4

The Flow of Money Capital

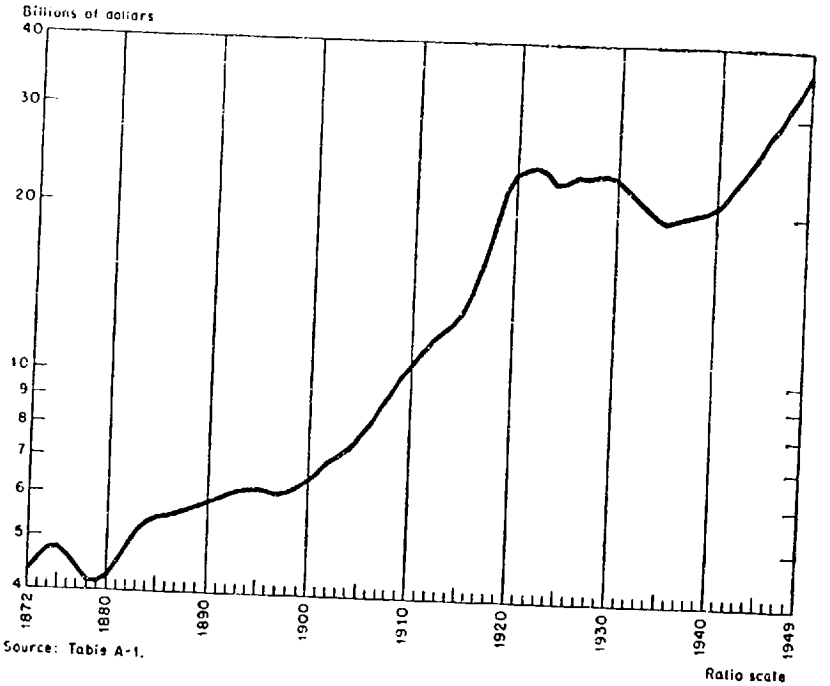
Analysis up to this point has been confined to flows of real capital — to aggregates expressed in terms of constant dollars and considered representative, insofar as techniques of deflation permit, of physical quantities. For some purposes actual money flows, unadjusted for price changes, are of prime importance. This is true in particular of all the purely financial aspects of railroad capital formation. The impact of railroad investment upon capital markets, for example, must be weighed in terms of flows of money.

Since price fluctuations have been sharp, and the general trend briskly upward since the turn of the century, the initial impression provided by the statistical portrait of railroad investment, expressed in current dollars, is radically different from that given in preceding pages. This difference, moreover, is a real one. In money terms the size of the railroads and the gross flow of its capital expenditures have followed an upward trend that has persisted through the period between the two world wars and beyond. From the standpoint of financial relations, this statement is of significance though, obviously, in the absence of the analysis of the preceding pages, it could be gravely misleading.

Throughout the period since 1870 the cost of road and equipment and the general level of prices fluctuated in rough consonance, but with one important and fairly consistent difference. The cost of road and equipment grew higher relative to general prices. Thus, from the 1870's to the mid-1890's the wholesale price index of the U. S. Bureau of Labor Statistics declined by about 40 per cent; the average price of the goods and services employed for railroad construction and equipment dropped by only 25 per cent. Correspondingly, the rise from the mid-1890's to the 1920's amounted to 100 per cent for wholesale prices

CHART 8

Value of Road and Equipment, U. S. Railroads
Five-Year Moving Averages, 1872-1949



but to 150 per cent for the cost of road and equipment. Again, the subsequent decline to the 1930's was about 30 per cent for wholesale prices but not more than 20 per cent for road and equipment. From the 1930's to the post World War II years, however, the rise was about 100 per cent in both cases. Over the entire eighty-year span the cost of road and equipment more than tripled, while wholesale prices barely doubled.

The record of the money value of the fixed capital of the railroads reflects this generally brisk upward trend in the cost of road and equipment, together with changes in the stock of real capital. To be sure, during the first tweny-five years covered by this study, prices tended downward moderately and partly counterbalanced the fast pace of real capital accumulation in this period; the money value of fixed capital advanced from $4 billion in 1870 to about $6 billion in 1897, as shown in Chart 8, while the quantity of real capital in the same

period roughly doubled. But in immediately subsequent years the combination of a growth of about 30 per cent in real capital, a steady rise in prices during the early years of the twentieth century, and the inflation during and immediately following World War I, catapulted the current dollar value of the railroads' stock of fixed capital from $6 billion in 1897 to $24 billion in 1922 -- a quadrupling in twenty-five years. From 1922 through 1935 a small net increase in real capital was overshadowed by tobogganing prices, but the inflation of World War II and the succeeding years resulted in another sharp boost in values. At the halfway mark of the twentieth century the total value of road and equipment in current dollars was at a new high of $36 billion.[12]

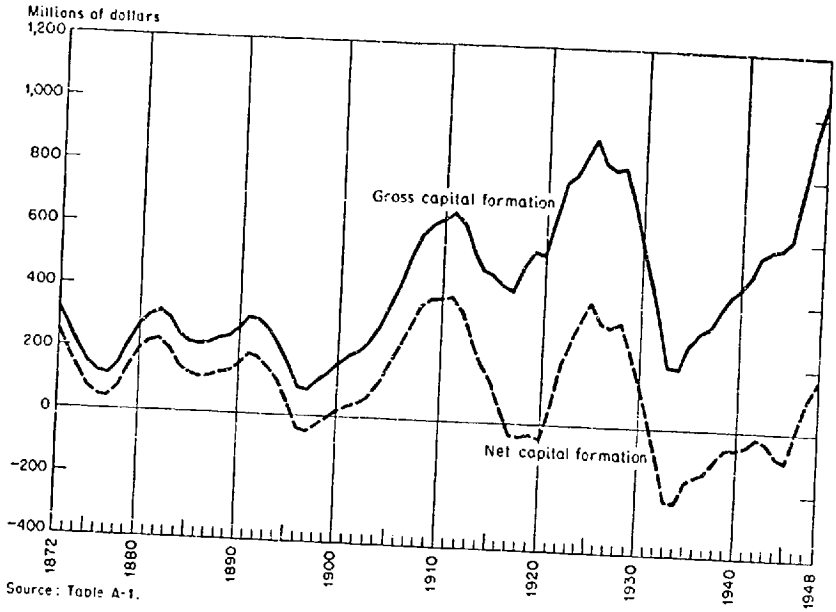
The close connection between the real stock of capital and real net capital formation, noted in Section 2 above, does not exist when these quantities are expressed in current dollars. For a price change will of course alter the money value of road and equipment, either upward or downward, even in the absence of net capital expenditures. The trend of the latter series cannot be derived from the former, as would be the case if the influence of prices were eliminated. Net capital expenditures in current dollars are depicted in Chart 9, and it will be noted that the picture given here is also quite different from that observed in the real capital series, though not so dramatically diverse as was the case for the stock of capital.

Of particular interest is the fact that the volume of net capital expenditures reached in the mid-1920's was about the same as that at the peak fifteen years earlier and considerably greater than all previous peaks. Again, the annual average of $165 million in net capital expenditures during the five years centered in 1948 is not far under the volumes reached in the greatest years of railroad growth in 1882 and 1891.

[12] It may be of some interest to note the behavior of the value of railroad assets in relationship to the general level of prices. This may be done roughly by deflating the current value of road and equipment by the Bureau of Labor Statistics wholesale price index, converted to a 1929 =100 base. The results would show the "purchasing power" of railroad assets in terms of commodities in general, at wholesale. In these terms the value of road and equipment rose from about $5 billion in 1872 to $12 billion in 1897 and to $24 billion in the early 1930's, then declined to $21 billion at the close of the 1940's. This pattern is a "dampened" modification of that followed by the real stock of capital series discussed in Section 2.

CHART 9

Gross and Net Capital Formation, U. S. Railroads
Five-Year Moving Averages, 1872-1948



Source: Table A-1.

But in the gross capital expenditures series, also shown in Chart 9, the pronounced downward trend noted earlier in real capital formation is completely reversed. The peaks reached in 1911 and in 1925 are successively greater than any that had gone before, and that reached at the end of the 1940's tops them all by a substantial margin. Annual gross capital expenditures in the five years centered in 1948 amounted to $1,050 million, compared with annual averages of not much more than $300 million when the expansion of railroad facilities was at its height in the early years of the 1880's and of the 1890's.

The sharply and progressively widening gap between net and gross capital expenditures, observed in the chart, is of particular importance. For this gap represents capital consumption measured in terms of current prices — i.e. actual replacement cost. Its tremendous growth from $70 million per year in the early 1870's to $150 million in the early 1900's, to about $500 million toward the close of the 1920's, and to about $900 million at the close of the 1940's mirrors the combined

effects of the upward drift until 1931 of the real capital of the railroads and, particularly in recent years, the sharp rise in prices. Ever since the start of World War I, capital requirements for replacement have exceeded those for expansion and improvement and ultimately dwarfed them. Even in the post-World War II years of greatest outlays — the five years centered in 1948 — capital consumption averaged $887 million per year against only $166 million for net capital expenditures. It is thus clear that so long as the railroads maintain their present size, they will exercise a significant influence in the magnitude of the nation's aggregate gross flow of funds into investment goods. On the other hand, in the absence of additional net growth in total railroad facilities their impact on capital markets would be limited to that stemming from the possible inability of some roads to finance all replacements internally, the possible shifts in relative importance of, say, western and eastern roads, and the repercussions of refinancing operations.

Sources and Uses of Funds

Although railroad capital formation is of less importance in the total economy now than it was in earlier periods, there is little question that the railroads' demand for capital weighed heavily in the nation's aggregate. Tables 10 and 11 indicate how these huge capital requirements were financed and the uses to which they were put. In general, the data in both tables summarize the events of periods ranging from five and one-half to fourteen years. Accordingly, trends which progress only for shorter periods are obscured occasionally. Thus if railroads issued bonds in the first few years of one of these spans and in the remaining years redeemed bonds, only the net balance of these opposing movements would appear in the tables. Similarly, the analysis summarizes the activities of railroads in the aggregate; though some roads may have sold securities while others purchased them in a given period, only the net results of the diverse activities are shown.

More concretely, several of the detailed series required for the customary "sources and uses" analysis are lacking in the period prior to World War I, and hence the data of Table 10 were derived simply by calculating the difference in corresponding balance sheet items during the indicated periods. One important source of error springing from

TABLE 10

Sources and Uses of Funds: All Railroads, 1880-1916
(millions of dollars)

CHANGES IN BALANCE SHEET ITEMS IN —	JULY 1, 1880 TO JUNE 30, 1890		JULY 1, 1893 TO JUNE 30, 1907		JULY 1, 1907 TO DECEMBER 31, 1916	
	Dollars	*Per Cent*	*Dollars*	*Per Cent*	*Dollars*	*Per Cent*
USES						
1 Investment in road and equipment (book value)	3,510.3	85.9	4,092.8	74.0	5,287.9	108.8
2 Current assets	169.0	4.1	941.1	17.0	127.3	2.6
a) Inventories	24.3	.6	150.9	2.7	112.6	2.3
b) Cash and other current assets	144.7	3.5	790.2	14.3	14.7	.3
3 Long-term investments other than securities	405.3	9.9	[a]	[a]	223.0	4.6
4 Other assets	....	....	498.7	9.0	--780.4	—16.1
5 Total uses	4,084.6	100.0	5,532.3	100.0	4,858.0	100.0
SOURCES						
6 Surplus	97.5	2.4	526.6	9.5	1,442.7	29.7
7 Depreciation reserves	0	0	0	0	639.8	13.2
8 Current liabilities	299.4	7.3	660.7	11.9	111.4	2.3
9 Securities outstanding	3,687.7	90.3	4,079.7	73.7	3,069.2	63.2
a) Capital stock	1,754.5	43.0	2,627.9	47.5	1,700.4	35.0
b) Bonds	2,240.6	54.9	3,532.3	63.8	2,921.9	60.1
c) (Less) Securities held	307.4	—7.5	2,080.5	—37.6	1,553.1	—32.0
10 Other	....	....	265.4	4.8	—405.0	—8.3
11 Total sources	4,084.6	100.0	5,532.3	100.0	4,858.0	100.0

Details may not add to totals because of rounding.
[a] Not shown separately.

this procedure may be found in revisions in property valuations -- particularly writeups — which were especially pronounced prior to 1907. After that date they were limited, though not eliminated, by both underlying economic conditions and ICC regulations.

Distortions arising from writeups may be expected to appear primarily on the uses side in "investment in road and equipment" and on the sources side in "securities outstanding" and "surplus." Fortunately, with the aid of data previously derived, the magnitude of this error may be roughly estimated. Since retirements were extremely small in the pre-World War I period, the change in the substantially undepreciated road and equipment account may be interpreted as an approximation of gross capital expenditures. The estimates of gross capital expenditures (including land) derived in our study of capital formation amount to $2,750 million from July 1880 to June 1890 and $3,069 from July 1893 to June 1907, respectively 22 per cent and 25 per cent less than the corresponding items in Table 10. These discrepancies, broadly, may be taken as estimates of the net writeups in these periods. From July 1907 to December 1916 our figure for gross capital expenditures is $5,482 million, less than 4 per cent in excess of the corresponding item of Table 10. This small discrepancy reflects the declining importance of revisions in the valuations of real property after 1907, the growing magnitude of retirements, and, of course, statistical errors in each of the series compared.

The effect of changes in valuation, both upward and downward, have in the main been eliminated from the data in Table 11, for in this case estimated series on gross capital expenditures, retained profits, and net new issues of securities have been incorporated directly. The remaining errors relate principally to noncash transactions such as claims and counterclaims between the federal government and the railroads following World War I; though an effort was made to exclude these, it was possible to do so only imperfectly. Since, for the most part, sources and uses for the period 1914-1949 were independently estimated, the discrepancies given in the last row of Table 11 casts some light on the magnitude of remaining errors. These discrepancies in the four subperiods of the table amount to 12, 25, 1, and 6 per cent respectively.

It is thus apparent that the data in both tables are to he employed

TABLE 11

Sources and Uses of Funds: Class I Railroads and Their Lessors, 1914-1949

	USES	JULY 1, 1914-DEC. 31, 1920[a] $ (millions)	%	JAN. 1, 1921-DEC. 31, 1930 $ (millions)	%	JAN. 1, 1931-DEC. 31, 1940 $ (millions)	%	JAN. 1, 1941-DEC. 31, 1949 $ (millions)	%
1	Total capital expenditures	$2,582.5	78.6	$7,879.0	120.3	$2,917.2	121.6	$6,908.1	80.4
	a) Road and Equipment	2,444.0	74.4	7,929.0	121.0	2,805.0	117.0	6,836.0	79.6
	b) Miscellaneous physical property	138.5	4.2	−50.0	−.8	112.2	4.7	72.1	.8
2	Current assets	266.1	8.1	−996.4	−15.2	−88.2	−3.7	1,614.8	18.8
	a) Inventories	485.5	14.8	−324.9	−5.0	−94.9	−4.0	389.3	4.5
	b) Receivables	191.7	5.8	−492.1	−7.5	−62.6	−2.6	165.7	1.9
	c) Cash and deposits	−25.2	−.8	152.4	2.3	100.9	4.2	863.0	10.1
	d) Other current assets	−385.9	−11.7	−331.8	−5.1	−31.6	−1.3	196.8	2.3
3	Long-term securities, other than those of affiliated companies	−438.2	−13.3	177.3	2.7	−292.6	−12.2	132.6	1.5
4	Other assets	875.0	26.6	−508.2	−7.8	−138.1	−5.8	−68.5	−.8
5	Total uses	3,285.4	100.0	6,551.7	100.0	2,398.3	100.0	8,587.0	100.0

	SOURCES								
6	Retained profits	1,289.7	34.9	2,513.0	50.8	336.7	13.9	3,801.9	47.3
7	Depreciation charges	657.3	17.8	2,178.0	44.0	2,017.7	83.5	4,367.0	54.3
8	Current liabilities	793.8	21.5	−635.6	−12.9	−490.5	−20.3	738.9	9.2
	a) Nongovernment	[b]	....	−4.0	−.1	−159.4	−6.6	417.5	5.2
	b) Tax liability	[b]	....	[b]	....	−4.3	−.2	331.1	4.1
	c) Other current liabilities	[b]	....	−631.6	−12.8	−326.8	−13.5	−9.7	−.1
9	Net new issues	121.2	3.3	1,277.6	25.8	346.0	14.3	−531.6	−6.6
	a) Common	−75.5	−2.0	586.5	11.9	136.7	5.7	−467.0	−5.8
	b) Preferred	−37.0	−1.0	142.7	2.9	150.3	6.2	−107.9	−1.3
	c) Bonds	1,347.9	36.5	1,832.3	37.1	−547.4	−22.6	−913.5	−11.4
	d) (Less) Investments in affiliated companies	1,114.2	−30.2	1,283.9	−26.0	−606.4	25.1	−956.8	11.9
10	Other	830.7	22.5	−387.9	−7.8	207.6	8.6	−340.3	−4.2
11	Total sources	3,692.7	100.0	4,945.1	100.0	2,417.5	100.0	8,035.9	100.0
12	Discrepancy	−407.3	....	1,606.6	....	−19.2	....	551.1	....

Details may not add to totals because of rounding.

[a] The period July 1, 1914 – December 31, 1920 covers Class I roads only; lessors are excluded.

[b] Not shown separately.

primarily for the detection of major trends and for the observation of the broader proportionate relations among the components. Fine differences must clearly be ignored. In connection with the absolute levels of the figures it should be noted that the data in Table 10 are based upon U.S. Bureau of the Census and ICC compilations, which covered from 96 to 99 per cent of the total assets of all railroads, and that the data in Table 11 refer only to Class I roads or Class I and lessors, which represented from 75 to 92 per cent of the total assets.

Throughout this study the obvious implication has been made that the bulk of the gross investment of the railroads, both during their period of maximum growth and later, was for fixed capital. Tables 10 and 11 provide the underlying data for this judgment. In the years from 1880 through 1916, inventory accumulation never accounted for more than 3 per cent of the total uses of funds, against from 74 to more than 100 per cent for expenditures on road and equipment. Only in the span from 1914 to 1920, which covers the war and postwar inflations, did inventory investment loom large, accounting for 15 per cent of all uses, though this rise was followed by liquidation during the next two decades. During the entire span from 1914 to 1949, investment in road and equipment accounted for more than 95 per cent of total uses and inventory accumulation for only 2 per cent. Expenditures for miscellaneous physical property — mines, timber lands, and other nonrailroad property — have in the main been relatively small in the total dispositions of funds; such investments reached significant proportions — 10 per cent — only in the 1880-1890 period.[13]

Among the financial dispositions of funds may be noted a fairly steady accumulation of cash and deposits that persisted even through the 1920's and 1930's, when the volume of business was either steady or declining, and reached 10 per cent of all uses with the upsurge in traffic in the 1940's.

In broadest outline, the flow of funds into their various uses remained in fairly steady proportions throughout the period 1880-1949. Expenditures for road and equipment were at all times the most important by a very substantial margin, inventory changes were usually

[13] In Table 10, where they are not shown separately, these investments comprise the bulk of the item in line 3, except for the period 1893-1907, when they are included in line 4.

among the smallest items, and so on. No such stability is to be found in the sources side of the tables. Here there were significant trends that apparently persisted throughout the time span covered and radically altered the pattern of financing.

Thus in the earliest interval, internal financing of investments was virtually absent. Depreciation charges were almost entirely lacking.[14] Retained profits — reflected in "surplus" — accounted for only 2 per cent of capital requirements. The bulk of all requirements were obtained from capital markets — about 50 per cent from the sale of bonds and 40 per cent from stocks. Short-term credit provided the remaining 7 per cent of all funds in this period. This swift absorption of money capital from external sources was, to be sure, interrupted by the depression of the mid-eighties and even more by that of the mid-nineties, which was marked by the failure of several important railroads. Numerous securities, at such times, were temporarily in default, the amount of bonded indebtedness involved reaching a peak of $700 million in 1894.[15] But such setbacks were relatively short-lived. In the aggregate the railroads sought and successfully obtained nearly all the funds required from 1880 through 1907 from long-term capital markets.

By 1907-1916 a pronounced change in this picture had already begun. Depreciation accounting, although still incomplete, had grown more popular, in large part because of a ruling on this subject by the ICC in 1907. Hence depreciation charges provided in excess of 10 per cent of all funds in this period. Retained profits also had become a highly important source of investment funds, accounting for almost 30 per cent of the total. Thus roughly two-fifths of the capital requirements were internally financed in this period — a span which, incidentally, covered some of the years of greatest investment in railroad history. The reduction in the relative importance of external financing

[14] The zero depreciation recorded in the periods 1880-1890 and 1893-1907 in Table 10 is an approximation.

[15] The figure of $700 million is the peak value of bonds upon which interest was in default in this period. Most of these bonds later regained their value and were ultimately redeemed. However, according to *Poor's Manual of Railroads in the United States*, 1900, a total of $191 million in stocks and bonds were written off as worthless in fifty-seven reorganized companies during 1884-1899. As a group, nevertheless, the fifty-seven companies had a greater value of stocks and bonds outstanding at the end of this period (after re-organization) than they did at the beginning.

was manifested primarily in the sale of stocks and only modestly in bond financing; together these sources provided less than two-thirds of the aggregate funds raised in 1907-1916 after the gross changes in securities outstanding is corrected for purchases and sales by affiliated companies and other intra-industry security transactions.

The trends already noted were intensified in succeeding years, as Table 11 shows. They reached their climax in the forties when the totality of capital requirements was internally financed. Indeed, a portion of retained profits was employed to reduce, by substantial amounts, both bonded indebtedness and equity securities outstanding. In the thirties internal financing also provided for almost all capital requirements, but such funds were obtained in substantial part from widespread defaults on bonded indebtedness. The total value of funded debt of Class I roads and their lessors that matured in that decade and remained unpaid was somewhat in excess of $1 billion; defaulted interest charges aggregated an additional $1 billion. Reorganizations led to permanent writedowns for many of these obligations; but in the following decade the sharp rise in business lifted revenue well above the level required to meet expenses, obligations, and new capital requirements as well. It may be noted that short-term credit, which in general had been employed very modestly, was also liquidated in the two decades following 1920, though some increase followed in the forties.

This broad shift in favor of internal financing is a manifestation of the trend toward increasing caution which has accounted for a similar change in financing patterns in many other industries. Internal financing bears no accounting charges and leaves actual obligation — to creditors or equity shareholders — unchanged. In the case of the railroads, however, there were also specific factors at work. Thus depreciation accounting had been used by the railroads more sparingly than by most other industries; only since 1943 have depreciation charges been made for road as well as for equipment. This shift alone accounted for a considerable portion of the rise in the relative importance of internal financing.[16] Second, in an industry in which the average life

[16] Of course there is no intention here to suggest that the adoption of depreciation accounting *necessarily* increases internal financing. There are, however, many obvious motivations for keeping dividend payments within the limits of reported net income, at least over the longer period, and depreciation charges are a deduction from reported net income.

of capital is about fifty years, the sharp price rise of the 1940's had an especially significant influence upon the funds required for replacement. Even if full depreciation charges (based on original cost) had been made throughout the period, they would have fallen far short of the amounts needed for keeping the stock of capital intact. Financing replacements from undistributed profits under these circumstances is one way of correcting for the limitations of conventional accounting methods during periods of sharp price rises. Third, since World War I the growth of the railroads had been increasingly limited, and ultimately halted, by competitive transportation. The darkened prospect — or at least greater uncertainty — of the future long-term trend of railroad traffic provided further grounds for reluctance to enlarge obligations, either to holders of bonds or equities. Finally, though more study in this area is needed to justify conclusions, it is possible that the structure of corporate and personal income taxes is a factor which has encouraged corporate industry in general to reinvest a larger proportion of its profits.

On the other hand, it should not be concluded that railroads are destined to play a minor role in capital markets of the future. Though the trend toward internal financing is hardly to be questioned, the figures for the decade of the forties may exaggerate its extent. During the war years the liquidity position of most roads improved swiftly as earnings mounted and material restrictions severely limited new investment and replacements. Liquid assets thus accumulated were employed to meet the capital requirements of the postwar years. However, in the period after 1946, *current* earnings alone were insufficient to meet all these requirements. Moreover, even though railroads in the aggregate reduced their obligations during this decade, a few individual roads expanded their stocks and bonds outstanding and, in general, refinancing operations were extensive. In all, between January 1, 1941, and December 31, 1949, railroads issued bonds, including equipment trust obligations, with face value aggregating nearly $5 billion. As Table 11 shows, of course, the value of such securities extinguished by the railroads in that period exceeded this amount.