.7	9.6
1963	76.8	20.3	2.9	100.0	41.6	58.4	6.9	34.2	17.3
1962	83.8	14.4	1.8	100.0	38.9	61.1	9.0	33.7	18.4
1961	89.9	9.3	0.8	100.0	34.7	65.3	11.8	35.3	18.3
1960	89.7	9.5	0.8	100.0	35.3	64.7	11.1	36.5	17.1
1959	91.5	7.9	0.6	100.0	34.5	65.5	16.0	34.0	15.4
1958	87.5	11.3	0.5	100.0	31.0	69.0	17.3	46.1	5.6
1957	93.8	5.9	0.3	100.0	24.8	75.2	11.6	41.7	21.9
1956	91.8	8.0	0.2	100.0	30.6	69.4	15.3	33.7	20.5
1955	88.6	10.5	0.9	100.0	27.4	72.6	18.8	34.6	19.2
1954	76.2	21.0	2.8	100.0	22.9	77.1	17.9	54.7	4.5
1953	92.3	6.6	1.1	100.0	26.4	73.6	24.6	42.6	6.4
1952	92.1	7.9	—	100.0	24.1	75.9	18.6	40.4	16.9

SOURCES: Calculated from data in reports to the Federal Power Commission of Class A and Class B privately owned electric utilities and natural gas pipelines.

TABLE 4-11  
Sources and Uses of Funds, Communications Corporations, 1952-67

(percent of total uses)

	Increase in Assets	Debt Retire- ment	Stock Retire- ment	Total Uses	Internal Funds	External Funds	Equity	Debt Securities	Other
1967	97.8	1.5	0.7	100.0	37.8	62.2	10.9	39.8	11.6
1966	97.6	1.7	0.7	100.0	35.7	64.3	14.3	41.2	8.8
1965	96.6	2.3	1.1	100.0	39.8	60.2	15.9	20.7	23.6
1964	92.2	4.5	3.3	100.0	33.5	66.5	50.6	16.8	-1.4
1963	81.8	16.0	2.2	100.0	40.9	59.1	18.6	32.0	8.6
1962	97.0	2.2	0.8	100.0	29.7	70.3	13.8	45.9	10.4
1961	80.5	18.5	1.0	100.0	26.8	73.2	49.7	23.5	—
1960	96.5	3.1	0.4	100.0	35.1	64.9	15.8	42.5	6.6
1959	91.9	7.6	0.5	100.0	37.8	62.2	24.9	33.0	5.9
1958	74.9	24.8	0.3	100.0	22.8	77.2	35.2	41.0	1.0
1957	94.7	3.7	1.6	100.0	26.3	73.7	11.1	68.4	-5.8
1956	83.7	14.6	1.7	100.0	16.7	83.3	51.9	30.5	0.8
1955	78.7	21.0	0.3	100.0	18.7	81.3	33.3	37.0	10.9
1954	63.7	35.8	0.5	100.0	24.5	75.5	48.5	29.9	-2.9
1953	78.7	20.8	0.5	100.0	17.2	82.8	35.4	44.4	3.4
1952	70.3	29.7	—	100.0	16.2	83.8	44.3	37.8	1.6

Sources: Calculated from data in reports of Class A telephone companies to the Federal Communications Commission as summarized in FCC *Common Carrier Statistics*, annual editions.

TABLE 4-12  
Sources and Uses of Funds, Miscellaneous Corporations, 1952-67  
(percent of total uses)

	Increase in Assets	Retire- ment		Net Retire- ment		Total Uses	Internal Funds	External Funds	Equity Securities	Debt Securities	Net Increase of Other Debt
		of Debt Securities	Equity	of Other Debt	Funds						
1967	57.8	7.5	2.5	32.2	100.0	78.7	21.3	2.8	18.4	—	
1966	65.7	6.6	4.2	23.5	100.0	81.3	18.7	3.8	14.9	—	
1965	84.6	6.8	3.1	5.5	100.0	78.5	21.5	2.7	18.8	—	
1964	73.9	6.1	3.2	16.8	100.0	79.6	20.4	2.1	18.2	—	
1963	91.6	5.7	2.7	—	100.0	65.3	34.7	1.3	18.5	14.8	
1962	92.5	5.1	2.4	—	100.0	74.7	25.3	2.4	9.5	13.4	
1961	84.4	8.0	5.0	2.5	100.0	79.9	20.0	5.0	15.0	—	
1960	69.7	6.7	2.6	21.0	100.0	80.0	20.0	3.6	16.4	—	
1959	89.2	6.5	2.2	2.2	100.0	81.2	18.8	4.3	14.5	—	
1958	91.1	6.9	2.0	—	100.0	66.5	33.5	2.0	11.8	19.7	
1957	76.1	6.9	1.9	15.0	100.0	81.8	18.9	3.1	15.7	—	
1956	92.7	4.7	2.6	—	100.0	66.5	33.5	2.6	10.3	20.6	
1955	88.4	6.1	5.5	—	100.0	64.0	36.0	3.7	17.7	14.6	
1954	82.6	9.4	2.9	5.1	100.0	81.9	18.1	3.6	14.5	—	
1953	80.0	5.6	0.8	13.6	100.0	80.0	20.0	1.6	18.4	—	
1952	93.0	7.0	—	—	100.0	83.6	16.4	2.3	12.5	1.6	

SOURCES: Based on the data of Table 4-7 and Tables 4-9 through 4-11, as explained in section 2, above.

As is the case at the aggregate level, the three sectors in which the share of equity financing was declining—manufacturing, utilities, and communications—also exhibited reductions in the role of debt securities as a source of funds. In all three sectors reliance on other forms of debt financing increased. The expanded role of other forms of debt financing was most dramatic in manufacturing, where the share of such debt rose from an annual average of 9.1 percent to 30.3 percent between the 1950's and the 1960's, and in communications, where it rose from 1.9 percent to 8.5 percent. In contrast to these sectors, the miscellaneous sector exhibited a slight increase in the role of debt securities and a substantial reduction in the role of other debt financing as sources of funds.

There were, then, significant intersectoral variations in financing behavior during the period. But both trends, when observed at the aggregate level—the most important for explaining the supply of equity securities—seem broadly to have characterized the pattern of behavior within sectors. In all sectors retirement of equity absorbed an increasing share of funds, while in all but the miscellaneous group the role of equity and debt security issues as sources of funds has been declining, with an accompanying shift toward greater reliance on other forms of debt financing.

### 3. DETERMINANTS OF THE COMPOSITION OF EXTERNAL FINANCING

Broadly speaking the sources of funds for firms may be divided into four categories, as we have done in the preceding tables: (1) internal funds, (2) debt securities, (3) equity securities, and (4) other sources including bank loans, trade debt, profit tax accruals, and mortgages. Whatever level of funds firms wish to raise, they can be expected to distribute these requirements over the various sources in such a way as to minimize the total cost of funds for a given level of financing. As a consequence the composition of financing should shift in response to changes in the relative cost of obtaining funds from the several sources.

Let us assume that in any period a firm has some desired level of total financing,  $TF^*$ , which is equal to its desired increase in physical capital plus replacement investment, plus its desired increase in financial assets.<sup>1</sup> The financing problem of the firm is then that of determining the level of funds to be raised from each source in such a way as to minimize cost, subject to the constraint that the sum of the funds raised be equal to the desired level of financing.

<sup>1</sup> This might be formalized through the use of an accelerator-adjustment model of desired total financing but it would serve no useful purpose at this juncture.

Among the four sources of funds recognized here, internal funds have the special attraction that the firm incurs no transactions costs in their use. Thus, while it may be difficult in practice to determine the opportunity cost of the marginal dollar of internal funds reinvested in the business, it would seem safe to assume that the cost of any given amount of funds will be minimized if it can be obtained from internal funds. Consequently, funds will be raised from the other three sources only if desired financing exceeds the amount of internally generated funds available. The excess of desired financing over internal funds gives the firm's required level of external financing, *REF*. If we accept this simplification, the financing problem becomes one of obtaining the required level of external financing at minimum cost.

The cost of funds from any source is made up of the interest charges the firm must pay plus certain transactions costs such as arranging for bank loans, or flotation costs in the case of bond or equity financing. While these transactions costs tend to be relatively insensitive to the amount of funds raised, the interest rates which must be paid are likely to increase with the amount raised from any source. This means that the marginal cost of funds from each source increases with the amount raised.

In addition, the levels of the cost curves probably differ among the sources of funds. Thus, because of the special tax advantages of debt financing, the cost curves for both bond and "other" financing lie below that for equity financing over some range. Furthermore, if as seems likely, the transactions costs of obtaining "other" funds are lower than the flotation costs of securities, the cost curve will be below both those for bond and equity financing over some range.

These properties of the cost curves mean that an optimal, i.e., cost minimizing, financial policy need not involve the use of all sources of external funds. Rather, there will be some level of required external financing below which it would be optimal to rely solely on "other financing." Let us denote this level as *REF'*. There will be another level of required external financing *REF''* below which cost minimization requires that no funds be obtained from equity issues. Thus firms whose required external funds fall below *REF'* and *REF''* will use both "other" and bond financing, while only those firms with requirements in excess of *REF''* would use all three sources. This dependence of optimal financing policy for individual firms upon their level of required external financing relative to two critical levels, *REF'* and *REF''*, makes it difficult to analyze the determinants of financing behavior.

Since we must rely on aggregate data on the amounts of different types

of financing and on total external financing, we can only attempt to explain financing behavior by equations such as:

$$\begin{aligned}\bar{F} &= \alpha_0 + \alpha_1 \bar{EF} + \alpha_2 r_f + \alpha_3 r_b + \alpha_4 r_e \\ \bar{B} &= \beta_0 + \beta_1 \bar{EF} + \beta_2 r_f + \beta_3 r_b + \beta_4 r_e \\ \bar{E} &= \eta_0 = \eta_1 \bar{EF} + \eta_2 r_f + \eta_3 r_b + \eta_4 r_e\end{aligned}$$

where  $\bar{F}$  = aggregate "other" financing

$\bar{B}$  = aggregate bond financing

$\bar{E}$  = aggregate equity financing

$\bar{EF}$  = aggregate external financing

$r_f$  = interest rate on "other" funds

$r_b$  = interest rate on bonds

$r_e$  = required rate of return on equity

But because the optimal financing policy for individual firms depends upon required external funds relative to the critical levels  $REF'$  and  $REF''$ , the "other" financing equation should have as separate variables: (1) external financing by firms which have requirements less than  $REF'$ , (2) external financing by firms which have requirements between  $REF'$  and  $REF''$ , and (3) external financing by firms with requirements greater than  $REF''$ . Similarly, the bond equation should have as separate variables: (1) external financing by firms with requirements less than  $REF'$ , and (2) external financing by firms with requirements between  $REF'$  and  $REF''$ . Finally, the equity financing equation should have as a variable only the external financing by firms with requirements in excess of  $REF''$ . The use of aggregate external financing as a single variable in each of the equations thus introduces errors which limit the usefulness of analysis of aggregate data for making inferences about financing behavior at the firm level.

One consequence of such errors will be a reduction of the estimated explanatory power of the model as measured by the coefficient of multiple determination,  $R^2$ . This in itself might not be too serious provided the problem is recognized. Nevertheless, since the errors lead to a magnification of unexplained variance, the standard errors of the estimated coefficients will be magnified. Thus, even if the properties of the errors are

such as still to lead to unbiased estimates of these coefficients, casual application of standard significance tests is to be avoided.

But even more serious problems may beset the analysis if the magnitudes of the errors are correlated with other explanatory variables in the model. And there is some reason to expect this to be the case, since the critical levels of required external financing,  $REF'$  and  $REF''$ , are not independent of the interest rates on funds from the various sources. It is therefore quite likely that the errors arising from the use of aggregate external financing as an explanatory variable are correlated with other variables in the model. As a consequence estimates of the coefficients in the model are likely to be biased in unknown directions and magnitudes.

All of this suggests that extreme caution is necessary in making inferences on the basis of aggregate financial data. Yet something may be gained from it. The nearer together are the total cost curves of the various sources of funds, the more firms there are whose external financing requirements are greater than  $REF''$ , and hence the smaller is the error introduced by estimating the financing equations through use of aggregate external financing as an explanatory variable. Thus, if the assumption of nearly identical cost functions were true, the estimated equations would have closely similar  $R^2$ 's. If, on the other hand, firms view the cost of "other" financing as significantly lower than the cost of bond financing over a large range, and the cost of bond financing as lower than that of equity financing over a substantial range, then the errors introduced by using aggregate external financing as an explanatory variable should be least for the "other" financing equation and greatest for the equity financing equation. Consequently, if the assumptions on the cost curves were true we should expect  $R^2$  to be highest for the "other" financing equation, lowest for the equity-financing equation, and intermediate for the bond-financing equation. Since it is commonly believed that such a hierarchy of sources of funds exists, it would be interesting to see to what extent actual financing behavior supports the belief.

Regressions of  $F$ ,  $B$ , and  $E$  on  $EF$  and measures of  $r_f$ ,  $r_b$ , and  $r_e$  are presented in Table 4-13. The rate on short-term commercial bank loans was taken as a measure of  $r_f$ , while the rate on AAA corporate bonds was taken as a measure of  $r_b$ . Two measures of  $r_e$  were used. The first was the inverse of the current price-earnings ratio for the Standard and Poor's composite group. The second was constructed by taking the earnings-price ratio for the Standard and Poor's composite group and adding to it the trend rate of growth of earnings per share of stocks in the same group. The trend used was calculated for each observation year by computing a

TABLE 4-13

Estimated Financing Equations, All Nonfinancial Corporations, 1952-67

Dependent Variable	Constant	$\overline{EF}$	$r_b$	$r_e$	$r'_e$	$R^2$	$d$
$\overline{F}$	15.910	.859* (.102)	-4.770* (1.659)	-1.017 (.633)	—	.892*	1.933
$\overline{B}$	-18.099	.116 (.085)	4.586* (1.388)	1.045* (.529)	—	.742*	2.100
$\overline{E}$	2.189	.025 (.031)	.184 (.510)	-.028 (.194)	—	.226	1.891
$\overline{F}$	7.821	1.000* (.126)	-4.400* (1.434)	—	-.296* (.161)	.890*	1.561
$\overline{B}$	-8.524	-.002 (.110)	3.893* (1.215)	—	.254* (.136)	.733*	1.516
$\overline{E}$	1.041	.004 (.039)	.412 (.427)	—	.041 (.048)	.269	2.115

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

semilogarithmic regression of earnings per share for the observation year and the preceding four years. The measures are denoted  $r_e$  and  $r'_e$ , respectively. Initial results showed the measures of  $r_f$  and  $r_b$  to be almost perfectly correlated, so  $r_f$  was eliminated; the regressions reported here used only  $r_b$  and  $r_e$ .

The resulting pattern of  $R^2$  conforms with the expectations based on the proposition that "other" financing is viewed as much less costly than the other forms of financing, while equity financing is viewed as the most costly. The magnitudes of all coefficient estimates are sensitive to the specification of  $r_e$ , but neither the explanatory power of the equations nor the signs of the coefficients are. While the interest rate coefficients are mostly insignificant or barely significant, what is more disturbing is their sign pattern. The coefficient of  $r_b$  has the right sign in the "other" financing and in the equity financing equations, while  $r_e$  has the right sign in both the bond and equity financial equations. Of the incorrect signs the most disturbing is the positive sign on  $r_b$  in the bond equation, since the estimated coefficient is highly significant. One explanation for this result would be that in periods of tight money, when both  $r_f$  and  $r_b$  rise, the availability of



funds from "other" sources contracts, and firms are forced into the debt securities market even at market rates they would prefer not to adopt. In terms of the underlying specification of the financing model, the perverse sign on  $r_b$  in the bond equation is an indication that the parameters of the "other" funds cost function,  $a_0$  and  $a_1$ , are not constant over time but increase as interest rates rise.

Similar equations were estimated for the manufacturing, utilities, and communications sectors. The results are presented in Tables 4-14 to 4-16. For manufacturing, the rate on AAA industrial bonds was used as a measure of  $r_b$  while  $r_e$  and  $r'_e$  were calculated using the procedures outlined above and employing earnings-price ratios and earnings per share data for Standard and Poor's industrial stocks. For both utilities and communications,  $r_b$  was based on data for AAA utility bonds while  $r_e$  was based on Standard and Poor's utility stocks.

The results show little variation from those for all nonfinancial corporations when  $r_e$  is measured by the current earnings-price ratio. The explanatory power is highest for the "other" financing equation for both manufacturing and utilities, but this equation ranks lower than those for

TABLE 4-14

Estimated Financing Equations, Manufacturing Corporations, 1952-67

Dependent Variable	Constant	$\overline{EF}$	$r_b$	$r_e$	$r'_e$	$R^2$	$d$
$\overline{F}$	10.788	.937* (.082)	-2.666* (1.374)	-.579 (.415)	—	.966*	1.813
$\overline{B}$	-9.751	.042 (.670)	2.285* (1.175)	.534 (.355)	—	.619*	2.120
$\overline{E}$	-1.172	.020 (.023)	0.392 (0.381)	.057 (.115)	—	.508	1.099
$\overline{F}$	5.567	.976* (.097)	-2.023* (1.066)	—	-.146 (.105)	.966*	1.374
$\overline{B}$	-4.176	.025 (.086)	1.529 (0.944)	—	.106 (.094)	.590*	1.496
$\overline{E}$	-1.230	.003 (.025)	0.451 (0.279)	—	.037 (.028)	.560*	1.189

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

TABLE 4-15

Estimated Financing Equations, Utility Corporations, 1952-67

Dependent Variable	Constant	$\overline{EF}$	$r_b$	$r_e$	$r'_e$	$R^2$	$d$
$\overline{F}$	.320	.477* (.126)	-.025 (.259)	-.195 (.164)	—	.771*	2.226
$\overline{B}$	-.787	.478* (.111)	.127 (.227)	.106 (.144)	—	.619*	2.704
$\overline{E}$	.483	.045 (.057)	-.102 (.118)	.088 (.075)	—	.440	1.641
$\overline{F}$	-1.843	.398* (.117)	.183 (.173)	—	.042 (.047)	.761*	2.398
$\overline{B}$	.280	.517* (.102)	.005 (.151)	—	-.009 (.041)	.798*	2.778
$\overline{E}$	1.564	.085 (.049)	-.186 (.073)	—	-.034 (.020)	.498*	1.716

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

bond and equity financing for communications. In all three sectors the sign on  $r_e$  in the "other" financing equation is negative rather than positive; however, in no instance is the estimated coefficient significantly different from zero. Both in manufacturing and in utilities the sign on  $r_b$  is negative rather than positive although the coefficient is significant only for the manufacturing equation. Once again this suggests that while the market rates for "other" funds and bonds move closely together, a rise in rates is accompanied by a contraction in the availability of "other" funds, forcing firms to seek alternative sources.

This is further borne out by the positive sign on  $r_b$  in the bond equation for each sector and by its significance in both manufacturing and communications. The coefficient on  $r_e$  in the bond financing equations is also positive in all cases, as it should be, although it is significant only in communications.

The equity financing equation performs rather poorly in all cases. While the equation explains slightly more than 50 percent of the variance in equity financing for both manufacturing and communications, it does less

TABLE 4-16

Estimated Financing Equations, Communications Corporations, 1952-67

Dependent Variable	Constant	$\overline{EF}$	$r_b$	$r_e$	$r'_e$	$R^2$	$d$
$\overline{F}$	-.374	.116 (.141)	.107 (.119)	-.020 (.093)	—	.298	2.606
$\overline{B}$	-.328	.319* (.145)	.447* (.122)	.303* (.096)	—	.691*	2.106
$\overline{E}$	3.654	.565* (.207)	-.554* (.174)	-.283* (.136)	—	.533*	2.889
$\overline{F}$	-.645	.085 (.160)	.121 (.089)	—	.014 (.033)	.305	2.574
$\overline{B}$	-.533	.229 (.221)	.183 (.122)	—	.028 (.045)	.452*	1.809
$\overline{E}$	1.178	.686* (.268)	-.304* (.149)	—	-.042 (.055)	.395	2.261

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

well for utilities. While all coefficients are significant in the equity financing equation for communications, none is individually significant in the equations for manufacturing and utilities. Furthermore, the sign on  $r_b$  is negative rather than positive in both manufacturing and communications, while the sign on  $r_e$  is positive rather than negative in both manufacturing and utilities.

As was the case for nonfinancial corporations as a group, using the more sophisticated measure of the cost of equity capital has little qualitative impact on the results, although there are often substantial changes in the magnitudes of the coefficient estimates. In general, the equations employing  $r_e$  have slightly different  $R^2$ 's, and the standard errors of the coefficients on  $r_b$  and  $r'_e$  are smaller, while the standard errors of the coefficients of  $\overline{EF}$  are slightly larger. These changes are probably due to the fact that  $r'_e$  is less strongly correlated with  $r_b$  and more highly correlated with  $\overline{EF}$  than is the simpler measure of the cost of equity capital,  $r_e$ . In any event the changes have no material effects on the observations made above.

Nevertheless, taken together, these somewhat disappointing results seem to indicate that for nonfinancial corporations as a whole, and for the

subsectors we have examined, equity financing is a source of last resort except for communications firms. Put another way, for almost all corporations equity capital is viewed as a markedly inferior substitute for funds from other sources. As a result changes in relative costs of equity, as measured by the approximate required rate of return to holders of equity, have very little impact on most firms' financing decisions. In addition most firms seem to prefer to raise funds by means other than the issuance of securities. They resort to securities not in response to changes in the relative costs of funds as measured by market interest rates but in response to contractions in the availability of other types of funds, a condition which is imperfectly reflected by changes in interest rates.

#### 4. EQUITY FINANCING BY LARGE MANUFACTURING CORPORATIONS

As a further test of the financing decision model presented in the previous section, a study was undertaken of the determinants of the volume of equity financing by large manufacturing corporations which had issued common stock during some year of the period under study. Fifty industrial corporations had at least one equity issue in excess of \$15 million in the period 1953-67. A sample of 50 corporations was randomly drawn from *Fortune's* 500 for 1968, making a total sample of 100 corporations. An attempt was then made to determine all equity issues of these 100 corporations and their predecessors during the years 1953-67.

Only 53 of the 100 corporations were found to have made equity issues during the period. These corporations had 63 issues of common stocks totaling \$2,848.2 million and 29 issues of preferred stocks totaling \$524.7 million. Since concentration on issues of common stock was decided upon, and since data on certain characteristics of the issuing firms were lacking in some cases, a number of issues had to be deleted from the sample. In the end, our sample was composed of 35 firms that had made a total of 43 issues of common stocks during the period.

In line with the model presented in the previous section, it was postulated that the volume of equity financing by the  $i$ th firm in year  $t$  could be expressed by

$$E_{it} = \gamma_0 + \gamma_1 EF_{it} + \gamma_2 r_{b, it} + \gamma_3 d_{it} + \gamma_4 r_{e, it} + u_{it}$$

where  $E_{it}$  = dollar value of common stock issued

$EF_{it}$  = total external financing

$r_{b, it}$  = the yield on corporate bonds

- $d_{it}$  = the firm's debt-equity ratio  
 $r_{e_{it}}$  = the required rate of return on equity  
 $u_{it}$  = a random error term

The debt-equity ratio was added to the equation, since a firm's capital structure is widely believed to influence cost of funds. More specifically, traditional views of corporate financing would indicate that the cost of additional debt financing is higher, the higher the existing debt-equity ratio. On the other hand, those views suggest that at least up to some point, firms with higher debt-equity ratios should be able to raise additional equity on more favorable terms. For both these reasons one would expect the debt-equity ratio to be an important determinant of equity financing and the coefficient on the ratio to be positive.

Unfortunately, estimation of such an equation from the available sample raises several problems. Since no firm in the sample had more than two issues during the period, time-series estimation of the equity financing equation for individual firms was not possible. Likewise, in no single year were there enough firms issuing common stocks to constitute a sample of acceptable size for cross-sectional estimation. As a result it was necessary to pool observations, treating each issue and the characteristics of the issuing corporation as an observation.

Pooling of the observations in this way raises several problems. First, the parameters of the financing equation may not have remained constant over the period. To allow for this possibility the equation was estimated in three ways: (1) pooling all 43 observations; (2) using only the observations on issues between 1953 and 1959; and (3) using only the observations on issues between 1960 and 1967.

Second, if there is little variability among firms in the sample with respect to debt-equity ratios, and if at the same time the sample firms tend on average to have quite different debt-equity ratios from firms which did not issue equities, then we might find this variable to have no influence on equity financing behavior even though it was an important determinant of equity financing. This, however, does not seem to be a problem. The average debt-equity ratio for firms in the sample is 0.45 with a standard deviation of 0.44. Data from the FTC-SEC Quarterly Survey of Manufacturing Corporations indicates that over the period studied the average debt-equity ratio for firms with assets in excess of \$25 million has varied between 0.4 and 0.6.

Third, the importance of the required rate of return on equity might be similarly disguised if there were little variability in required rates of

return among firms in the sample and if these firms at the same time had required rates of return quite different from firms which did not issue equity securities. Again this does not seem to be the case. The average earnings-price ratio for firms in the sample was 5.64 percent with a standard deviation of 2.89. Over the period studied, the average earnings-price ratio for Standard and Poor's industrials was 6.8. Thus, sample firms did apparently tend to have below average earnings-price ratios but there was considerable variation among them in this respect.

Fourth, the data could mask the importance of interest rates as a determinant of equity financing if most issues occurred in years with high interest rates. Such bunching of observations would tend to reduce the amount of a variation in the interest rate variable, particularly since that variable has the same value for all firms in any one year. This does appear to be a real problem since over half of the issues in the sample occurred in the four years 1956 (5 issues), 1957 (10 issues), 1966 (5 issues), and 1967 (6 issues).

These considerations indicate that the results to be presented should be viewed as highly tentative and, at best, suggestive. Much larger samples need to be analyzed with more sophisticated models and techniques in order to gain a solid understanding of the determinants of equity financing.

Data on the value of common issues were obtained from records maintained by the Federal Reserve Board. Total external financing and debt-equity ratios were computed from balance sheet and income statements of issuing corporations, published in *Moody's Industrials Manual*. The corporate bond yield variable was taken as the yield on AAA corporate industrial bonds. The same two measures of the required return on equity capital used in the previous section were also employed here. These measures were calculated from data in *Moody's Industrials* and *Moody's Handbook of Common Stocks*. Common issues and external financing were measured in millions of dollars. Bond yields and required return on equity were expressed as percentages, but the debt-equity ratio was expressed simply as a ratio.

The initial regressions run had uniformly very low  $R^2$ 's and seemed to indicate the presence of heteroscedasticity. To counteract this problem all variables were deflated by the total assets of the issuing corporation in the year prior to the issue ( $A_{t-1}$ ), and  $1/A_{t-1}$  was entered as an independent variable. The results of this estimation when the required rate of return on equity is measured by the current earnings-price ratio are shown in Table 4-17. Table 4-18 shows the results when the required return on

TABLE 4-17  
 Deflated Equity-Financing Equations Based on Current Earnings-Price Ratio

	Number of Issues	Dependent Variable	Constant	$\frac{EF_t}{A_{t-1}}$	$\frac{r_b}{A_{t-1}}$	$\frac{d}{A_{t-1}}$	$\frac{r_e}{A_{t-1}}$	$\frac{1}{A_{t-1}}$	$R^2$
1953-67	43	$\frac{E}{A_{t-1}}$	.089	.068* (.039)	-0.732 (3.088)	-7.196 (5.865)	-1.409* (0.530)	16.461 (13.430)	.750*
1953-59	23	$\frac{E}{A_{t-1}}$	.069	.382* (.108)	-2.519 (6.624)	-12.845* (7.164)	-1.767 (1.090)	27.019 (28.837)	.632*
1960-67	20	$\frac{E}{A_{t-1}}$	.073	.038 (.042)	3.118 (6.179)	4.997 (10.058)	-2.142* (1.090)	0.147 (25.250)	.860*

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

TABLE 4-18  
 Deflated Equity-Financing Equations Based on Current Earnings-Price Ratio plus Trend Rate of Growth of Earnings per Share

	Number of Issues	Dependent Variable	Constant	$\frac{EF}{A_{t-1}}$	$\frac{r_b}{A_{t-1}}$	$\frac{d}{A_{t-1}}$	$\frac{r'_e}{A_{t-1}}$	$\frac{1}{A_{t-1}}$	$R^2$
1953-67	43	$\frac{E}{A_{t-1}}$	.086	.041 (.038)	4.257 (2.619)	-17.868* (5.809)	.039 (.058)	-6.849 (11.055)	.704*
1953-59	23	$\frac{E}{A_{t-1}}$	.064	.360* (.118)	4.743 (5.264)	-13.900* (7.788)	-.068 (.124)	-7.747 (19.576)	.582*
1960-67	20	$\frac{E}{A_{t-1}}$	.066	.044 (.047)	-2.058 (6.338)	-0.166 (12.738)	.001 (.074)	19.235 (26.546)	.818*

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.



equity is measured by the current earnings-price ratio plus the trend rate of growth of earnings per share over the previous five years.

These regressions were estimated with a constant term; however, in strict accordance with the model specified above, the constant term in the regressions should be zero. For that reason, the regressions were rerun with the constant term forced to zero. The resulting equations had very substantially lower and statistically less significant  $R^2$ 's than the equations reported in Tables 4-17 and 4-18, indicating that the size of the firms as measured by total assets exerted a significant independent effect on the amount of equity financing.<sup>2</sup> Consequently, additional regressions using undeflated values of the variables and including  $A_{t-1}$  as an independent variable were run. These results are reported for each of the measures of the required return on equity in Tables 4-19 and 4-20. On the whole the undeflated form of the equation which included  $A_{t-1}$  as an independent variable seems to provide the more reliable estimates, not only because the  $R^2$ 's are higher for that formulation but also because deflation of the variables by  $A_{t-1}$  introduced rather high (.8 or higher) levels of inter-correlation among the independent variables.

But regardless of the formulation of the equation there is little evidence to suggest that equity financing decisions are sensitive to the bond yield, the measures of the required return on equity capital, or the debt-equity ratio. The coefficient on  $r_b$  is not significant in any equation and has the wrong sign in seven of the twelve regressions. While the coefficient of the debt-equity ratio is significant in three equations, it has the wrong sign in each of these cases and in six additional ones. The current earnings-price ratio has the right sign in all six regressions in which it is entered but is significant in only half of them and is never significant for the 1953-59 subsample. When the required return on equity is measured by the current earnings-price plus the trend rate of growth of earnings per share, its coefficient is never significant and is negative only in the regressions for the 1953-59 subsample. These observations suggest that the current earnings-price ratio is a more satisfactory approximation to the required rate of return on equity in explaining equity financing behavior.

Nevertheless, total external financing and the size of the issuing corporation appear to be the overriding determinants of equity financing. The total external financing as an important determinant of the magnitude of equity financing is, of course, not surprising. The positive and significant

<sup>2</sup> It should be noted that external financing and size, as measured by the previous period's total assets, are not highly correlated. The simple correlations are .140 for the sample as a whole, .025 for the 1953-59 subsample; and .497 for the 1960-67 subsample.

TABLE 4-19  
 Undeclared Equity-Financing Equations Based on Current Earnings-Price Ratio

	Number of Issues	Dependent Variable	Constant	EF	$r_b$	$d$	$r'_e$	$A_{t-1}$	$R^2$
1953-67	43	E	74.149	.269* (.060)	-10.639 (9.918)	-17.157 (13.899)	-2.955 (2.372)	.047* (.004)	.833*
1963-69	23	E	117.224	.788* (.166)	-25.245 (23.898)	-22.045 (22.621)	-2.312 (3.272)	.042* (.004)	.897*
1960-67	20	E	-17.778	.120* (.037)	8.878 (0.162)	-11.500 (8.864)	-5.204* (2.119)	.078* (.006)	.959*

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

TABLE 4-20  
 Undeclared Equity-Financing Equations Based on Current Earnings-Price Ratio plus Trend Rate of Growth of Earnings per Share

	Number of Issues	Dependent Variable	Constant	EF	$\tau_b$	$d$	$r'_e$	$A_{t-1}$	$R^2$
1953-67	43	E	386.398	.267* (.061)	-5.258 (9.160)	-17.458 (14.157)	-.147 (.266)	.046* (.004)	.826*
1953-59	23	E	77.133	.799* (.169)	-18.190 (21.594)	-20.717 (22.861)	-.124 (.452)	.041* (.004)	.890*
1960-67	20	E	-16.923	.107* (.045)	4.613 (10.762)	-13.959 (10.500)	.026 (.200)	.078* (.007)	.939*

NOTE: Figures in parentheses are standard errors.

\* Significant at the 5 percent level or better on a one-tailed test.

coefficient on the size of the corporation seems to indicate that larger firms can raise equity capital on more favorable terms, other things being equal.

The two formulations which employ the current earnings-price ratio indicate a fall in the coefficients of both total external financing and the required return on equity in the 1960's. On the other hand, both formulations indicate an increase in the coefficients of the bond yield, the debt-equity ratio, and the size of firm. It is interesting to note that all of these shifts are in accord with what one would expect if funds from sources other than the securities market were more easily available during the 1960's than they were in the 1950's. In terms of the model presented in the previous section, such an increase in availability would be reflected in decreases in the values of the parameters of the total cost curve for other financing. These decreases would in themselves give rise to the observed pattern of changes in the coefficients of the equity financing equations. This suggests that an explanation for the reduced reliance on both equity and bond financing in the sixties as opposed to the fifties may lie in an increase in the availability of funds from sources other than the securities markets.

These findings require further qualification, however, because the dependent variable, equity financing, is included in total external financing. The two are thus quite highly correlated and it is this correlation which accounts for a substantial portion of the explanatory power of the equations presented above.

To avoid this problem the ratio of equity financing to total external financing was regressed on bond rates, current earnings-price ratios, and debt-equity ratios. To allow for shifts in this equity financing function over time, dummy variables were introduced to permit a different intercept for each year. In this formulation none of the coefficients, including those for the dummy variables, was significant. In addition the signs on both the earnings-price ratio and the debt-equity ratio were contrary to expectations.

These results reinforce the finding that the volume of equity financing is not sensitive to the cost of equity capital relative to the cost of funds from other sources—at least in the ranges encountered over the period studied here. Additional tests indicate that the decision to engage in equity financing, irrespective of the amounts so raised, is also insensitive to indicators of the relative cost of capital.

It might be expected that even though the volume of equity financing was not closely related to earnings-price ratios, firms which engaged in some equity financing would tend to have below average earnings-price

ratios. However, only 54 percent of the issues in our sample took place at times when the issuing corporations had earnings-price ratios below the average for all manufacturing corporations. Statistically, this percentage is not significantly different from what one would expect if issuing corporations were equally likely to have above, or below, average earnings-price ratios.

Similarly, only 49 percent of the issues were made by corporations which had debt-equity ratios in excess of the average for all manufacturing corporations at the time of issue. Comparison of the debt-equity ratios of issuers with the average debt-equity ratio for corporations in the same industry group (SIC 2-digit) showed that issuers had above average debt-equity ratios in the case of 59 percent of the issues. Once again this percentage is not statistically different from what one would expect if issuers were equally likely to have debt-equity ratios above or below the average for firms in the same industry.

#### 5. DETERMINANTS OF RETIREMENTS

To the extent that retirements of equity securities are not associated with merger activity or liquidations or the retirement of preferred stocks, they reflect a decision by management that cash distributions to stockholders are a more attractive use of funds than the internal investment opportunities available to the firm. Various other reasons have been offered for retirements, such as the desire to increase the debt-equity ratio. However, if a firm has sufficient profitable investment opportunities, the preferred method of increasing its debt-equity ratio would be to engage in debt financing. Consequently, retirement of equity should only occur when internal fund flows exceed the amount that can profitably be absorbed by the investment opportunities available to the firm. Of course, dividend payments offer an alternative means of distributing excess cash to the stockholders. But if the excess cash were distributed in the form of dividends, stockholders would become liable for tax on the full amount of the distribution and at ordinary income tax rates. On the other hand, when cash distributions are accomplished through stock repurchases, shareholders need only pay tax, at capital gains rates, on the excess of the repurchase price over the initial purchase price of the shares retired.

For corporations as a group, internal fund flows have not in any year exceeded the amounts by which the firms have been willing to add to their physical and financial assets, and they have absorbed funds from other sectors in every year. Nor, as we have seen, is there any observable tendency for the ratio of internal funds to other capital expenditures or total

asset expansion to increase over the period for corporations as a group.

These observations do not, however, rule out the possibility that individual corporations have at times during the period experienced internal cash flows in excess of the amounts they could profitably re-invest in the business. Furthermore, one might expect to observe a high positive correlation between internal fund flows and stock repurchases. One might also expect firms to be more prone to distribute excess cash through repurchases of their stocks when stock prices are low. Consequently, a negative correlation between stock prices and repurchases is to be expected.

A regression of cash retirements ( $T$ ) on Standard and Poor's index of stock prices ( $SP$ ) and on the level of internal funds over the period gave the following result:

$$T_t = -.771 + .018 SP_t + .025 IF_t$$

$$(.012) \quad (.020)$$

$$R^2 = .910$$

However, these results are unreliable because all the variables exhibit strong time trends over the period. Thus the correlation coefficient of stock prices on time is .986; that between internal funds and time is .965; and that between repurchases and time is .917. As a result stock prices and internal funds are highly correlated ( $r = .970$ ), and the above equation provides only a slightly better prediction of repurchases than a simple time trend.

As an alternative, the deviations of  $T_t$  from its trend value were regressed on the deviations of stock prices and internal funds from their trend values with the following results:

$$\overline{T}_t = 0.0 + .043 \overline{SP}_t + .032 \overline{IF}_t$$

$$(.017) \quad (.018)$$

$$R^2 = .542$$

While both stock prices and internal funds are significant in this equation, repurchases are apparently more closely related to stock prices than to internal funds, and the relationship is positive rather than negative. This strange result is probably a statistical quirk arising from the use of highly aggregated data. Consequently, while it seems reasonable to attribute the rising trend in repurchases to rising liquidity in some corporations, no satisfactory test of that explanation can be performed with the data on hand.

The other quantitatively important category of retirements includes cases where stock has been retired with debt securities issued in exchange. These types of retirements have also shown an upward trend over the period, and as noted earlier, the most obvious explanation for this lies in the rising trend of merger activity over the period. A regression of the value of exchanges ( $EX$ ) on the estimated market value of acquired firms ( $M$ ) gave the following results:<sup>3</sup>

$$EX_t = -43.728 + .053 M_t$$

$$(.020)$$

$$R^2 = .395$$

Thus, while the expected relationship exists, merger activity alone provides a relatively weak explanation of the value of exchanges. This is not surprising, since it is unlikely that the percentage of the total value of mergers consummated through exchanges has been constant from year to year throughout the period.

## 6. SUMMARY

While the value of outstanding equity securities has grown substantially over the period studied, a minor proportion of this growth is accounted for by net new issues and the proportion has been declining. This is a reflection of two phenomena which have characterized corporate financing in all nonfinancial sectors; namely, a trend away from equity securities relative to other types of financing and an increasing trend in the retirement of equity securities as a proportion of total uses of funds.

The first of these trends is particularly surprising in the face of a general trend toward lower earnings-price ratios on common stocks relative to bond yields. Indeed, statistical studies of equity financing behavior based on time-series data for the aggregate of all nonfinancial corporations, and for the manufacturing, utilities, and communications subsectors, indicate that equity financing decisions are quite insensitive to changes in the costs of equity capital, as measured by the required rate of return on equity and the cost of debt capital as measured by market interest rates. This same insensitivity of equity financing behavior to market measures of the costs of funds from various sources is also found in studying the determinants of the volume of equity financing by individual manufacturing corporations.

<sup>3</sup> The market value of mergers was estimated by applying the average of market to book value for Standard and Poor's stocks to estimates of the assets value of large mining and manufacturing firms acquired, as reported by the Federal Trade Commission.

Both of these findings suggest that equity financing is a "source of last resort." Nonfinancial corporations seem to turn to equity financing only when all other sources of capital have been exhausted. This further suggests that the decline in the share of funds raised through issues of equity securities in the 1960's relative to the 1950's may be due to an increase in the availability of external funds from other sources, particularly bank credit.

The rising trend in the share of funds used to retire equity seems most reasonably explained by the growth of internally generated funds relative to internal investment opportunities for some corporations. Tests of this hypothesis are, however, hampered by lack of appropriate data. At the aggregate level, cash retirements are not highly correlated with internal funds flow once the strong time trends are removed from both variables. Nor is there any evidence that retirements behavior is strongly influenced by the behavior of stock prices. The rising trend of noncash retirements, that is, exchanges of debt for equity, might plausibly be explained by trends in merger activity. However, since the share of mergers consummated through exchanges of debt for equity is likely to vary widely from year to year, there is not a strong correlation between the volume of exchanges and the estimated market value of mergers.