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comment, namely, its stability before 1929. On the assumption that since 1919 the volume of gross national product had described a complete long swing, one would expect to observe its reflection in an upward movement of the ratio of gross capital formation to gross national product from 1919, or the preceding or succeeding year, to 1929. For in all cyclical oscillations, especially of long duration, the volume of gross capital formation may be expected to rise more during the phase of expansion, just as it usually declines more during the phase of contraction. Gross capital formation did decline more after 1929, but its share did not increase before 1929. One reason for this stability may be looked for in the use of three-year moving averages; but their use has a relatively small effect since it did not conceal a marked decline after 1929. A more significant explanation may be that the

long swing that culminated in 1929 may have begun before 1919. The War period, 1914-19, with its low volume of residential construction, was possibly characterized by a low ratio of gross capital formation to gross national product; although this surmise may be incorrect in view of the large net change in claims against foreign countries and extensive production of capital equipment during the War years. The trough of the ratio of gross capital formation to gross national product may have occurred before 1914, and the rise may have been from these low levels to the high plateau of 1920-29. Our study does not include years before 1919, but its results, shown in Table 12, suggest the importance of carrying the analysis back at least to the first decade of the twentieth century, if one is to understand clearly the developments since 1919.

VIII APPORTIONMENT OF NATIONAL INCOME BETWEEN NET CAPITAL FORMATION AND CONSUMERS' OUTLAY

1 NET CAPITAL FORMATION, VOLUME AND COMPOSITION

a *Characteristics of the Estimates*

THE volume of net capital formation is measured by subtracting from gross capital formation the estimated consumption of all durable capital goods utilized in the process of production. Such estimates have been prepared by Solomon Fabricant covering capital consumption: (a) that took place within the business enterprises of the nation (exclusive of that chargeable to residential buildings); (b) that was chargeable to the use of residential buildings; (c) that was chargeable to the use of durable goods by governmental agencies. Mr. Fabricant presented his preliminary results in *Bulletin 60, Measures of Capital Consumption, 1919-1933*, and we have taken advantage of the results of his subsequent work. Lack of data on the consumption of consumers' durable products except residential buildings and passenger cars made it impossible to measure net capital formation in Variant II; we had to confine our measures to net capital formation as described in Variant I (see Table 13 and Chart 8).

For the most important item in Table 13, capital formation destined for business use, there is

some lack of correspondence between the gross capital formation totals (Table 10) and the totals of depreciation, depletion and fire loss deductions which are presented as measures of capital consumption. This lack of correspondence arises largely from two factors: (1) our distinction between producers' and consumers' goods is based on the preponderant use of the commodities, whereas the measures of depreciation, depletion, etc., charged by business enterprises are based on the actual segregation of capital goods used by business enterprises; (2) depreciation may be deducted for items not appearing in gross capital formation. Thus, the estimates in Table 13 of net capital formation destined for business use may be too large because: (a) gross capital formation totals include some durable goods that are destined for use either by ultimate consumers or by non-business agencies (e.g., government); (b) these totals include commodities (e.g., tools), which, their unit cost being small, may be treated by business enterprises on an inventory basis in 'deferred charges', rather than made subject to depreciation charges; (c) depreciation may be applied to capital values that have been reduced from their original cost. On the other hand, the net capital formation totals in Table 13 may be too small because: (a) the gross capital

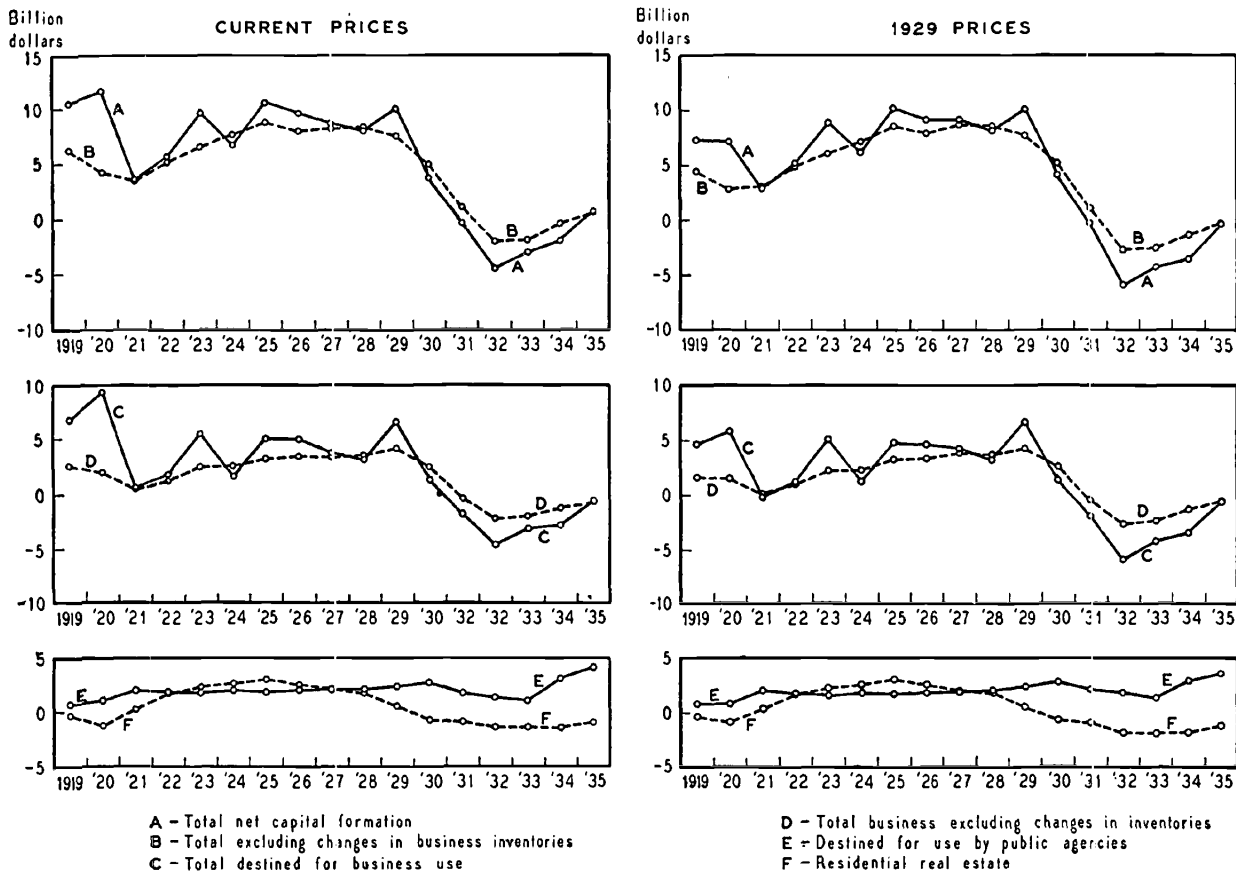
Table 13
NET CAPITAL FORMATION, 1919-1935
(millions of dollars)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Current Prices																	
I Estimated consumption of capital goods in	6,297	7,283	5,492	5,293	6,002	5,857	5,954	6,550	6,457	6,674	7,134	6,746	6,058	5,200	4,921	5,395	5,669
1 Business use	2,082	2,666	1,894	1,781	2,056	2,100	2,133	2,239	2,338	2,407	2,480	2,431	2,087	1,826	1,752	1,873	1,853
2 Residential real estate	445	521	419	406	450	465	480	514	554	575	602	606	597	548	582	648	666
3 Government use ¹																	
II Net capital formation																	
1 Business																	
a Incl. net change in business inventories	6,831	9,418	674	1,872	5,581	1,701	5,183	5,118	3,945	3,242	6,769	1,406	-1,665	-4,545	-3,063	-2,715	-574
b Excl. net change in business inventories	2,699	2,043	620	1,338	2,565	2,618	3,395	3,532	3,481	3,563	4,355	2,534	-290	-2,084	-1,934	-1,191	-593
2 Residential real estate	-350	-1,173	347	1,743	2,366	2,613	3,069	2,518	2,186	1,848	530	-626	-825	-1,382	-1,360	-1,415	-930
3 Public agencies	721	1,151	2,034	1,972	1,822	2,063	1,964	2,054	2,122	2,121	2,471	2,728	1,886	1,460	1,138	3,143	4,172
III Net change in claims against foreign countries	+3,315	+2,254	+628	+215	-78	+446	+428	+44	+606	+957	+312	+371	+326	+40	+298	-868	-1,868
IV Total net capital formation	10,517	11,650	3,683	5,802	9,691	6,823	10,644	9,734	8,859	8,168	10,082	3,879	-278	-4,427	-2,987	-1,855	800
1 Incl. net change in business inventories	6,385	4,275	3,629	5,268	6,675	7,740	8,856	8,148	8,395	8,489	7,668	5,007	1,097	-1,966	-1,858	-331	781
2 Excl. net change in business inventories																	
1929 Prices																	
I Estimated consumption of capital goods in	5,732	5,708	5,506	5,821	5,932	5,909	6,112	6,671	6,557	6,818	7,134	7,084	6,951	6,533	6,315	6,464	6,584
1 Business use	2,000	2,027	1,885	1,919	1,975	2,045	2,139	2,239	2,333	2,414	2,480	2,511	2,490	2,467	2,447	2,433	2,407
2 Residential real estate	397	394	405	432	424	450	479	514	551	584	602	631	669	696	722	755	788
3 Government use ¹																	
II Net capital formation																	
1 Business																	
a Incl. net change in business inventories	4,600	5,826	-124	1,258	5,105	1,367	4,926	4,635	4,345	3,300	6,752	1,460	-1,899	-5,865	-4,160	-3,487	-596
b Excl. net change in business inventories	1,677	1,503	18	1,010	2,312	2,337	3,282	3,415	3,903	3,656	4,338	2,591	-458	-2,600	-2,370	-1,347	-531
2 Residential real estate	-336	-892	345	1,878	2,273	2,544	3,079	2,518	2,182	1,854	530	-646	-994	-1,867	-1,899	-1,839	-1,209
3 Public agencies	834	832	2,082	1,883	1,586	1,834	1,766	1,889	1,980	2,051	2,471	2,801	2,099	1,798	1,322	2,899	3,574
III Net change in claims against foreign countries	+2,280	+1,391	+613	+212	-74	+433	+394	+42	+605	+943	+312	+409	+426	+59	+431	-1,104	-2,226
IV Total net capital formation	7,378	7,157	2,916	5,231	8,890	6,178	10,165	9,084	9,112	8,148	10,065	4,024	-358	-5,875	-4,306	-3,531	-457
1 Incl. net change in business inventories	4,455	2,834	3,058	4,983	6,097	7,148	8,521	7,864	8,670	8,504	7,651	5,155	1,083	-2,610	-2,516	-1,391	-392
2 Excl. net change in business inventories																	

¹No depreciation charges were calculated on roads and sewers.

NET CAPITAL FORMATION

Chart 8
NET CAPITAL FORMATION, 1919-1935



formation total used fails to include some portion of commodities, classified by us as consumers' durable, that may be utilized by business enterprises (e.g., rugs); (b) depreciation charges may be applied to capital values that have become appreciated as compared with their original cost; or to intangibles; or to material repairs and alterations not included under gross capital formation in Table 13; or to commodities classified by us as consumers' durable but actually used by business enterprises. Similarly, the estimates of capital consumption for residential buildings, and especially for the durable commodities used by governmental agencies, are rough approximations. Obviously the measures in Table 13 are not of a high order of precision and should be used as approximations rather than as exact measures of net changes in the stock of capital goods held by the groups of users distinguished.

Nevertheless, the broad indications of the estimates are fairly trustworthy. We first compare them with gross capital formation and capital consumption, then discuss the absolute magnitude of net capital formation, and its distribution among the various components.

b Comparison with Gross Capital Formation and Capital Consumption

Comparison of gross capital formation, capital consumption and net capital formation shows what a large part of the total diverted into investment is offset by the current consumption of already existing durable commodities (Table 14). Of the average volume of gross capital formation for the entire period 62 per cent in current prices and 68 per cent in 1929 prices is accounted for by capital consumption, and only 38 and 32 per cent, respectively, can be considered as a net addition to the stock of capital goods.

This average percentage distribution of gross capital formation between presumptive replacement of capital consumed and net addition to stock varies little as between estimates in current and in 1929 prices; but it does vary significantly among the various groups distinguished in Tables 13 and 14. The relative share of capital consumption is greatest in residential construction, owing obviously to the existence of a large stock of residential buildings as compared with the moderate rate of gross additions to it during the period. In capital formation destined for business use the impor-

NATIONAL INCOME AND CAPITAL FORMATION

Table 14

AVERAGE VOLUME OF GROSS CAPITAL FORMATION, CAPITAL CONSUMPTION AND NET CAPITAL FORMATION

	GROSS CAPITAL FORMATION, AVERAGE VOLUME PER YEAR (millions of dollars)	CAPITAL CONSUMPTION		NET CAPITAL FORMATION		PERCENT- AGE OF NET CAPITAL FORMATION (INCLU- SIVE TOTAL, LINE 5a)
		VOLUME PER YEAR (millions of dollars)	PER- CENTAGE OF GROSS CAPITAL FORMATION	VOLUME PER YEAR (millions of dollars)	PER- CENTAGE OF GROSS CAPITAL FORMATION	
<i>Current Prices</i>						
1 Business						
a Incl. net change in business inventories	8,361	6,057	72.4	2,305	27.6	43.2
b Excl. net change in business inventories	7,624	6,057	79.4	1,568	20.6	29.4
2 Residential construction	2,656	2,118	79.7	539	20.3	10.1
3 Public agencies	2,595	535	20.6	2,060	79.4	38.6
4 Net change in claims against foreign countries	437	0	0	437	100.0	8.2
5 Total						
a Incl. net change in business inventories	14,050	8,709	62.0	5,340	38.0	100.0
b Excl. net change in business inventories	13,313	8,709	65.4	4,603	34.6	86.2
<i>1929 Prices</i>						
1 Business						
a Incl. net change in business inventories	7,957	6,343	79.7	1,614	20.3	37.2
b Excl. net change in business inventories	7,680	6,343	82.6	1,337	17.4	30.8
2 Residential construction	2,691	2,248	83.5	443	16.5	10.2
3 Public agencies	2,541	558	22.0	1,982	78.0	45.6
4 Net change in claims against foreign countries	303	0	0	303	100.0	7.0
5 Total						
a Incl. net change in business inventories	13,492	9,149	67.8	4,342	32.2	100.0
b Excl. net change in business inventories	13,215	9,149	69.2	4,066	30.8	93.6

tance of the replacement share is only slightly less, if we exclude changes in business inventories, a net item not subject to capital depreciation. Its inclusion serves to reduce the relative share of capital consumption in the total of gross capital formation destined for business use, and makes this share significantly lower than in residential construction. The apportionment between replacement and net additions is strikingly different, however, in the volume destined for use by governmental agencies. In the latter, capital consumption accounts for only one-fifth of the average volume of gross capital formation. The measure of capital consumption by governmental agencies is admittedly crude and incomplete, in that depreciation on roads and sewers is not allowed for. But this omission is perhaps justified on the ground that in these public properties little capital depreciation really occurs, capital consumed being replaced through repairs and maintenance. And whatever may be said of the possible underestimate of public capital consumption in the estimate presented, its share in the gross capital formation destined for public use may reasonably be expected to be very much lower than in residential construction or business capital, because the stock of public capital must have been small compared with the substantial gross additions since 1919 and because the rate at which

the existing durable commodities in the hands of the government would depreciate would be extremely low.²²

c Absolute Volume Compared with Wealth

The absolute volume of as inclusive a total of net capital formation as can be obtained with the available data is on the average 5.3 billion dollars per year in current prices, and 4.3 billion in 1929 prices. The significance of these figures is, perhaps, better comprehended when they are expressed in cumulative totals. If we add the net additions to the stock of capital goods that resulted during 1919-35 from the flow of producers' durable commodities to their ultimate domestic recipients, the volume of all new construction, net changes in business inventories and stocks of gold and silver, and net changes in claims against foreign countries, then, with each annual addition in current prices, the total amounts to 90.8 billion dollars; with these additions in 1929 prices, the total amounts to 73.8 billion. All this capital accumulation took place before the recent depression. The corresponding totals for the eleven years 1919-29 are, in current prices, 95.7 billion, in 1929 prices, 84.3 billion; and from 1930 through 1935 the net total added to the stock of capital goods was re-

²² See also Section VIII, 1, d.

duced 4.9 billion dollars in current prices, 10.5 billion in 1929 prices.

It is of interest to compare this total of capital formation with the stock of wealth, to which it was an addition. The latest acceptable estimate of national wealth for this country is that made as of December 31, 1922 by the Federal Trade Commission (see *National Wealth and Income*, Washington, 1926). According to this report, total wealth at the current valuation amounted at the end of 1922 to 353 billion dollars. This total includes, however, 39.8 billion of furniture and personal effects, 4.6 billion of motor vehicles (Table 1, p. 28), and 122.2 billion of land exclusive of improvements (Table 3, p. 34). The first and last items should be completely omitted from the stock of wealth to which net capital formation, as measured in Table 13, could contribute; and the same is true of the preponderant portion of the value of motor vehicles. If, accordingly, we subtract 165 billion dollars from the total, the value of man-made wealth (excluding consumers' goods but including residential buildings) is some 188 billion dollars, at the end of and at valuation of 1922. If we assume that the same wealth would not be greatly different from the amount indicated if revalued at 1929 prices, an assumption whose arbitrariness is perhaps reduced by the fact that the general commodity price level in the two years is approximately the same, we can make the desired comparisons. The wealth at the beginning of 1919 must have amounted, in 1929 prices, to 188 billion minus the sum of net capital formation for 1919-22, i.e., minus 22.7 billion, or 165.3 billion. Hence the cumulative addition to this stock of capital goods during the seventeen years, 1919-35, amounted to about 44 per cent; and at this arithmetic rate of increase, the stock would have been doubled in about forty years. The total increase before 1930, i.e., before the depression, amounted, however, to 51 per cent of the stock at the beginning of 1919; and at the pre-depression rate, the stock would have doubled in twenty-two years. Whether either of the rates of capital accumulation thus shown appears high, average or low is hard to say, because our knowledge of capital growth in the past, the only basis for judgment, is so scanty.

d *Distribution Among Component Elements*

In considering the apportionment of total net capital formation among the distinguishable categories by type of user, the most striking feature is the relatively large amount destined for use by public agencies. Even if we disregard the rise in

this item in 1934 and 1935, due largely to the influx of gold, the average volume for the period is not much below that of business net capital formation, and accounts for 30 per cent of the total. As will be seen from Table 14, this distribution of *net* capital formation makes a striking contrast to that of gross; when gross volumes are considered, capital formation destined for use by public agencies is less than one-third as large as that destined for use by business, and accounts for only 18 per cent of the total. The explanation lies in the materially smaller allowance for consumption of durable capital goods used by public agencies than of goods used by business firms or embodied in residential real estate.

The reasonableness of this difference among the various categories of capital goods with respect to the magnitude of the allowance for consumption and the resulting shift in the distribution from gross to net volumes has already been commented on and may be supported further by a brief inspection of the 1922 estimate of national wealth already referred to. According to this estimate, the value of improvements embodied in streets, roads and other highway structures not covered under exempt real estate, and in exempt real estate amounted to 20.8 billion dollars (*National Wealth and Income*, Table 3). This left some 167 billion as the value of man-made wealth (i.e., excluding land) in use by business agencies or embodied in residential structures. Table 14 shows that the average volume of gross capital formation for use by public agencies was about 2.6 billion dollars, whereas that for use by business or resulting from residential construction amounted to about 11.0 billion. Thus even the gross additions were at a higher relative rate for capital destined for use by public agencies than for business or residential construction. If, furthermore, we take into consideration the naturally much lower rate of capital consumption of goods in public use, the results in Table 14 are easily comprehended.

However, gross rather than net capital formation provides the proper guide to the relative importance of the various categories of capital goods in the economic life and industrial structure of the nation. The line between replacement demand and expansion demand for capital goods is thin and tenuous; and it is the total volume that controls the relative importance of a given category of capital goods and of the changes in their flow. True, the relatively large share of public agencies in net capital formation, if continued, will eventually modify greatly the structure of national wealth, and per-

haps also the structure of the current production of capital goods. But for the present, it is gross capital formation, with its materially different distribution among business, ultimate consumers and public agencies that provides the more valid notion of the relative importance of various capital goods categories in the functioning of the economic system.

Finally, it should be noted that the movements in the percentage distribution of net capital formation among its component elements parallels those observed for gross capital formation, Variant I. The volume of public construction and hence of public capital formation accounts for an increasing percentage of total net capital formation; whereas the net changes in business inventories account for an algebraically diminishing proportion. These shifts in favor of public capital investment, and within business capital formation from investment in inventories to investment in capital equipment, are characteristic of the period since 1919, and even more marked for net capital formation than for gross.

2 APPORTIONMENT OF NATIONAL INCOME BETWEEN NET CAPITAL FORMATION AND CONSUMERS' OUTLAY

National income, as defined and measured above, is directly comparable with net capital formation; and the volume of consumers' outlay can again be obtained by subtracting net capital formation from national income. But differences in the assumptions underlying the estimates of the two totals necessitate the use of three-year moving averages rather than values for single years (Table 15 and Chart 9).

The first interesting conclusion suggested by Table 15 concerns the relatively small proportion that net additions to the stock of capital goods, as measured by us, constitute of total national income. The average share over the period is about 8 per cent, in contrast to the share of the comparable measure of gross capital formation in gross national product of about 19 per cent. This dif-

ference in the percentage distribution is obviously due to the subtraction, in arriving at net capital formation, of all consumption of the stock of capital goods from the gross volume. It is thus seen that of the total *net* output of commodities and services only a relatively small fraction, even in the most prosperous years, can be characterized as net addition to the stock of capital goods. Even during prosperous years over 87 per cent of the current output is in the group of immediately consumed commodities and services.

This relatively small share of the net product that constitutes a net addition to the nation's stock of capital goods fluctuates violently over the period. Even with the short term fluctuations smoothed out by the application of a three-year moving average, it almost doubles from 1921 to 1926, when computed for volumes in current prices; and increases almost a half from 1921 to 1926, when computed for volumes in 1929 prices. Its decline after 1928-29 is, of course, still more marked. And instead of the stability during 1920-29 in the ratios of capital formation to national product, observed in the comparison of gross volumes, there is a definite upward movement to 1924 or 1926 in the ratios in Table 15.

The volume of consumers' outlay, in contrast to the volume and share of net capital formation, shows no marked fluctuations, especially when the effect of changing price levels is removed. When measured in constant prices and in terms of a three-year moving average, it does not decline until 1930; and while the subsequent contraction to 1932 is fairly substantial, its movement over the period as a whole is distinctly upward. This contrast in movement and variability between consumers' outlay and capital formation clearly justifies the emphasis that economic science places upon the distinction between capital goods and consumable goods; and renders it important to provide separate and comprehensive measures of the volume of consumers' outlay and of capital formation as the basis for a further study of the various economic forces that operate to produce divergent movements in these two, essentially related, segments of the national product.

Table 15

APPORTIONMENT OF NATIONAL INCOME BETWEEN NET CAPITAL FORMATION AND CONSUMERS' OUTLAY, 1920-1934

(absolute figures in millions of dollars)

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Current Prices															
1 National income, 3-year moving average	63,552	63,479	62,585	66,594	71,640	74,897	77,251	79,101	80,417	78,920	70,791	56,193	44,974	42,253	46,722
2 Net capital formation, inclusive total, 3-year moving average	8,617	7,045	6,392	7,439	9,053	9,067	9,746	8,920	9,036	7,376	4,561	-275	-2,564	-3,090	-1,347
3 Consumers' outlay, line 1 - line 2	54,935	56,434	56,193	59,155	62,587	65,830	67,505	70,181	71,381	71,544	66,230	56,468	47,538	45,343	48,069
4 Net capital formation as percentage of national income	13.6	11.1	10.2	11.2	12.6	12.1	12.6	11.3	11.2	9.3	6.4	-0.5	-5.7	-7.3	-2.9
5 Consumers' outlay as percentage of national income	86.4	88.9	89.8	88.8	87.4	87.9	87.4	88.7	88.8	90.7	93.6	100.5	105.7	107.3	102.9
1929 Prices															
1 National income, 3-year moving average	56,453	57,941	61,381	66,419	70,682	73,301	75,462	77,880	80,036	79,468	73,531	61,915	54,032	52,943	57,924
2 Net capital formation, inclusive total, 3-year moving average	5,817	5,101	5,679	6,766	8,411	8,476	9,454	8,781	9,108	7,412	4,577	-736	-3,513	-4,571	-2,765
3 Consumers' outlay, line 1 - line 2	50,636	52,840	55,702	59,653	62,271	64,825	66,008	69,099	70,928	72,056	68,954	62,651	57,545	57,514	60,689
4 Net capital formation as percentage of national income	10.3	8.8	9.3	10.2	11.9	11.6	12.5	11.3	11.4	9.3	6.2	-1.2	-6.5	-8.6	-4.8
5 Consumers' outlay as percentage of national income	89.7	91.2	90.7	89.8	88.1	88.4	87.5	88.7	88.6	90.7	93.8	101.2	106.5	108.6	104.8

Chart 9
 PERCENTAGE APPORTIONMENT OF NATIONAL INCOME BETWEEN
 NET CAPITAL FORMATION AND CONSUMERS' OUTLAY
 1920 - 1934

