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Changes during Business Cycles, 1900—1938

The economy's behavior during business cycles is not revealed sharply by the available estimates of national income and its components, for they cover a short period; being annual rather than monthly, they fail to show timing and amplitude precisely; and the margin of error is fairly wide, especially for some components. Yet national income series are the most comprehensive measures of the economy; and differences among various sectors in their behavior during business cycles can be observed better in its components than in other bodies of data.

Because of this unique advantage, we summarize what national income estimates show concerning changes during periods commonly recognized as defining cycles in the economy at large, called 'reference' cycles. Series for such wide time units as years afford little opportunity to establish differences in timing. And there is little need for studying 'specific' cycles, i.e., cycles in individual series, as by and large and for obvious reasons, the short term fluctuations in national income and in most of its components take place within reference cycles. Consequently, the summary is confined to changes during reference cycles, and attention is centered on the consistency and magnitude of the changes.

1 The Magnitude of Changes

Before we consider the differences in the degree to which national income and its components fluctuate during business cycles, we try to give some notion of the absolute magnitude of the changes (Table 22).

During each reference expansion, national income and employment rose substantially; during each reference contraction,

TABLE 22

National Income (1929 Prices) and Aggregate Employment
Changes during Reference Cycles, 1919-1938

		NATIONAL INCOME (billions of dollars)		AGGREGATE EMPLOYMENT (Employees & Entrepreneurs—millions)	
		Total Change (1)	Change per Year (2)	Total Change (3)	Change per Year (4)
	Cycle 1919-21				
1	Change, 1919-20	+1.5	+1.5	+0.4	+0.4
2	Change, 1920-21	—3.3	—3.3	—3.7	—3.7
3	Difference		—4.8		—4.1
	Cycle 1921-24				
4	Change, 1921-23	+14.0	+7.0	+4.3	+2.2
5	Change, 1923-24	+1.3	+1.3	—0.2	—0.2
6	Difference		—5.7		—2.3
	Cycle 1924-27				
7	Change, 1924-26	+7.3	+3.6	+2.1	+1.1
8	Change, 1926-27	+0.9	+0.9	+0.1	+0.1
9	Difference		—2.7		—1.0
	Cycle 1927-32				
10	Change, 1927-29	+7.0	+3.5	+2.0	+1.0
11	Change, 1929-32	—31.4	—10.5	—8.9	—3.0
12	Difference		—13.9		—4.0
	Cycle 1932-38				
13	Change, 1932-37	+28.5	+5.7	+7.8	+1.6
14	Change, 1937-38	—3.3	—3.3	—2.4	—2.4
15	Difference		—9.0		—4.0
	Average for 5 Cycles				
16	Change, expansion	+11.6	+4.3	+3.3	+1.2
17	Change, contraction	—7.1	—3.0	—3.0	—1.8
18	Difference		—7.2		—3.1

COLUMN
1 Based on estimates in *National Product since 1869*, Table I 19, col. 3.
3 Based on estimates in *National Income and Its Composition*, Vol. One, Table 8.

both either declined or rose at rates materially lower than during the preceding or following expansion; during each reference cycle the rate of change declined sharply from expansion to contraction. The rise in national income averaged close to $12 billion (in 1929 prices) for the five reference expansions, or somewhat over $4 billion per year; the decline averaged somewhat more than $7 billion for the five reference contractions, or $3 billion per year. The increase in employment averaged for the five reference expansions 3.3 million, or 1.2 million per year; and the decline was 3 million, or 1.8 million per year.

The consistency of the marked alterations in the rate of movement in national income and employment from reference expansion to contraction is hardly surprising. The reference dates were fixed in terms of cycles in general business activity; and comprehensive measures of output and employment should vary in close agreement with such a reference chronology. If the estimates of national income and employment are fairly accurate, any lack of consonance between short term fluctuations in them and the reference cycle chronology would be reason for questioning the validity of the latter, not a symptom of any substantive problem calling for investigation.[24]

The interesting points about the estimates in Table 22 are the substantial changes during reference cycles and the frequency of either absolute declines or of sharp drops in the rate of increase. During the two decades national income in 1929 prices averaged $70.5 billion; employment averaged 40.5 million; and the average decline per depression year in both was more than 4 percent of the average level. Of the 19 year-to-year changes in the two decades, there were five large absolute declines in national income; in three other years the increase dwindled to relatively negligible proportions. The same was essentially true of employment, there being five years of large absolute declines, one year of small absolute decline, and three years in which the increase was relatively inappreciable. In other words, substantial rises characterized at most 11 year-to-year changes out of 19.

This very fluctuation in the short term rate of output and employment constitutes a problem, even if we disregard any effect on the average level for the longer period. Ignoring for the moment a possible lowering of the *secular* level of output and employment due to the loss of opportunities during depressions, we assume that the average level attained during the

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[24]The upturns and downturns (the latter allowing for breaks in the rate of change) of the annual series for both national income (in 1929 prices) and total employment are identical in timing with the annual chronology of reference cycles and phases established by the Business Cycle Study of the National Bureau of Economic Research. Since neither series was available at the time the chronology was established, the conformity constitutes a corroboration of it.

twenty years would have been conducive to greater welfare had it materialized at either equal or steadily rising rates each year. Final users, ultimate consumers or purchasers of net additions to the stock of capital, would have enjoyed greater returns had consumer and capital goods remained constant or risen steadily. This particular aspect of the business cycle problem cannot be analyzed here.

We can attempt, however, an illustrative calculation of the second aspect mentioned just above. The question is: what would have been the secular movement of national income had the economy not been plagued by conspicuous cyclical depressions? If we can estimate this potential secular movement at all, we can approximate the loss due to cyclical contractions.

One way of answering the question would be to assume that increases attained during the cyclical expansions measured the economy's long term capacity. The reasoning would be somewhat as follows. Had there been no cyclical contractions, the long term growth would have been much greater. Undisturbed by cyclical contractions, the economy would increase its output at the rate it attained during cyclical expansions. Applying the annual rate of increase in national income during cyclical expansions in Table 22, $4.3 billion, to the period covered in the table, we calculate that national income would have grown $81.7 billion; or from $58.2 in 1919 (our estimate of national income in 1929 prices) to $139.9 billion in 1938. As national income in 1938 was $80.7 billion, the loss for this year alone was $59.2 billion, or almost 75 percent of the level actually attained. For each year in the period we could compare the hypothetical level, calculated by adding $4.3 billion per year to the level for 1919, with the actual income realized, and derive the deficit or excess.

The fallacy in this crude calculation is the identification of rates during cyclical expansions with the possible secular rate. The very depth to which the economy sinks during a depression is a factor in the rise during the succeeding expansion; and the rapidity with which output can increase from the trough of a cycle, permitted by existing productive capacity and stimulated by accumulated deficits in purchases by ultimate

consumers or users of capital goods, is no indication of the
steady rate at which it would grow during a long period. The
average in Table 22, line 16, column 2, being partly inflated
by years of rebound from sharp contractions, is likely to be
altogether too high as a rate for sustained secular growth.
This conclusion is confirmed when we apply a similar
calculation to employment. Its average annual rate of growth
during cyclical expansions, 1.2 million, applied to the period
yields a total increase in employment from 1919 to 1938 of
22.8 million; which, added to the estimated employment in
1919, 39.8 million, would mean employment of 62.6 million
in 1938. Yet the total gainfully occupied in that year was about
55 million.[25] And allowing for minimum frictional unemploy-
ment, it is difficult to see how employment could much exceed
52 million.

A more valid approach to the problem is set forth in Table
23, although even here the results are merely illustrative. We
have data on the number of the gainfully occupied during the
period. This being the most important productive resource, its
secular increase is certainly one factor contributing to the
secular rise in national income. The other is the rise in income
per employed, due partly to the increasing efficiency of the
worker himself, partly to the increased supply of capital per
worker. To calculate this second factor, we compared national
income in constant prices per *employed* (i.e., entrepreneurs
and employed wage earners and salaried workers) at the
beginning and end of the twenty years, averaging 1919 with
1920 and 1937 with 1938 to eliminate the effects of cyclical
changes without canceling too much of the secular rise itself.
Prorating per year this total increase in income per employed
yielded column 2. Combining the two factors making for the

[25]This figure is quoted from *National Income and Its Composition,* Vol. One,
Table 8. Recent revisions tend to lower the estimates for the gainfully occupied,
and the correct total for 1938 would probably be between one and one and a half
million less. On the other hand, the figure for estimated employment in 1919 should
be raised slightly. However, the effect of these minor adjustments on the example
in the text would be insignificant. The estimates of the gainfully occupied and
employed used subsequently are all from *National Income and Its Composition,*
without revisions.

TABLE 23

Illustrative Calculation of Difference between Potential Secular Levels
and Actual Levels of National Income, 1919-1938
(all dollar values in 1929 prices, billions)

| | INDEXES OF POTENTIAL SECULAR MOVEMENT | | | POTENTIAL NATIONAL INCOME 1ST APPROX. | DIFFERENCE BETWEEN ACTUAL & (4) | POTENTIAL NATIONAL INCOME 2D APPROX. | DIFFERENCE BETWEEN ACTUAL & (6) |
	Number of Gainfully Occupied (1)	Income per Employed (2)	National Income (3)	(4)	(5)	(6)	(7)
1919	100.0	100.0	100	58.4	—0.2	58.4	—0.2
1920	101.9	101.7	104	60.7	—1.1	60.2	—0.6
1921	103.9	103.5	107.5	62.8	—6.5	62.5	—6.2
1922	105.8	105.2	111	64.8	—4.1	64.2	—3.5
1923	107.7	107.0	115	67.2	+3.1	66.6	+3.7
1924	109.6	108.7	119	69.5	+2.2	68.3	+3.4
1925	111.6	110.5	123	71.8	+2.2	70.7	+3.3
1926	113.5	112.2	127	74.2	+4.8	73.0	+6.0
1927	115.4	113.9	131	76.5	+3.4	74.8	+5.1
1928	117.3	115.7	136	79.4	+1.4	77.1	+3.7
1929	119.0	117.4	140	81.8	+5.1	79.4	+7.5
1930	120.3	119.2	143	83.5	—3.6	81.2	—1.3
1931	121.6	120.9	147	85.8	—17.1	82.9	—14.2
1932	122.9	122.7	151	88.2	—32.7	85.3	—29.8
1933	124.2	124.4	154.5	90.2	—33.9	87.0	—30.7
1934	125.5	126.2	158	92.3	—29.3	88.8	—25.8
1935	126.8	127.9	162	94.6	—27.0	90.5	—22.9
1936	128.1	129.6	166	96.9	—19.1	92.9	—15.1
1937	129.4	131.4	170	99.3	—15.3	94.6	—10.6
1938	130.7	133.1	174	101.6	—20.9	96.9	—16.2

COLUMN

1 The over-all percentage increase in the number of gainfully occupied between
1919-20 and 1928-29 and between 1928-29 and 1937-38 was calculated from
estimates in *National Income and Its Composition,* Vol. One, Table 8. It checks
fairly closely with the rate from 1920 to 1930 derived from *Normal Growth of the
Labor Force in the United States: 1940 to 1950* (Bureau of the Census, Special
Report, June 12, 1944), Table 5, p. 4; and from 1930 to 1940 derived from the
same table on the basis of the increase in the "persons in labor force". The
increase, prorated per year, was applied to 100.0 in 1919, to yield the entries
for other years. Because it reflects some short term fluctuations associated with
cycles, the actual annual series was not used.

2 Income per employed (in 1929 prices) was calculated for 1919, 1920, 1937, and
1938 from the annual estimates of national income in *National Product since
1869,* Table I 19, col. 3, and of aggregate employment in *National Income and
Its Composition,* Vol. One, Table 8. The over-all percentage increase between
the average for 1919-20 and that for 1937-38 was computed, prorated per year,
and applied cumulatively to the 100.0 base for 1919.

3 Col. 1 multiplied by col. 2, divided by 100.

4 1919 (the average of 1919, 1920 weighted twice, and 1921, from *National Product
since 1869*) extrapolated by col. 3.

5 Difference between actual levels in *ibid.* and col. 4.

6 Similar to col. 4, but on the assumption that the absorbed unemployed in 1937-38
(excluding frictional unemployment) estimated to be about 18 percent of the

secular rise in national income yielded column 3, which, applied
to the national income level in 1919, estimated at the average
actually attained during the 1919-21 cycle, yielded column 4—
the potential secular level of national income in 1929 prices,
on the assumption that the capacity level in 1919 is measured
by the average for the cycle 1919-21, and that the two factors
making for the secular rise are as estimated in columns 1 and
2.

The decade average for the 1920's shows no net deficit: on
the contrary, in most years the actual level attained is above
secular capacity, a result far from absurd since an economy
can exceed its longer term capacity levels for a few years. The
huge deficits appear with the 1929-32 depression, and persist,
though they are much smaller from 1934 through 1938. The
average deficit for the two decades is substantial—about $9.4
billion, or somewhat more than 13 percent of the average
national income. It is the concentration of shortages in the
1930's that points at the crux of the business cycle problem in
recent years—the persistent falling short of potential capacity
levels during the last decade before this war.

Column 4 exaggerates the potential levels of national in-
come in all years, particularly during recent years of large
unemployment because it assigns income per employed to the
gainfully occupied under the assumption of full employment (ex-
cluding a frictional minimum). This can be seen clearly when
the shortages in 1937 and 1938 in column 5—about 22 per-
cent of the national income actually attained—are compared
with the relative unemployment in the two years. The latter,
excluding frictional unemployment—estimated to be about 4
percent of the gainfully occupied—would amount to about 23
percent of total employment. In other words, the levels set in
column 4 for 1937 and 1938 (and for other years) are those

Notes to Table 23 concluded
total gainfully occupied, can be assigned only 75 percent of the per capita income
of those actually employed during these years. The reduced increase between
1919-20 and 1937-38 in income per employed was prorated and applied as in the
calculation of col. 2. The resulting index multiplied by col. 1 and divided by
100 yielded a new column paralleling col. 3, which was then applied to
1919, col. 4.

that would be attained were we to assume full employment (excluding a frictional minimum); and income per absorbed unemployed equal to income per actually employed, at its secular level.

But in view of the selectivity possible when there is a large idle labor reserve, are we justified in assuming that income per absorbed unemployed would equal that actually received per employed? It is perhaps more reasonable to say that since most of the unemployed are the less qualified and skilled elements in the labor supply, they could be expected, if absorbed, to produce and receive a per capita income smaller than that of the actually employed. If we assume that the absorbed unemployed are unlikely to produce a per capita income larger than 75 percent of that per employed, the productivity index in later years and the implicit rise in productivity from 1919-20 (years of relatively full employment) to 1937-38, will be lowered. The effect of this assumption is to lower the level of the potential secular rise in national income (col. 6), reducing in turn the average deficit of actual income as compared with the potential (col. 7) to $7.2 billion, or somewhat above 10 percent of the average level; but the concentration of the deficits in the 1930's still remains.

Numerous objections—some apparent, some real—can be raised to the illustrative calculations in Table 23. It may be argued that capacity levels are set too low for 1919, thereby understating potential levels and deficits throughout the period. However valid the argument, the too low level in column 4 for 1919 is not due to cyclical causes: the 1921 depression, as measured by indexes of physical volume, is not one of the more violent, and low capacity during the 1919-21 cycle would be due to after-effects of the war, not to cyclical factors.

Among the more real objections is that the rates of increase in the gainfully occupied and in income per employed are taken from an historical period in which business cycles are conspicuous. Were we to wish away cycles completely, productivity might rise because of an uninterrupted net cumulation of capital and of consumer demand assuring steadily expanding markets, much more than it does in column 2. The difficulty with this

argument is that it goes into realms of speculation, where no conclusion can be proved or disproved. For example, one could argue that were cycles wished completely away, rates of labor market participation might drop and the gainfully occupied and hours of employment be appreciably fewer than they actually were. This would mean a lowering of the index in column 1 that might offset or more than offset the argued greater rise of the index in column 2.

If we accept the framework of the analysis illustrated in Table 23—and the loss entailed by cyclical depressions can be calculated only if one accepts some realistic measures of capacity factors—two conclusions of interest emerge. First, the loss, in the sense of an average deficit in actual national product as compared with that possible by steady growth from the 1919 levels, is much less, in percentage terms, than one would be likely to guess, particularly because the depressed 1930's are remembered more vividly than the expansive 1920's. Second, the deficits are concentrated in the 1930's and this raises the serious problem, already noted in Part II in the discussion of longer term trends, as to the secular significance of this decade, i.e., does it represent retardation of growth, portending lower secular levels for the future?

Whatever the judgment, Tables 22 and 23 clearly indicate that marked short term fluctuations in total production and employment are concomitants of business cycles; that though the gaps they cause between actual and potential national income levels may not average out to large percentages, the deficits may be substantial, and in the 1930's, were huge. Again, there is a sizable loss to social welfare from the mere fluctuations in volumes and rates of change, regardless of their effect on long term levels. In explaining and dealing with these cyclical fluctuations, differences in the consistency and amplitude with which business cycles are reflected in various sectors of the economy are important.

2   *National Aggregates, in Current and Constant Prices*
Table 24 summarizes changes during business cycles in three nationwide aggregates in current prices; and in the most com-

TABLE 24

National Income and Aggregate Payments, Differences in Rate of
Movement between Expansion and Contraction

Reference Cycles, 1919-1938

(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

		AGGREGATE PAYMENTS		
	NATIONAL INCOME	INCL. ENTREP. SAVINGS	EXCL. ENTREP. SAVINGS	NATIONAL INCOME
REFERENCE CYCLES	Current Prices	Current Prices	Current Prices	1929 Prices
	(1)	(2)	(3)	(4)
1 1919-21	—36.5	—27.3	—33.2	—8.2
2 1921-24	—8.5	—7.4	—6.6	—8.7
3 1924-27	—7.9	—4.7	—2.5	—3.5
4 1927-32	—24.9	—20.3	—18.1	—18.2
5 1932-38	—19.0	—16.4	—14.6	—12.9
6 Av. for 5 cycles	—19.4	—15.2	—15.0	—10.3

COLUMN
1-3 *National Income and Its Composition,* Vol. One, Table 3.
 4 Based on estimates in *National Product since 1869,* Table I 19, col. 3.

prehensive of the three, national income, in 1929 prices. The
measures used—differences between the change per year dur-
ing expansion and during contraction, the changes expressed in
percentages of the average value for each reference cycle—are
most free from the effect of longer term movements and there-
fore most suitable for studying the consistency with which a
series reflects business cycles and the amplitude of its fluctua-
tion during reference cycle periods.[26]

The three countrywide totals in current prices differ in that
national income (col. 1) includes undistributed net profits of

[26]The differences referred to and used in all the subsequent tables are calculated
as follows. The values for each series are converted to percentages of the average
value for each reference cycle. The total change in these percentages from the
reference year of the initial cyclical trough to the reference year of the cyclical
peak, divided by the number of years elapsed, is the change per year during
the reference cycle expansion. The total change from the reference year of the
cyclical peak to the reference year of the terminal cyclical trough, divided by
the number of years elapsed, is the change per year during the reference
cycle contraction. The difference in the rate of movement is then calculated by
subtracting the change per year during the reference cycle expansion from the
change per year during the reference cycle contraction.

These calculations are made for each reference cycle separately. The averages
are arithmetic means of the measures for the several reference cycles occurring in
the period.

corporations and net savings of governments; aggregate pay-
ments in column 2 exclude these items but, like column 1,
include entrepreneurial net savings; column 3, by means of
a rough segregation of entrepreneurial withdrawals from net
income, excludes entrepreneurial net savings. Differences among
the three totals in their changes during business cycles must
be due to the cyclical behavior of items excluded from one
total and included in another.

Consequently, the very substantial narrowing, as we pass
from national income to aggregate payments including entre-
preneurial savings, in the amplitude of the 'differential' change
during business cycles—from an average of —19.4 to —15.2—
is due to the extreme sensitivity of net savings of corporations
(and to some extent of government savings) to business cycles.
Since this item constitutes merely a small percentage of national
income, its fluctuations during business cycles must be violent
indeed for its exclusion to narrow so appreciably the amplitude
of the differential movement. And, in fact, as the economy
expands and contracts, net savings of corporations move from
large positive to large negative totals. The exclusion of them
(and of government savings) narrows the amplitude of move-
ment in all five reference cycles.

One would expect that the exclusion of entrepreneurial net
savings would also narrow the amplitude of the differential
movement during business cycles: these savings or undistributed
net profits should vary more intensely than most distributed
income flows. And, indeed, the averages excluding entrepre-
neurial net savings are slightly smaller in four of the five
reference cycles. The narrowing in amplitude is not greater
partly because of the large weight in entrepreneurial net savings
of those by farmers: farm incomes in general do not move in
consistent conformity with business cycles.

That a substantial part of the changes in national income
during business cycles is due to fluctuations in prices is evident
when estimates in current and in 1929 prices are compared
(col. 1 and 4). Adjustment for price changes cuts the average
for the five reference cycles almost in half and causes a re-
duction in four of the five cycles. The reduction is particularly

large in the 1919-21 swing, which was characterized by violent changes in price levels.

Robert F. Martin's estimates, used in Part II, are analyzed here to measure the changes during business cycles for a longer period, covering ten rather than five reference cycles (Table 25). His totals are comparable to our aggregate payments excluding entrepreneurial net savings; and thus represent the least cyclically-sensitive of the three countrywide totals in Table 24.

TABLE 25

Aggregate Payments excluding Entrepreneurial Savings
Differences in Rate of Movement between Expansion and Contraction
Reference Cycles, 1900-1938
(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

REFERENCE CYCLES		CURRENT PRICES (1)	1929 PRICES (2)
1	1900-04	—3.5	+0.5
2	1904-08	—10.5	—3.1
3	1908-11	—9.0	—6.4
4	1911-14	—6.3	—6.4
5	1914-19	—1.0	—7.6
6	1919-21	—26.9	+3.4
7	1921-24	—5.1	—7.5
8	1924-27	—3.9	—0.2
9	1927-32	—19.7	—13.6
10	1932-38	—18.8	—13.2
	Averages		
11	Lines 1-10	—10.5	—5.4
12	1- 5	—6.1	—4.6
13	6-10	—14.9	—6.2
14	1- 4	—7.3	—3.9
15	4- 7	—9.8	—4.5
16	7-10	•—11.9	—8.6

Based on estimates in R. F. Martin, *National Income in the United States, 1799-1938*, Table 1, and revisions in the *Economic Almanac for 1944-45* (National Industrial Conference Board, 1944), p. 80. Mr. Martin's series in 1926 prices was recomputed to a 1929 base.

When measured in current prices, these countrywide aggregates of income payments reflect all ten reference cycles. But when a crude adjustment for price changes is made, the rate of change from expansion to contraction apparently does not decline in two reference cycles, possibly because of the crudity of either the current price estimates or of the price adjust-

ment. On the other hand, it may well be that in a mild business cycle such as 1900-04 the rate of change in annual totals of income payments, expressed in units of constant purchasing power, does not decline from expansion to contraction.[27]

The adjustment for price changes results not only in failure to reflect every business cycle in the period but also in a much narrower amplitude of the differential change. The average for the ten cycles declines almost one-half from column 1 to column 2; and this narrowing of amplitude is observed in seven of the ten reference cycles.

Though the period is only 38 years the amplitude of the changes during reference cycles may be studied for some trend. Do the fluctuations, as measured by the degree to which the rate of change declines from reference expansion to contraction, become more or less prominent over the period?

For the aggregates in current prices, the answer is clear: the amplitude of the differential change does widen perceptibly from the earlier part of the period to the later, whether we group the ten cycles in two sets of five or in three sets of four with one overlapping. But this uptrend in amplitude seems to be due in large part to price fluctuations. For the totals in constant prices, the amplitudes widen much less. The average for the first five cycles is —4.6; for the second five, —6.2. In the three groups of four cycles each, a moderate widening of amplitude from the first to the second is followed by a very substantial widening from the second to the third. However, because the estimates for recent years are more accurate, they may be expected to reflect cyclical changes more sensitively. Hence this widening in amplitude may, at least in part, be due to the statistical improvement of the estimates; and cannot be taken as evidence of an appreciable secular rise in the amplitude of changes during business cycles in totals in constant prices. The sole unambiguous evidence lies in the length of the 1929-32 contraction, the one reference contraction in the

[27]A comparison with Table 24 shows no exception for the 1919-21 cycle for *national income* in constant prices. This suggests that were the estimates in Table 25, col. 2 for national income instead of for aggregate payments, they would probably have conformed in all reference cycles.

period that in the annual chronology lasts more than a year.

3 *Differences among Industries*

From what we know about the cyclical behavior of various industries, we would expect marked differences among them in the degree to which the rate of change in their activity fluctuates with cycles in the economy at large. And we do find such marked differences in the estimates of the net product of each industry (i.e., its gross product minus the contribution to it of other industries consumed in the production process) in current prices, for the five reference cycles of 1919-38 (Table 26). Even for the ten broad industrial divisions, differences in the amplitude of fluctuations during business cycles are large. As judged by the averages for the period, the industrial divisions whose fluctuations during business cycles are distinctly narrower than in the all-industry average are the various service groups (finance—covering banking, insurance, and real estate—service, and government) and trade. Of the commodity producing divisions agriculture alone shows a smaller average change than all industries combined. The changes in mining, manufacturing, and construction, on the contrary, have an amplitude well above the all-industry average.

These differences among the major industrial divisions tend to persist from cycle to cycle. The entry for government is lower than that for the all-industry average in four of the five cycles; for service—in four of the five, and equal to the all-industry average in the fifth; for finance—in all five; for trade and agriculture—in three of the five. The industrial divisions characterized by amplitudes wider than that for the all-industry average, mining, manufacturing, and construction, show it in all five reference cycles.

Changes during business cycles in net income originating in many other, more narrowly defined, industrial branches can be estimated from the data in *National Income and Its Composition*. Those selected here illustrate the contrasts among branches within the major industrial divisions—primarily between industries supplying ultimate consumers and industrial

TABLE 26

Net Income Originating (Current Prices) by Industries
Differences in Rate of Movement between Expansion and Contraction
Reference Cycles, 1919-1938

(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

| INDUSTRIAL DIVISIONS | REFERENCE CYCLES | | | | | AV. FOR 5 CYCLES |
	1919-21 (1)	1921-24 (2)	1924-27 (3)	1927-32 (4)	1932-38 (5)	(6)
1 Agriculture	—20.3	—3.3	—3.8	—29.2	—30.0	—17.3
2 Mining	—94.4	—35.8	—34.3	—36.8	—55.4	—51.3
3 Manufacturing	—54.6	—35.1	—8.7	—42.1	—56.5	—39.4
4 Construction	—56.4	—15.1	—11.6	—32.2	—25.0	—28.1
5 Transp. & other public utilities	—39.6	—7.8	—6.6	—21.4	—18.2	—18.7
6 Trade	—11.9	—21.3	—6.3	—24.1	—13.5	—15.4
7 Finance	—4.9	+2.9	+4.0	—24.2	—5.8	—5.6
8 Service	—14.0	—5.4	—5.5	—21.4	—10.7	—11.4
9 Government	—67.7	+9.8	—0.6	—13.4	—9.7	—16.3
10 Miscellaneous	—21.8	—13.2	—7.2	—38.7	—21.0	—20.4
11 Total	—34.6	—14.2	—5.6	—27.4	—23.8	—21.1
Branches						
2a Anthracite mining	—14.8	+7.0	—20.8	—9.9	—18.9	—11.5
2b Metal mining	—99.7	—30.5	—19.5	—99.9	—137.0	—77.3
3a Food & tobacco mfg.	—16.1	—16.0	+0.8	—24.7	—14.3	—14.1
3b Metal mfg.	—79.5	—43.4	—14.6	—60.0	—96.8	—58.9
5a Steam rr., Pullman & express	—44.4	—11.8	—9.0	—24.6	—27.6	—23.5
5b Street railways	—19.9	—6.5	—0.7	—12.9	—2.5	—8.5
5c Telephone	—9.3	—0.7	—2.8	—17.4	—3.8	—6.8

Based on data underlying Table 59, *National Income and Its Composition,* Vol. One.

users. Anthracite mining has a relatively narrow amplitude; metal mining, a wide amplitude. The difference is almost as great between changes during business cycles in net income originating in the food and tobacco and in the metal manufacturing industries. In the public utilities group, net income originating in steam railroads changes much more during business cycles than that originating in street railways or telephones. All these inter-industry differences in the degree to which their activity reflects business cycles are fairly persistent, cycle by cycle.

To extend the record we use Robert F. Martin's estimates since 1900. As his series is of aggregate payments excluding entrepreneurial savings, not of national income, the estimates in Table 27 are of changes in total payments, not in net in-

TABLE 27

Total Payments excluding Entrepreneurial Savings
(Current Prices) by Industries, Differences in Rate of Movement
between Expansion and Contraction, Reference Cycles, 1900-1938
(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

INDUSTRIAL DIVISIONS	MARTIN'S SERIES, AV. FOR		NBER SERIES, AV. FOR	
	5 Reference Cycles 1900-19 (1)	4 Reference Cycles 1919-32 (2)	4 Reference Cycles 1919-32 (3)	5 Reference Cycles 1919-38 (4)
1 Agriculture	—3.0	—8.0	—17.1	—15.1
2 Mining	—26.4	—33.3	—29.7	—32.0
3 Manufacturing	—15.4	—25.0	—24.9	—28.7
4 Construction	—6.9	—28.5	—28.4	—26.9
5 Transp. & other public utilities	—2.2	—13.7	—14.9	—14.2
6 Trade	—1.8	—13.1	—13.7	—12.6
7 Finance	+2.2	—8.5	—5.6	—4.5
8 Service	+0.5	—9.6	—8.5	—8.8
9 Government	—5.6	+3.1	+0.3	+0.6
10 Miscellaneous	—8.0	—9.0	—10.5	—10.7
11 Total	—6.1	—13.9	—15.1	—15.0

COLUMN

1 & 2 Based on estimates in *National Income in the United States, 1799-1938,*
Tables 1, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 40, 43, 44, and 46.
3 & 4 Based on data underlying Table 61, *National Income and Its Composition,*
Vol. One.

come, originating in the major industrial divisions (the latter alone are available).

The averages indicate that the changes in the rate of movement from expansion to contraction were, with two exceptions (finance and service), of the same sign, if not of the same magnitude, during the five cycles from 1900 through 1919. Too, the inter-industry differences in the amplitude of the changes observed in Table 26 persist. In government, service, finance, trade, agriculture, and also—more conspicuously here than in Table 26—the public utilities group, the rate of change from expansion to contraction is much smaller, on the average, than in the all-industry average (col. 1). In mining, manufacturing, and construction, it is distinctly larger.

Moreover, the amplitude widens from the five reference cycles of 1900-19 (col. 1) to the four of 1919-32 (col. 2); and by implication to the five of 1919-38. For every industrial division except government, the average differential movement

during business cycles for the first twenty years is appreciably less than for the second. Thus, the widening in the amplitude of aggregate payments in current prices in Table 25 is seen here to be true of payments originating in each of the ten major industrial divisions. There is some doubt about the existence of such a trend in the totals in constant prices. But violent fluctuations even in monetary totals are significant, so far as they create stresses and strains in the credit and money mechanism, and thus tend to affect eventually the flows measured in real terms.

Since there are appreciable differences in the extent to which the prices of products or resources in various industries fluctuate during business cycles, estimates of net product in constant prices would not show the same inter-industry differences as do those in current prices in Tables 26 and 27. In the absence of net income estimates by industries in constant prices, we use total employment. True, employment tends to vary less during business cycles than net income in constant prices: the average decline in the rate of change from expansion to contraction 1919-38 was 10.3 for national income in constant prices and 7.6 for aggregate employment. Yet, inter-industry differences in changes in net product in constant prices are likely to be associated with inter-industry differences in changes in employment (Table 28).

Comparison of Tables 28 and 26 reveals interesting similarities and differences. As in the case of net income in current prices, the fluctuations in employment during business cycles have a narrower amplitude than the average for all industries in all services (service, government, finance), trade, and agriculture; and a wider amplitude than the average in mining, manufacturing, and construction. Again, as in Table 26, these differences in amplitude are fairly consistent from cycle to cycle. Here also, as in Table 26, the branches of mining, manufacturing, and public utilities, singled out to illustrate differences between consumer and producer goods categories, show the expected contrasts in amplitude of fluctuations during business cycles, both in the averages and consistently cycle by cycle.

But it is the differences between Tables 26 and 28 that

TABLE 28

Total Employment by Industries, Differences in Rate of Movement
between Expansion and Contraction, Reference Cycles, 1919-1938
(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

INDUSTRIAL DIVISIONS	REFERENCE CYCLES					AV. FOR 5 CYCLES
	1919-21 (1)	1921-24 (2)	1924-27 (3)	1927-32 (4)	1932-38 (5)	(6)
1 Agriculture	—1.5	+0.5	—1.3	—0.2	—0.2	—0.5
2 Mining	—38.4	—21.6	—15.2	—10.5	—20.7	—21.3
3 Manufacturing	—22.1	—17.6	—4.0	—17.5	—27.7	—17.8
4 Construction	—21.4	—14.0	—13.6	—23.2	—16.9	—17.8
5 Transp. & other public utilities	—22.2	—8.3	—2.7	—11.5	—13.2	—11.6
6 Trade	—16.0	—2.4	+0.7	—10.3	—6.2	—6.8
7 Finance	—8.7	+4.6	+3.7	—13.3	—2.4	—3.2
8 Service	—2.2	—1.9	—0.5	—8.5	—6.9	—4.0
9 Government	+21.6	+5.3	+0.5	—1.5	—1.5	+4.9
10 Miscellaneous	—4.0	—5.1	—1.8	—8.2	—5.5	—4.9
11 Total	—10.4	—6.0	—2.3	—9.5	—9.9	—7.6
Branches						
2a Anthracite mining	+18.9	+9.1	+4.2	—6.6	—9.7	+3.2
2b Metal mining	—48.3	—25.6	—9.1	—23.7	—51.5	—31.6
3a Food & tobacco mfg.	—9.4	—7.6	+3.1	—11.0	—11.4	—7.3
3b Metal mfg.	—42.0	—26.7	—8.3	—27.6	—47.9	—30.5
5a Steam rr., Pullman & express	—25.1	—10.6	—3.3	—11.3	—18.2	—13.7
5b Street railways	—10.9	—6.0	—1.3	—7.3	—1.5	—5.4
5c Telephone	—12.8	—5.2	—0.6	—16.3	—1.8	—7.3

Based on data underlying Table 69, *National Income and Its Composition,* Vol. One.

suggest the effect of price fluctuations on changes in net in-
come in current prices. For employment, the average ampli-
tude of changes in agriculture falls much further short of
that for the all-industry average than for net income in cur-
rent prices in Table 26. Obviously, prices of agricultural pro-
ducts tend to fluctuate with the business cycles, affecting net
income originating in agriculture in current prices; and proba-
bly the average changes in the net product of agriculture in
constant prices during business cycles would have much nar-
rower amplitudes than those in national income in constant
prices. A difference of opposite character appears for the
transportation and public utilities category: the amplitude of
the fluctuations in its employment during business cycles is
appreciably wider than in all-industry employment, in both
the average and in all five reference cycles (except 1924-27

where the difference is still of the same sign, but small). Net income in current prices originating in this category was shown in Table 26 to fluctuate during business cycles with an amplitude somewhat narrower than that in national income, both in the average for the period and in three of the five reference cycles. Presumably the temporal stability of prices for services of transportation and public utilities and hence their lesser responsiveness to business cycles affects fluctuations in net income in current prices; so that changes in net income in constant prices in that industry may well be of appreciably wider amplitude than those in national income in constant prices.

The declines in the rate of change from reference expansion to contraction, in both net income and employment, suggest two tentative conclusions. First, while the amplitude of change during business cycles is very much wider in net income (current prices) than in employment, the *relative* dispersion among the various industries appears to be wider for employment than for net income. For example, in employment (Table 28, col. 6) the average decline in the rate of change from expansion to contraction is 7.6 for all industries (as a percentage of the average value for each reference cycle); but the range among industrial divisions is from +4.9 to —21.3. In net income (Table 26, col. 6) the all-industry average is —21.1; but the range, from —5.6 to —51.3, is relatively narrower than in employment.

Second, distinct differences appear among the successive reference cycles in the relative dispersion among industries of the measures of, 'differential' change, in both net income and employment. For example, for the 1919-21 cycle, the cyclical change in net income for the all-industry average is —34.6, with a range among industrial divisions from —4.9 to —94.4; for the 1927-32 cycle, when the all-industry average is —27.4, the range is only from —13.4 to —42.1. For employment there is a similar contrast in the inter-industry dispersion of measures of change: for the 1919-21 cycle the all-industry entry is —10.4, the range, from +21.6 to —38.4; for the 1927-32 cycle it is —9.5, with a range from —0.2 to —23.2.

These two conclusions are confirmed by simple measures of
inter-industry dispersion in changes during business cycles
(Table 29). One set was calculated by using the ten major
industrial divisions shown in the earlier tables; the other set,
covering thirty industrial divisions, by using also the minor
industrial groups, when available (only such major groups
were included as were not available by subgroups). For each
cycle and for the average of the five cycles the unweighted
all-industry arithmetic mean was computed (lines 1, 4, 7, and
10); the average deviation from the arithmetic mean (lines
2, 5, 8, and 11); and as a measure of relative dispersion, the
ratio of the average deviation to the unweighted mean (lines
3, 6, 9, and 12).

In every comparison based on the major industrial divi-
sions, the relative dispersion among industries in the ampli-
tude of change during business cycles is greater for employ-
ment than for net income in current prices; in the comparison
based on the major and minor industrial divisions, it is greater
for the all-industry average and for three of the five refer-
ence cycles. This suggests that the cyclical price changes,
which tend to be common to all industries, contribute to
greater convergence in changes during business cycles when
measured in current prices. In employment, this common in-
fluence of price change is missing. One might expect that, were
estimates of net income in constant prices available, the
changes in them during business cycles would also show
greater relative dispersion among industries than the changes
in income in current prices.

The second conclusion is likewise confirmed and extended:
differences among the several cycles in the inter-industry dis-
persion of declines in the rate of movement from expansion
to contraction are evident. For both net income in current
prices and employment, this inter-industry dispersion is greater
in the first three reference cycles than in the last two; and
in both the broader and the more detailed industrial classifi-
cations. What distinguishes the last two reference cycles from
the first three is their much longer duration: the 1927-32
cycle lasted five years, the 1932-38 cycle, six, whereas the first

TABLE 29

Net Income Originating (Current Prices) and Total Employment

Inter-industry Dispersion in Magnitude of Changes during
Reference Cycles, 1919-1938

(based on changes in rate of movement from expansion to contraction)

		REFERENCE	CYCLES			AV. FOR 5
	1919-21	1921-24	1924-27	1927-32	1932-38	CYCLES
	(1)	(2)	(3)	(4)	(5)	(6)
A TEN MAJOR INDUSTRIAL DIVISIONS						
Net Income Originating						
1 Unweighted mean	38.6	12.4	8.1	28.4	24.6	22.4
2 Av. deviation from line 1	24.0	11.7	6.1	7.4	13.7	10.3
3 Relative dispersion (line 2 ÷ line 1)	0.62	0.94	0.76	0.26	0.56	0.46
Total Employment						
4 Unweighted mean	11.5	6.0	3.4	10.5	10.1	7.3
5 Av. deviation from line 4	12.5	7.4	4.5	4.7	7.6	7.8
6 Relative dispersion (line 5 ÷ line 4)	1.09	1.23	1.32	0.45	0.75	1.07
B THIRTY MAJOR AND MINOR INDUSTRIAL DIVISIONS						
Net Income Originating						
7 Unweighted mean	47.6	15.3	10.2	30.1	31.7	27.0
8 Av. deviation from line 7	34.4	15.6	11.3	13.0	21.1	17.2
9 Relative dispersion (line 8 ÷ line 7)	0.72	1.02	1.11	0.43	0.67	0.64
Total Employment						
10 Unweighted mean	14.7	8.6	3.4	11.8	14.2	10.5
11 Av. deviation from line 10	14.9	8.8	5.3	5.6	9.6	7.6
12 Relative dispersion (line 11 ÷ line 10)	1.01	1.03	1.58	0.47	0.67	0.73

LINE

1 & 7 Based on data underlying Table 59, *National Income and Its Composition,*
Vol. One. The minus signs for these entries have been omitted.

4 & 10 Based on data underlying Table 69, *ibid;* minus signs omitted.

three reference cycles lasted two, three, and three years, respectively. In other words, the longer the cycle, the more time there is for the cyclical effects to materialize not only in the industries highly sensitive but also in those relatively insensitive to fluctuations in general business. Because of 'ceilings' and 'floors' limiting the amplitude of cyclical expansions and contractions in various industries, a long reference cycle means less inter-industry dispersion than a short.

In the brief record in Table 29, the duration of the cycle

is more important than the intensity of the fluctuation in determining inter-industry dispersion. One would expect that the more violent the cycle, the more consistently would all industries be affected, and the less the inter-industry dispersion in the amplitude of the 'differential' change. Yet the 1919-21 reference cycle, though characterized by a greater decline in the rate of movement from expansion to contraction than the 1927-32 and 1932-38 cycles, shows relative inter-industry dispersion greater rather than less than for the last two.

4   Differences among Types of Payment

We should not expect income flows of different types—wages, salaries, dividends, interest, etc.—to respond to business cycles with the same consistency and amplitude. Some, such as interest and salaries, are, by reason of social or institutional inertia, sticky and unresponsive to short term changes. Others, such as entrepreneurial income, are heavily weighted by agriculture, whose short term fluctuations do not conform closely to reference cycles. Still others, such as dividends, which are in part akin to entrepreneurial profits and concentrated in mining and manufacturing—both industries quite responsive to business cycles—can be expected to show consistent and large variations in the rate of movement within reference cycles.

The estimates in Table 30 for the five reference cycles from 1919 through 1938 do show differences in average amplitude that fulfil these expectations. In dividends the average change in rate of movement from expansion to contraction is a large decline, much greater than in aggregate payments. The only other type of payment showing an amplitude wider than in the aggregate payments average is employee compensation, presumably because of the sensitivity of wages in such cyclically responsive industries as mining, manufacturing, construction, and some public utilities. In dividends, the amplitude of the changes is wider than in aggregate payments in three of the five reference cycles, in employee compensation in only two.

Of the three other types of payment, two—interest and rent—show changes during business cycles of distinctly, and

TABLE 30

Various Types of Income Payment (Current Prices)

Differences in Rate of Movement between Expansion
and Contraction, Reference Cycles, 1919-1938

(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

TYPES OF INCOME PAYMENT	REFERENCE CYCLES					AV. FOR 5 CYCLES
	1919-21 (1)	1921-24 (2)	1924-27 (3)	1927-32 (4)	1932-38 (5)	(6)
1 Employee compensation	—37.7	—9.8	—4.2	—19.0	—16.4	—17.4
2 Entrep. net income						
a Incl. savings	—13.2	—4.1	—12.1	—25.9	—14.8	—14.0
b Excl. savings	—40.0	+0.6	—0.7	—13.0	—4.7	—11.6
3 Service income						
a Incl. entrep. savings	—31.1	—8.5	—6.0	—20.4	—16.2	—16.4
b Excl. entrep. savings	—38.2	—7.6	—3.4	—17.7	—14.1	—16.2
4 Dividends	—19.0	—13.5	—2.9	—32.5	—49.7	—23.5
5 Interest	—5.7	0.0	+1.6	—7.7	+1.5	—2.1
6 Rent	—3.2	+2.4	+3.4	—20.8	—4.6	—4.6
7 Property income incl. rent	—8.5	—2.7	+0.9	—19.7	—17.5	—9.5
8 Aggregate payments						
a Incl. entrep. savings	—27.3	—7.4	—4.7	—20.3	—16.4	—15.2
b Excl. entrep. savings	—33.2	—6.6	—2.5	—18.1	—14.6	—15.0

LINE

1-7 Based on estimates in *National Income and Its Composition,* Vol. One,
    Tables 1 and 57.

8a & b *Ibid.,* Table 3.

on the whole consistently, narrower applitude than those
characterizing aggregate payments. The average for interest
is less than one-seventh of that for aggregate payments; for
rent, somewhat less than one-third. Interest shows this nar-
rower amplitude of change in all five reference cycles; rent,
in four.

The average amplitude of changes in entrepreneurial in-
come is narrower than in aggregate payments, and this nar-
rower amplitude is observed in four of the five cycles if
savings are excluded; in only three if savings are included. Pos-
sibly agriculture causes large variations in this type of pay-
ment when it expands and contracts with business at large;
and small variations when it runs counter to the short term
trend of the urban economy, as happens at least part of the time.

The *average* differences among types of payment in the
amplitude of change during the five reference cycles 1919-38

are true also of their cyclical behavior during the first two decades of the century (Table 31). Here again, the rate of movement in dividends fluctuated more violently than in aggregate payments or in any other type of payment. In the least sensitive, interest and rent, the rate of movement in this earlier period from expansion to contraction does not decline on the average. The average for employee compensation exceeds that for aggregate payments; for entrepreneurial income (excluding net savings) it is less.

TABLE 31

Various Types of Income Payment (Current Prices)
Differences in Rate of Movement between Expansion
and Contraction, Reference Cycles, 1900-1938
(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

TYPES OF INCOME PAYMENT	MARTIN'S SERIES, AV. FOR		NBER SERIES, AV. FOR	
	5 Reference Cycles 1900-19 (1)	4 Reference Cycles 1919-32 (2)	4 Reference Cycles 1919-32 (3)	5 Reference Cycles 1919-38 (4)
1 Employee compensation	—7.4	—16.8	—17.7	—17.4
2 Entrep. withdrawals	—3.8	—6.5	—13.3	—11.6
3 Service income	—6.5	—14.9	—16.7	—16.2
4 Dividends	—16.9	—9.6	—17.0	—23.5
5 Interest	+4.3	—5.5	—2.9	—2.1
6 Rent	+1.4	—9.7	—4.6	—4.6
7 Property income incl. rent	—4.3	—8.1	—7.5	—9.5
8 Aggregate payments excl. entrep. savings	—6.1	—13.9	—15.1	—15.0

COLUMN
1 & 2 Based on estimates in *National Income in the United States, 1799-1938,* Tables 4, 41, 42, 43, 44, 46.
3 & 4 Based on estimates in *National Income and Its Composition,* Vol. One, Table 57.

Types of payment differ also in the consistency with which they fluctuate more or less than aggregate payments. For example, dividends show a wider amplitude of change than aggregate payments in four of the five reference cycles 1900-19; and the amplitude of change in interest and in rent is narrower than that for aggregate payments in all five cycles. In contrast, the wider amplitude of change in employee com-

pensation, and the narrower in entrepreneurial income is observed in only three of the five reference cycles.

Finally, the most important difference among types of income in the degree of their participation in business cycles—that between undistributed net profits of corporations and all payment flows—is not measured in Tables 30 and 31. Because these undistributed net profits alternate from positive to negative figures, the technique of measuring changes during business cycles in *percentages* of cycle averages is not applicable to them. But as revealed by Table 24 above the wide amplitude of their fluctuations is manifest in the effect their inclusion with all payment flows to form national income has on the magnitude of changes in the latter.

5 Differences among Shares of Upper and Lower Income Groups

Differences in the degree to which types of payment vary during business cycles should provide some basis for conjecturing changes in the distribution of income among recipients grouped by size of income. As some types of payment flow chiefly to the upper and others chiefly to the lower income groups and the differences in the type-composition of income at the lower and at the upper levels are substantial, the wider amplitude of changes in dividends, narrower in interest, and so on, should give us some clue to the changes in the size distribution during business cycles.

But the inferences cannot be definitive, for the effects of the inter-type differences in amplitude are not all or even preponderantly in the same direction. The wider amplitude of changes in dividends would suggest that the share of total income payments going to the upper income groups should increase during expansions and decline during contractions. But the narrower amplitude of changes in interest and the wider amplitude of changes in employee compensation suggest that the differential movement in the share of the upper income groups should be an increase from expansion to contraction, not a decline.

The only data with which we can study these fluctuations

in the size distribution of total income payments during business cycles are those mentioned in Part I—federal income tax returns. As noted, comparison of the income tax population and its income with total population and total income payments yields approximations to the shares of income of the top 5 percent of population alone. But even a series that covers only the extreme upper right tail of the distribution may be of interest.

In order to simplify presentation and discussion, Tables 32 and 33 deal with the one variant of income shares of the upper income groups in the population for which analysis by type of payment is possible. This variant is not adjusted for differences between marital status groups in number of persons per return; nor to exclude federal income taxes. But these adjustments would not affect greatly the short term movements of the shares. A more important factor is that income receipts analyzed here exclude capital gains, gifts, and other transfers. In other words, they are shares in total income payments—not the amounts individuals retain after the kind of re-distribution that results from purchase and sale of assets, gifts, contributions, etc. The exclusion of capital gains in particular removes an important cyclical element in the distribution of income by size, when income is defined to include net results of transfers.[28]

The first impression produced by Table 32 is that annual shares in total income payments received by the upper 1 percent of population; by the next group of 2d through 5th percent from top; and by the whole mass of the lower 95 percent, fluctuate from year to year only moderately (col. 1, 5, and 9). There is no year in which the share in column 1 undergoes an absolute change of more than 1.5 percent; in

[28]Yet even the inclusion of capital gains would not invalidate the conclusions suggested below. It would serve largely to accentuate the short term fluctuations, shown by the variant analyzed in Tables 32 and 33, resulting particularly in a greater rise of the share of the upper 1 percent to 1928; and a more conspicuous decline of that share to the middle 1930's. This statement is based partly upon our own analysis, and partly on the estimates of Adolph J. Goldenthal (see *Concentration and Composition of Individual Incomes, 1918-1937,* TNEC Monograph No. 4, Washington, D. C., 1940).

TABLE 32

Annual Changes in Percentage Shares of Total Income Payments
(Current Prices) Received by Upper and Lower Income Groups, 1919-1938
(basic variant, unadjusted for marital status and including federal income taxes)

| | UPPER 1 PERCENT | | | | 2D THROUGH 5TH PERCENT FROM TOP | | | | LOWER 95 PERCENT | | | |
| | | | CHANGE ASSOCIATED WITH SHIFTS | | | | CHANGE ASSOCIATED WITH SHIFTS | | | | CHANGE ASSOCIATED WITH SHIFTS | |
	% SHARE IN TOTAL INCOME PAYMENTS (1)	CHANGE IN (1) (2)	Among Types of Payment (3)	Within Types of Payment (4)	% SHARE IN TOTAL INCOME PAYMENTS (5)	CHANGE IN (5) (6)	Among Types of Payment (7)	Within Types of Payment (8)	% SHARE IN TOTAL INCOME PAYMENTS (9)	CHANGE IN (9) (10)	Among Types of Payment (11)	Within Types of Payment (12)
1919	12.8				10.1				77.1			
1920	12.3	−0.50	−0.27	−0.23	9.7	−0.34	−0.16	−0.18	77.9	+0.84	+0.43	+0.41
1921	13.5	+1.16	+0.57	+0.58	12.0	+2.24	+1.65	+0.60	74.5	−3.40	−2.22	−1.18
1922	13.4	−0.12	−0.07	−0.05	11.4	−0.56	−0.45	−0.11	75.2	+0.68	+0.52	+0.16
1923	12.3	−1.10	−0.89	−0.21	10.6	−0.80	−0.60	−0.20	77.1	+1.90	+1.49	+0.41
1924	12.9	+0.63	+0.47	+0.17	11.4	+0.77	+0.53	+0.23	75.7	−1.40	−1.00	−0.40
1925	13.7	+0.82	+0.42	+0.40	11.5	+0.08	+0.06	+0.02	74.8	−0.90	−0.48	−0.42
1926	13.9	+0.20	+0.19	+0.01	11.3	−0.15	−0.06	−0.09	74.8	−0.05	−0.13	+0.08
1927	14.4	+0.46	+0.23	+0.22	11.6	+0.26	+0.21	+0.05	74.0	−0.72	−0.44	−0.27
1928	14.9	+0.56	+0.28	+0.27	11.8	+0.26	+0.20	+0.06	73.2	−0.81	−0.48	−0.33
1929	14.5	−0.45	−0.49	+0.05	11.6	−0.24	−0.17	−0.07	73.9	+0.69	+0.66	+0.03
1930	13.8	−0.67	−0.60	−0.07	11.8	+0.24	+0.23	+0.01	74.3	+0.44	+0.37	+0.06
1931	13.3	−0.54	−0.22	−0.31	12.9	+1.11	+0.89	+0.22	73.8	−0.57	−0.66	+0.09
1932	12.9	−0.38	−0.02	−0.36	13.1	+0.16	+0.12	+0.04	74.0	+0.22	−0.10	+0.32
1933	12.1	−0.77	−0.34	−0.43	12.5	−0.59	−0.49	−0.10	75.4	+1.36	+0.83	+0.53
1934	12.0	−0.11	−0.04	−0.06	11.9	−0.57	−0.40	−0.17	76.0	+0.68	+0.44	+0.23
1935	12.1	+0.04	−0.13	+0.18	11.7	−0.24	−0.20	−0.03	76.2	+0.19	+0.34	−0.15
1936	13.4	+1.29	+0.77	+0.52	11.4	−0.31	−0.22	−0.09	75.2	−0.98	−0.55	−0.43
1937	13.0	−0.37	−0.10	−0.27	11.1	−0.29	−0.23	−0.06	75.9	+0.66	+0.33	+0.34
1938	11.5	−1.46	−0.64	−0.83	11.4	+0.34	+0.28	+0.06	77.0	+1.13	+0.36	+0.77

Based on estimates in *Some Aspects of the Distribution of Income by Size* (in preparation).

column 5 of more than 2.2 percent; and in column 9 of more than 3.4 percent. Indeed, for most years absolute changes are in fractions of 1 percent. In view of the violent fluctuations during the period in total income payments and income per capita, the distribution by size as reflected by the shares of the upper income groups seems to display a marked degree of stability.

A further question immediately arises: instead of reflecting genuine changes in the distribution of income by size, may not the changes, small as they are, be due to errors and crudities in procedure and underlying data? The question is especially pertinent here since the procedure by which these income shares have been estimated involves a sequence of statistical adjustments applied to income tax returns that may well suffer from serious errors of omission and underreporting. Hence, the analysis of changes that apportions them between those that can be associated with shifts in weight *among* the several types of payment, and those due to shifts in shares of the top income groups *within* the countrywide total of each type of payment is particularly important: not only for the interest in its substantive conclusions but also for the test it provides as to whether changes can be explained in terms of data relatively independent of possible errors in tax return information.

The allocation of changes between those due to *inter*-type of payment shifts and those due to *intra*-type of payment shifts is obtained by the following simple procedure. First, multiplying the average share for 1919-38 of each type of payment received by the upper income groups (i.e., those in lines 2a-g of Table 4) by the share in each year of each type of payment in total income payments, we calculate a series that shows what the shares of the upper income groups would have been if there were shifts only in the distribution of total income payments by type and no changes in the shares of each type of payment received by the upper income groups (the *inter*-type of payment shifts series). Second, multiplying the average share for 1919-38 of each type of payment in total income payments (i.e., those in Table 4, col. 4, lines

3a-g) by the annual share of the upper income groups in each type of payment total, we obtain a series that shows what the shares of the upper income groups would have been if there were shifts only in the shares received of each type of payment and no changes in the percentage distribution of total income payments by type (the *intra*-type of payment shifts series). The two series are then adjusted so that they average out for each year to the total series of shares of the upper income groups, a very minor proportional adjustment. The year-to-year change in the total series is the arithmetic sum of the changes in the two adjusted series: the first adjusted series yielding changes associated with *inter*-type of payment shifts, the second, changes associated with *intra*-type of payment shifts.

It is clear from this brief description that the calculated *inter*-type of payment series is relatively independent of the tax returns data: of the latter it uses only the *average* percentages in lines 2a-g of Table 4 as constant weights. Hence, changes in the inter-type of payment series are produced exclusively by changes in the percentage distribution of total income payments by type; and are thus based upon estimates in *National Income and Its Composition*—estimates that are almost completely independent of tax data for individuals.

For this reason, the evidence of Table 32 that inter-type of payment shifts produce changes in shares of upper income groups (col. 3, 7, and 11) in the same direction as the total changes in them (col. 2, 6, and 10), and account for a substantial proportion of these changes, lends support to the genuineness of the latter—their independence of the vagaries of income tax data and of our procedures for treating the latter. For the shares of the upper 1 percent, changes associated with inter-type of payment shifts are in the same direction as total changes in 18 of the 19 comparisons; and account for half or more than half of the total change in 12 of these 18 (col. 2 and 3). Likewise, the changes for the 2d through 5th percentage from top and for the lower 95 percent are to a large extent accounted for by the inter-type of payment shifts. In other words, year-to-year changes in the

TABLE 33

Changes in Percentage Shares of Total Income Payments
(Current Prices) Received by Upper and Lower Income Groups
Average Values, and Differences in Rate of Movement
between Expansion and Contraction, Reference Cycles, 1919-1938
(basic variant, unadjusted for marital status and including
federal income taxes)

| | REFERENCE CYCLES | | | | | AV. FOR 5 CYCLES |
	1919-21 (1)	1921-24 (2)	1924-27 (3)	1927-32 (4)	1932-38 (5)	(6)
AVERAGE VALUE FOR EACH REFERENCE CYCLE						
Share of Upper 1%						
1 % share in total income payments	12.8	13.0	13.8	14.0	12.5	13.2
2 Change in line 1		+0.20	+0.82	+0.27	—1.57	—0.07
Change associated with shifts						
3 *Among* types of payment		—0.07	+0.42	—0.10	—0.78	—0.13
4 *Within* types of payment		+0.26	+0.40	+0.37	—0.79	+0.06
Share of 2d-5th% from Top						
5 % share in total income payments	10.4	11.2	11.4	12.1	11.8	11.4
6 Change in line 5		+0.86	+0.18	+0.69	—0.28	+0.36
Change associated with shifts						
7 *Among* types of payment		+0.61	+0.12	+0.61	—0.18	+0.29
8 *Within* types of payment		+0.24	+0.06	+0.08	—0.10	+0.07
Share of Lower 95%						
9 % share in total income payments	76.9	75.8	74.8	73.9	75.7	75.4
10 Change in line 9		—1.06	—1.00	—0.96	+1.85	—0.29
Change associated with shifts						
11 *Among* types of payment		—0.55	—0.55	—0.51	+0.96	—0.16
12 *Within* types of payment		—0.51	—0.46	—0.44	+0.90	—0.13
DIFFERENCES IN RATE OF MOVEMENT (ABSOLUTE) BETWEEN EXPANSION AND CONTRACTION						
Share of Upper 1%						
13 In share in total income payments	+1.65	+1.24	—0.05	—0.59	—1.48	+0.16
Associated with shifts						
14 *Among* types of payment	+0.84	+0.95	—0.07	—0.18	—0.67	+0.17
15 *Within* types of payment	+0.81	+0.30	+0.02	—0.41	—0.82	—0.02
Share of 2d-5th% from Top						
16 In share in total income payments	+2.59	+1.45	+0.29	+0.50	+0.74	+1.11
Associated with shifts						
17 *Among* types of payment	+1.81	+1.06	+0.21	+0.40	+0.59	+0.81
18 *Within* types of payment	+0.78	+0.39	+0.08	+0.10	+0.15	+0.30
Share of Lower 95%						
19 In share in total income payments	—4.24	—2.69	—0.24	+0.09	+0.75	—1.27
Associated with shifts						
20 *Among* types of payment	—2.65	—2.01	—0.14	—0.22	+0.08	—0.99
21 *Within* types of payment	—1.59	—0.69	—0.10	+0.31	+0.66	—0.28

shares of the upper income groups can, to a considerable extent, be explained by shifts in the relative weight of the various types of payment in the countrywide total of all income payments—an explanation that serves to reduce materially possible qualms about whether the changes may not be mere reflections of varying biases in the federal income tax data.[29]

We may now examine these short term changes more closely, keeping the distinction between those due to inter- and to intra-type of payment shifts. We study first the changes in these shares from reference cycle to reference cycle, to see whether any movements longer than those associated with reference cycles can be observed; then consider the changes from expansion to contraction within each reference cycle (Table 33).

The cycle averages in lines 1, 5, and 9 suggest that in addition to fluctuations within reference cycles there appears to have been a longer swing during the period, with a peak (or trough) in the late 1920's and a trough (or peak) in the

[29]Computations completed since this report was written show, however, that the relative size of the inter- and intra-type elements depends partly upon the period chosen as base for calculating average shares. Tables 32 and 33 use the average shares for the full period, 1919-38. Thus, in calculating the inter-type component, we derived the 1919-38 average share of the top percent of the population in each of the several types of payment, and applied these shares as weights in calculating changes due to year-to-year shifts among types of payment. Likewise, in calculating the intra-type component, we derived the 1919-38 average share of each type of payment in the countrywide aggregate of all payments, and applied these shares as weights in calculating changes due to year-to-year variations in shares of the top percent of the population in each of the several types of payment.

If instead of the average shares for 1919-38, we use as weights the given single year's shares, the division of the total change between the inter- and the intra-type components is modified substantially. On this basis, the inter-type component is still preponderant in accounting for year-to-year changes in the shares of the top 1 percent of the income population, but is not significant in the year-to-year changes in the shares of the top 2d to 5th percent. The major conclusions of Tables 32 and 33 as to the importance of inter-type shifts remain; but the relative weight of the latter is appreciably reduced, with a corresponding increase in the weight of the intra-type component.

Note to Table 33

Based on estimates in Table 32. Measures of changes within reference cycles (lines 13-21) are here on an absolute basis, i.e., they reflect absolute rises and declines (per year) in the percentage shares of the upper and lower income groups.

1930's. The annual series in Table 32 serve to confirm this impression, for the share of the upper 1 percent of the population: the peak value, reached in 1928, is followed by a long decline to a temporary trough in 1934. This longer swing is obscured in the combined share of the 2d through 5th percent from the top, although more detailed analysis might bring it out for the percents closer to the top. But the cumulated share for the upper 5 percent is still dominated by this longer swing in the upper 1 percent, which causes an inverted swing in the share of the lower 95 percent with a trough in 1928, followed by a long rise to a temporary peak in 1935. When one views the period as a whole, there seems to have been stability or a slight decline in the share of the upper 1 percent; a rise in the total share of the 2d through 5th percent from the top; and stability or a slight decline in the share of the lower 95 percent. As far as inequality in distribution of income can be reflected by the measures in Table 33, they suggest a decline in the inequality of the distribution *within* the top 5 percent group and no significant changes in shares of the top 1 or lower 95 percent.

The fluctuations within reference cycles are measured here in terms of absolute rise or decline in the percentage shares—not in percentages of average value for each cycle. This facilitates both understanding of the measures and their analysis as between inter- and intra-type of payment shifts. The evidence suggests that for the upper 1 percent of the population during the first two reference cycles shares of income declined during expansion and rose during contraction. But the pattern shifts to a reverse movement—rise in share during expansion and decline in share during contraction in the last two reference cycles. No such reversal of pattern is observed in the combined shares of the 2d through 5th percent from the top: they tend more uniformly either to decline during expansions and rise during contractions, or at least to show an algebraically greater rate of movement per year during contractions than during preceding expansions. The cumulated total for the upper 5 percent, and hence the residual share for the lower 95 percent, is still dominated by the shifting

pattern of the share of the upper 1 percent. But it is clear from Table 33 that if we were to push the dividing line between upper and lower income groups further below the 5 percent break, the cumulated share of the upper group would tend to show an inverted pattern, i.e., a higher rate of movement during contractions than during expansions; and the lower group would consequently show a positive pattern. Thus, if we define inequality in the distribution of income by size in terms of the relative shares of the upper and lower income groups compared, and ask how such inequality changes during reference cycles, the answer, at least for 1919-38, would depend upon where we draw the line between the upper and lower groups. If we draw it at the 1 percent level, inequality tended to decline during expansions and to rise during contractions at the beginning of the period, and to reverse the pattern during the latter part of the period. If we were to draw the line at say 20 or 25 percent, it is plausible to infer that inequality would tend to show a pattern inverted to the reference cycle—to decline during expansions and to rise during contractions. Since the inclusion of capital gains affects chiefly the share of the upper 1 percent, merely accentuating the long term swing already indicated by Tables 32 and 33, the conclusions suggested in the text would probably hold also for the distribution by size of income inclusive of gains and losses from sale of capital assets.

The major importance of inter-type of payment shifts in accounting for the changes in the rate of movement from expansion to contraction is evident in Table 33. While both types of shifts, inter and intra, contribute to whatever total changes occur within each reference cycle, the weight of the former is on the whole markedly greater than that of the latter—a conclusion subject to the qualification stated in footnote 29 above.

The small changes in the shares in total income payments received by the top income groups may in part be due to the crudity of our estimates: were more refined measures possible, they would show somewhat greater fluctuations, tending, on the whole, to raise the magnitude of changes associated with the intra-type of payment shifts. Furthermore, the top income

groups are important in determining certain categories of in-
come use—income taxes, savings, and expenditure on some
luxury and durable commodities. Minor changes in shares of
total income received by the upper groups may have a sub-
stantial effect on income tax yields; on the savings-income ratio
for the country; and on the proportion of income expended
for certain types of consumer goods.

Finally, the estimates shed no light on the size distribution
of income among lower income recipients. Yet the character-
istics of that distribution are affected by an important cyclical
factor—full and part time unemployment. Inequality in the dis-
tribution by size within the lower 95 or 75 percent of the popu-
lation would tend to be less in expansions because the unem-
ployed, who receive little or no income, are fewer, and greater
in contractions because the unemployed are more numerous.
How this cyclical fluctuation would combine with the ones sug-
gested above, i.e., those between the upper and lower groups
or within the upper group proper, to determine changes in
the distribution by size through the whole range from highest
to lowest is a problem that awaits further analysis.

6 Differences among Final Use Components

Inasmuch as the method used here to measure changes during
business cycles involves percentages of cycle averages, it can-
not be applied to net capital formation or its four components
because they alternate between positive and negative values.

That cyclical fluctuations in net capital formation, no matter
how measured, are wide can be seen from their effect on nation-
al income, made up as it is, of net capital formation and the
flow of goods to consumers. The average decline in the rate of
movement from expansion to contraction is only 12 percent in
the flow of goods to consumers, while that in national income
is more than one and a half times as great (Table 34, lines 1
and 2). This difference is observed in all five reference cycles;
and, in relative terms, is even larger when totals in 1929
prices are compared (lines 7 and 8).

We cannot measure differences in the amplitude of changes
in the components of net capital formation, but we can for

TABLE 34

National Income Categories by Type of Use
Differences in Rate of Movement between Expansion
and Contraction, Reference Cycles, 1919-1938

(all measures of change are on a per year basis and in percentages of
the average value of the series for each full reference cycle)

| | REFERENCE CYCLES | | | | | AV. FOR 5 CYCLES |
	1919-21 (1)	1921-24 (2)	1924-27 (3)	1927-32 (4)	1932-38 (5)	(6)
	CURRENT PRICES					
1 National income	—36.5	—8.5	—7.9	—24.9	—19.0	—19.4
2 Flow of goods to consumers	—26.7	0.0	—4.7	—17.8	—8.5	—11.6
3 Perishable	—30.7	+1.4	—7.5	—17.3	—15.0	—13.8
4 Semidurable	—35.6	—13.9	—3.3	—19.6	—8.0	—16.1
5 Consumer durable	—34.9	—15.3	—12.9	—31.8	—39.1	—26.8
6 Services	—12.8	+9.6	+0.2	—14.0	+5.9	—2.2
	1929 PRICES					
7 National income	—8.2	—8.7	—3.5	—18.2	—12.9	—10.3
8 Flow of goods to consumers	—0.8	0.0	—0.4	—10.3	—4.1	—3.1
9 Perishable	—1.0	+4.2	+0.2	—4.8	—5.5	—1.4
10 Semidurable	+32.6	—18.7	+7.3	—9.8	+0.2	+2.3
11 Consumer durable	—18.4	—18.2	—16.3	—24.6	—35.1	—22.5
12 Services	—8.7	+8.2	+1.1	—12.2	+3.2	—1.7

Based on estimates in *National Product since 1869,* Table I 18, col. 3, Table I 19, col. 3, and Table I 5.

the four components of the flow of goods to consumers, in both current and 1929 prices. Totals in current prices show the expected differences: widest amplitude in consumer durables and narrowest in the services category. Also, while the rate of movement of consumer durables and semidurables declines from expansion to contraction in all five reference cycles, perishables do not in one, and services do not in three.

Adjustment to constant prices narrows the amplitude of changes in all four categories and increases the number of cycles during which there is no decline in the rate of movement from expansion to contraction—in perishable to two, and in semidurable to three. Consumer durables, in which price changes are smallest, are influenced least by the price adjustment. Consequently, on the average and in all five reference cycles, their rate of movement from expansion to contraction still declines sharply. The average for perishable commodities

drops to one-tenth of its level for totals in current prices. The large positive entry for the flow of semidurable commodities in the 1919-21 cycle causes its average for the period to be positive rather than negative. The effect of the price adjustment on the measures for the services category is not as great, owing, as in the case of durable commodities, to the temporal rigidity of prices. But the narrow amplitude of changes during business cycles characteristic of values in current prices is accentuated.

Despite possible errors attaching to the allocation of the flow of goods to consumers among its four categories, and especially to the adjustment for price changes, the main differences in Table 34 between the estimates in current and constant prices and among the categories are beyond reasonable doubt. The greater responsiveness to business cycles of flows in current prices than of those in constant prices, and the wider amplitude of changes in the flow of consumer durable commodities and the narrower of those in the flow of other categories are confirmed by other data and easily accounted for.

The relative (and for averages, even absolute) dispersion among the categories of final use in the amplitude of changes during business cycles is greater for values in constant prices than for those in current prices: for the latter the average is —11.6, with a range from —2.2 to —26.8, for the former, —3.1, with a range from +2.3 to —22.5 (col. 6). Thus, just as in our comparison of the inter-industry dispersion of net income (current prices) and employment, so also here the tendency toward covariation in prices imposes an element of uniformity on changes during business cycles in the several consumer goods categories in current prices that is absent when they are measured in constant prices.

In this brief account of short term fluctuations in national income and its components, only the amplitude of participation in business cycles could be measured. Differences in such amplitude were established among net income originating in dif-

ferent industries; various types of income or income payment; shares of upper and lower income groups; components by type of use; volumes in current and in constant prices. These confirmed expectations based upon already established knowledge of differences among economic processes in their participation in business cycles.

That the comprehensive totals of national income and of its components are so clearly responsive to business cycles and that the differences suggested by studies based upon partial data are confirmed and extended in the analysis of the wider components lends firmness to notions concerning the per-vasiveness of business cycles; and the importance in them of differences in response on the part of different processes. Obviously, differences in response among the several processes, all of which are inter-related in the economic system, help us to understand not only how a cyclical expansion or contraction, once generated, spreads, but also how it comes to an end because of the braking influence of the least responsive processes upon those that respond and fluctuate widely. Likewise, knowledge of these differences is clearly relevant to social policy directed at ameliorating the effects of business cycles or at reducing their incidence. It would be natural for such social policy to address its measures in the first order to the sectors of the economy that respond most violently and, regardless of their possibly strategic role in the cyclical process, experience its undesirable consequences most acutely.

National income measures can contribute to the understanding and control of business cycles much more than the brief analysis above suggests. Annual estimates are available for many more aspects of the performance of the economy than could be discussed above; and for recent years quarterly and monthly measures have become accessible, although so far for too short a period to warrant analysis. Yet it must always be remembered that we deal here with summaries that conceal a variety of experience and fail to reveal the mechanism of response of the individual, firm, or single institution. The proper cognizance of all these is indispensable to both theoretical understanding and policy formulation. The apparent

simplicity of the picture portrayed by estimates of national income and its components should not free us from the responsibility of studying the behavior of the groups of individuals and firms whose activities are merged in these over-all totals; and of paying due attention to the variety of their experience in any consideration of business cycle policy.