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Volume Title: American Exports During Business Cycles, 1879-1958

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Volume Publisher: NBER

Volume ISBN: 0-87014-390-5

Volume URL: <http://www.nber.org/books/mint61-1>

Publication Date: 1961

Chapter Title: Exports and United States Business Cycles

Chapter Author: Ilse Mintz

Chapter URL: <http://www.nber.org/chapters/c0536>

Chapter pages in book: (p. 13 - 24)

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## Exports and United States Business Cycles

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United States exports comprise a wide variety of commodities, from the rawest materials to complex manufactured goods, and they are sold in virtually every country of the globe. Any rise or decline in sales to particular countries or of particular commodities thus runs a good chance of being offset by an opposite change in a different sector. Even eighty years ago, when a few agricultural products still were dominant in exports, such counterbalancing movements had a considerable stabilizing effect. Yet the aggregate value of exports was and still is far from stable.

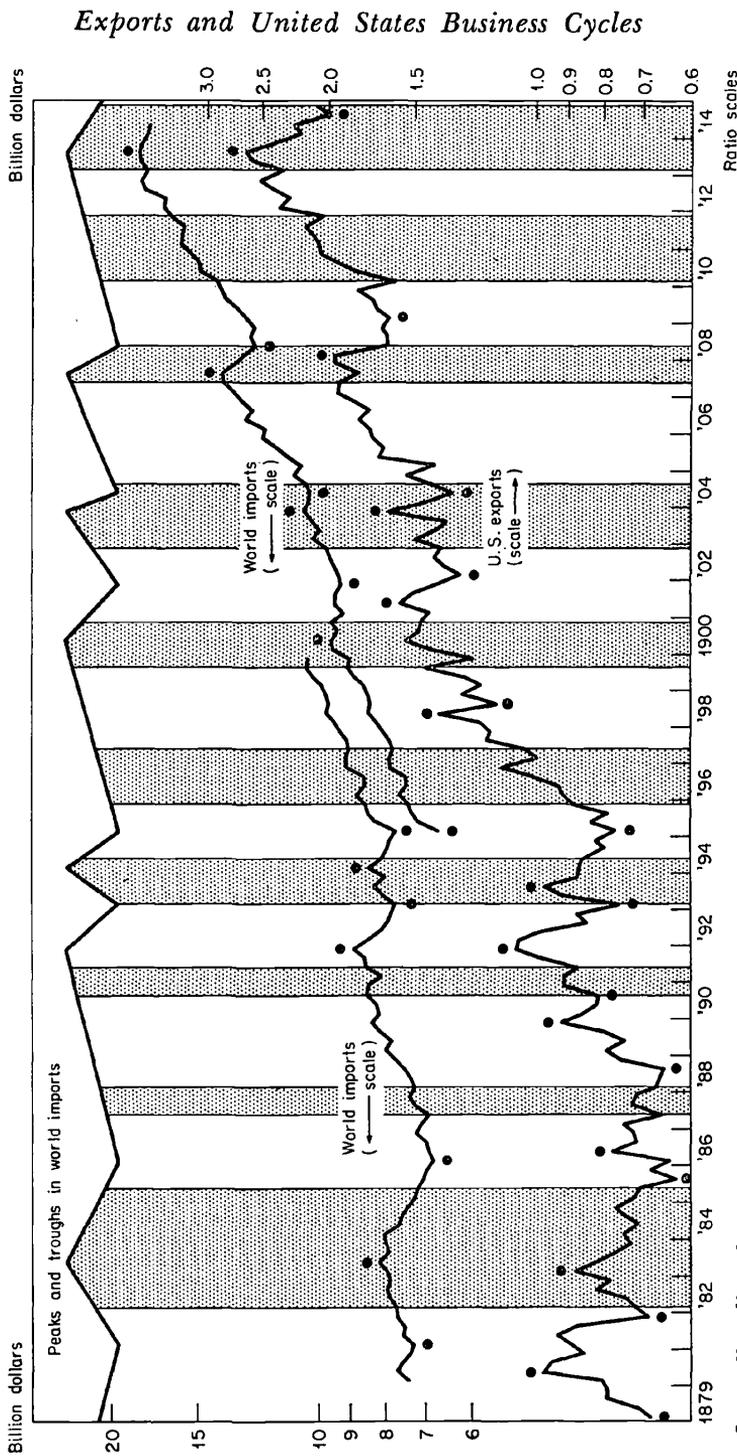
Chart 1 depicts the wavelike movements during the earliest period covered, 1879-1913.<sup>1</sup> It shows ten and a half cycles of about two to five years' duration. The average export cycle lasted approximately three and a quarter years, consisting of two years of rising and one and a quarter years of falling exports (Table 4). The fact that expansions were on the average nearly twice as long as contractions is due to the long export rises in 1895-1913, which reflect the rapid secular growth of exports in those years. Such a growth generally makes contractions briefer and milder and has an opposite effect on expansions. Thus four of the eleven expansions in the entire period lasted at least eleven quarters, but none of the contractions was as long. The rise and fall of exports in these short cycles amounted to about 54 per cent of their average level, or about 18 per cent per year, which is a considerable amplitude compared to domestic series covering activities of similar diversity.

Do these export cycles bear a close affinity to business cycles? Did the tides in exports conform to those in general business activity? Before examining the evidence, we may sketch briefly the relation one would in

<sup>1</sup> The contraction in 1913-14 is excluded from our measures because it was strongly affected by the outbreak of World War I.

CHART 1

U.S. Exports and World Imports During Cycles in World Imports and Domestic Business, Quarterly Totals at Annual Rates, 1879-1914



Seasonally adjusted.  
 World imports exclude U.S. imports.  
 Shaded areas are U.S. business contractions.  
 Dots denote turns of series.

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TABLE 4  
Cycles in U.S. Exports: Duration and Amplitude, 1879-1959

	1879-1913	1921-38	1921-38 <sup>a</sup>	1945-59	1921-38 <sup>a</sup> 1945-59	1879-1913 1921-38 <sup>a</sup>
	(1)	(2)	(3)	(4)	(5)	(6)
Number of cycles	10.5	4	3	4	7	17.5
Average duration (years)	3.3	4.3	2.9	3.3	3.1	3.2
Average amplitude (per cent)	54.4	83.1	42.5	70.4	58.4	56.2
Average annual change (per cent)	18.2	19.5	14.8	21.2	18.7	18.4

The amplitude equals the sum of the total percentage rise and fall.

The contraction 1913-14 is excluded because of its exceptional character due to the outbreak of World War I.

See Table 1, notes 1-4.

<sup>a</sup> Excluding 1929-37.

theory expect to find between United States exports and business cycles. In his unpublished manuscript on business cycles, Mitchell states his views on this point as follows: "The volume of goods a country imports depends primarily upon its domestic demand for commodities, whereas the volume of goods a country exports depends primarily upon the demand for commodities in foreign countries. The foreign demand for commodities varies with business activity in the countries to which exports are shipped. Hence exports tend to conform to domestic cycles only in so far as business cycles have a common pattern in different countries, or in so far as the activity of domestic business depends upon the volume of export trade. It was shown . . . that American business cycles have diverged considerably from the course followed by business cycles in other countries. It is well known also that the domestic market is vastly more important to American business than the foreign market. Therefore there is no reason to expect that American exports will show high indexes of conformity to domestic business cycles."

Most economists share Mitchell's view—confirmed by our study—that foreign demand is the most important factor in export fluctuations. To recognize the central role of foreign demand, however, need not lead us to underestimate the influence of other forces, as was sometimes done in the earlier postwar literature. Waves in domestic business also have a direct impact on export sales as distinguished from their indirect effects

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via foreign cycles. Of what sort will this influence be? Should we expect export sales to be pulled in the direction in which general domestic business is moving? Or will they be inversely affected?

Let us consider, first, the prices of export goods. Given constant foreign demand, we should expect these, like other prices, to move with the domestic business cycle. During a business expansion, for instance, they would rise more or fall less than during a contraction; the more the domestic demand for export goods is swollen by rising prosperity and the less domestic and foreign buyers are deterred by rising prices, the more export prices will rise. The extent to which production of the exported goods expands at home and abroad in response to rising demand is another factor that determines how much prices will rise.

The quantity exported, on the other hand, would, with constant foreign demand, move inversely to domestic business activity. It would fall more or rise less during domestic business expansions than during contractions, as foreigners would react to relatively unfavorable price movements by relatively smaller purchases, assuming that their demand for imports is not completely insensitive to price. The more domestic demand for export goods is raised by the general expansion of business, the more sharply foreign customers react to price rises, the more easily foreign sources of supply can be substituted for those of the exporting country, and the less domestic supply is stimulated by higher prices, the greater will be the relative fall in quantity of exports during domestic business expansions (given constant foreign demand).

Movements in the value of exports which result from these opposing price and quantity movements could thus—again in the absence of changes in foreign demand—be either with or against the tides of domestic business. Whether the outcome is one or the other is a matter of the reaction of the foreign demand to price changes. When the rise or fall in quantity sold outweighs the fall or rise in prices, export value will move inversely to domestic business cycles.

Actually, of course, fluctuations in foreign demand combine with those in domestic business, and the resulting export movement depends on the correlation and relative strength of foreign and domestic factors. Take, for instance, a period of simultaneous expansion in the world and in the United States. In such a period, the value of U.S. exports would probably be affected by opposing forces—stimulated by foreign and repressed by domestic expansion.<sup>2</sup>

<sup>2</sup> This argument assumes that harvest variations are a random factor which does not impose a cyclical pattern on exports. If, on the contrary, harvest variations caused cycles in general business, then the relation of agricultural exports to business cycles would be different from that described above. This possibility will be examined in a forthcoming study of exports by commodity classes.

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When we now proceed to inspect the actual movements of United States exports from 1879 to 1913, we find that, as Mitchell expected, they appear to be independent of the state of the domestic economy. The four long waves, which, after the decline of 1880-85, quadrupled the value of exports in less than thirty years, are all longer than business cycles and do not seem to be related to them. Chart 1, which distinguishes between expansions and contractions in business at large according to the National Bureau standard quarterly chronology, shows a number of vigorous export rises during business expansions, such as in 1888-89, 1897-98, 1905-07, and 1911-12. But equally large ones can be found during contractions, e.g., 1895-96 and 1910-11. Likewise exports declined or failed to grow not only in business contractions (1902-03 and 1907-08), but also frequently in business expansions (1891-92, 1894-95, 1901-02, and 1908-10).

The visual impression of this chart must be checked against exact measurements. This is done by the conformity indexes in Table 5, which

**TABLE 5**  
**Domestic Business Cycles: Average Change in U.S. Exports, 1879-1958**

	1879-1913	1921-38	1945-58	1921-38 1945-58	1879-1913 1921-38 1945-58
Number of expansions	10	3	3	6	16
Number of contractions	9	3	3	6	15
Conformity index					
Expansion	+40	+100	+100	+100	+65
Contraction	-11	+100	+33	+71	+25
Full cycle	+11	+100	+83	+83	+40
Average total percentage change					
Expansion	+7.2	+12.5	+30.9	+21.7	+12.6
Contraction	+4.9	-4.4	-11.2	-7.8	-0.2
Full cycle	2.3	16.9	42.1	29.5	12.8
Average annual percentage change					
Expansion	+3.7	+7.0	+9.7	+8.7	+5.9
Contraction	+3.0	-4.0	-11.3	-7.4	-0.1
Full cycle	0.8	5.8	10.1	8.3	5.3
Average annual percentage change					
Expansion					
1st half	+9.8	+10.7	+21.2	+17.4	+13.1
2nd half	-2.4	+3.2	-1.7	+0.1	-1.3
Contraction					
1st half	+13.1	+4.8	-10.0	-2.2	+8.5
2nd half	-7.0	-12.9	-12.5	-12.7	-8.7

The conformity index is constructed by rating a rise in expansion or fall in contraction +100, the opposite movements -100, and averaging these ratings. See Appendix B. The cycle 1929-37 is included in the conformity indexes, but excluded otherwise. See Table 1, notes 1-4.

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are constructed by rating a rise during a business expansion or a fall during a contraction +100, the opposite changes -100, and averaging the ratings for all phases covered.<sup>3</sup> The indexes tell a clear story. Secular growth has been a more important factor than business cycles in determining changes in exports. Exports have increased more often than they have declined during business contractions (five times against four) as well as during business expansions (seven times against three). Hence the conformity indexes are positive for expansions and inverse for contractions. Even more significant is the index for full cycles, which counts as conforming positively all cycles when exports rise less (or fall more) in contractions than in adjacent expansions. This index is not affected by trend, since it rests on comparative rates of change. That it is as low as +11 for 1879-1913 indicates that, in the nine and a half business cycles covered, the rate of growth of exports in business expansions exceeded that in adjacent business contractions only slightly more often than vice versa.

Other measures confirm the finding that before World War I exports developed only a trifle less favorably in business contractions than in business expansions. When we divide cycle phases into stages and note the direction of export movements from stage to stage within each phase we find that 60 per cent of forty interstage changes in business expansions and 53 per cent of thirty-six such changes in business contractions were rises.

Not only the frequency of export rises but also their rate of growth was on the average only moderately higher in business expansions than in contractions (Table 5 and Chart 2). The average annual increase during business prosperity was 3.7 per cent compared to 3.0 per cent during business recessions. Since business expansions were on the average longer than contractions, the difference between total growth of exports in expansions (7.2 per cent) and in contractions (4.9 per cent) was larger than in rates of growth. Still, the resulting total business cycle amplitude of only 2.3 per cent is among the lowest found in any economic series. It is only about 4 per cent of the total cyclical variation of exports.

Not even vigorous business expansions or severe business contractions have commanded regular conformity of exports. For example, exports declined during the strong expansion of 1908-10 and rose during the severe contraction of 1895-96. The absence of a relation between export changes and the amplitudes of business cycle phases can be seen when phases are ranked by their amplitude.<sup>4</sup> We find that the average amplitude of phases

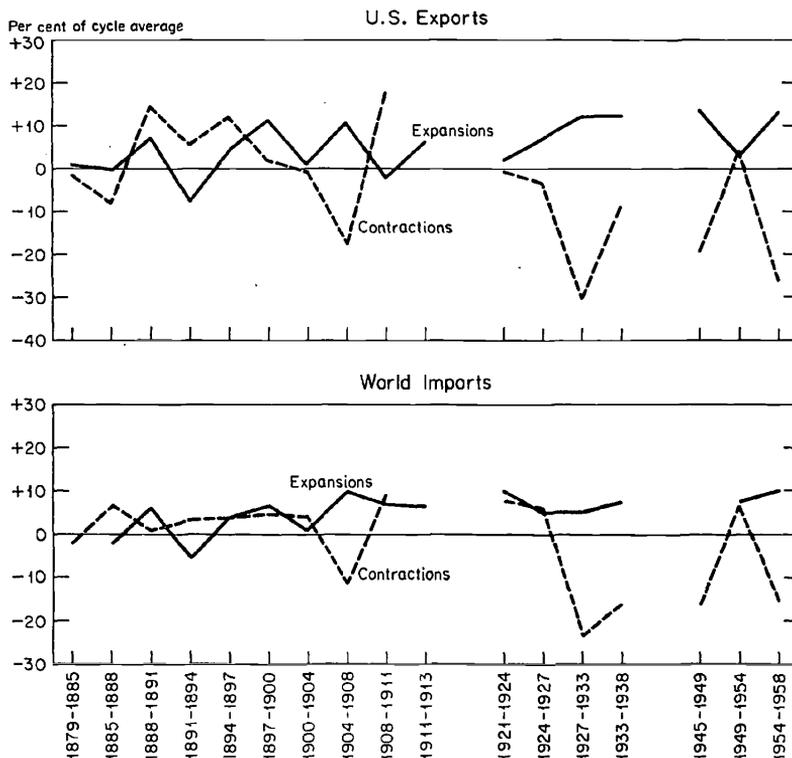
<sup>3</sup> For a more exact description, see Appendix B.

<sup>4</sup> Ranking measures exclude the 1879-82 expansion in order to be comparable to corresponding measures for world trade discussed below.

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CHART 2

Annual Percentage Change During Individual Business Expansions and Contractions: U.S. Exports and World Imports, 1879-1958



World imports exclude U.S. imports.  
See Table 1, notes 1-4.

with export rises does not differ significantly from that with export declines. When the smallest business expansion or contraction receives rank 1, the average rank of business expansions with rising exports is 4.7 and with declining exports 5.7. For business contractions, the rank of those with export rises is 5.1 and with export declines 4.9. Coefficients of rank correlation are not significant. All of the foregoing agrees with Mitchell's view cited above. Clearly, export movements before World War I do not appear to have been closely related to cycles in United States business.

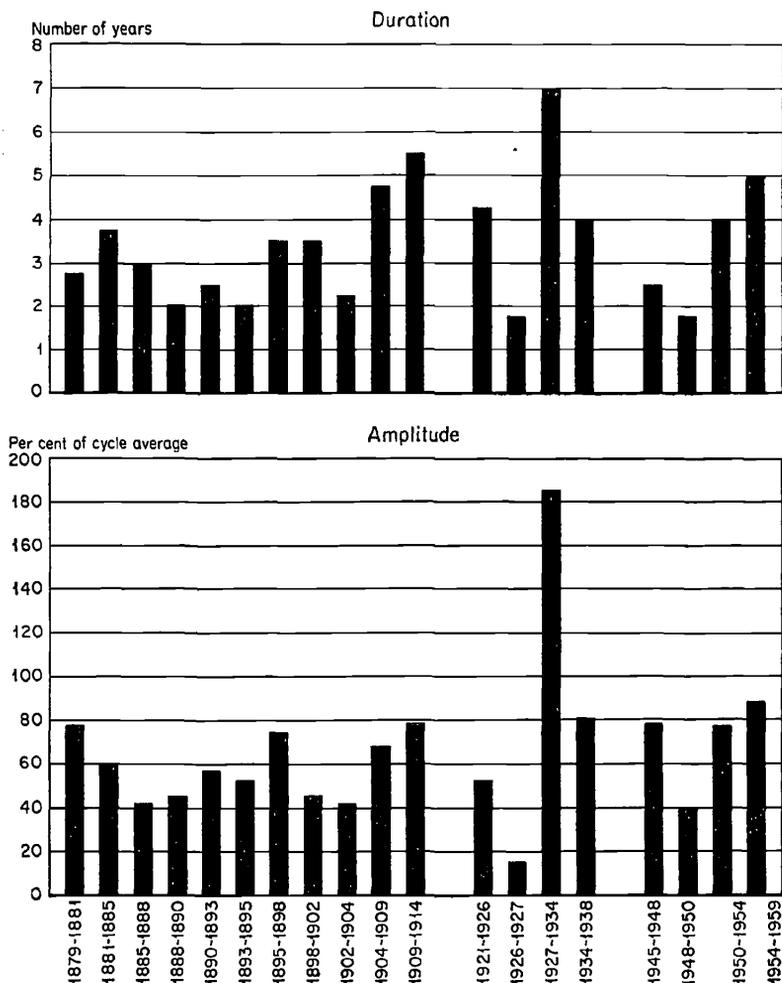
But what has the story been since the end of World War I? Apart from the Great Depression cycle of 1929-37, export swings during 1921-59 have

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again averaged about three years, as in the earlier period (Table 4), with expansions again about two years and contractions again five quarters. The two latest declines in 1952-54 and 1957-59, each lasting two years, were the longest contractions since the 1880's, again except for the Great Depression. As one would have expected, amplitudes of export cycles were mild in the 1920's and severe in the 1930's (Chart 3). What is noteworthy,

### CHART 3

#### Duration and Amplitude of Individual U.S. Export Cycles, 1879-1959



The amplitude equals the sum of the total percentage rise and fall.  
See Table 1, notes 1-4.

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however, is the violence of three out of the four export swings since 1945. The average rise and fall of exports in these cycles reached 70 per cent and the annual rate of change 21 per cent, against 54 and 18 per cent in 1879-1913. This recent increase in the instability of exports is worth noting because it is in contrast to the observation that cyclical fluctuations in general are milder today than they used to be. That exports have not shared in the trend toward greater stability can probably be ascribed largely to the impact of war and cold war. It is not surprising that events like the Korean War or the Suez crisis result in unusually violent export movements. We shall see below that not only United States exports but also total world trade is more unstable now than in 1883-1913.

The really striking change is not in export cycles as such, however, but in their relation to expansions and contractions in general business. A look at Charts 4 and 5 shows how exports have come to conform to business cycles. The sharp contraction of 1920-21, the subsequent vigorous expansion, the mild recession of 1926-27, the final spurt to 1929, and the tremendous slump, weak recovery,<sup>5</sup> and renewed decline of the 1930's all appear clearly in the fluctuations of exports. Again, after World War II exports rose steeply during part of the first two business expansions and almost all of the last one, while they fell in two of the three contractions.

The conformity indexes for the seven cycles since 1921 are +100 for expansion, +71 for contraction, and +83 for full cycles. In other words, in eleven out of twelve comparisons of changes in contractions with those in preceding or succeeding expansions, exports fell more (or rose less) in the contraction (Table 5 and Chart 2).

Amplitudes and rates of change also tell the same story. During the average business expansion in the interwar and postwar periods (excluding the Great Depression), exports rose 22 per cent, or three times as much as in the period before World War I. During the average contraction, they fell 8 per cent against a former *rise* by 5 per cent. The result is that the total rise and fall over a business cycle was on the average 30 per cent in the later period, against 2 per cent in the earlier period.<sup>6</sup>

We saw above that there was no major change in the average cyclical variability of exports after World War I and only a moderate rise in it after World War II. Hence the larger movements during business cycles are due primarily to the greater consilience of changes in exports and domestic business. This appears clearly when annual rates of change in exports during export cycles and business cycles are compared. Before

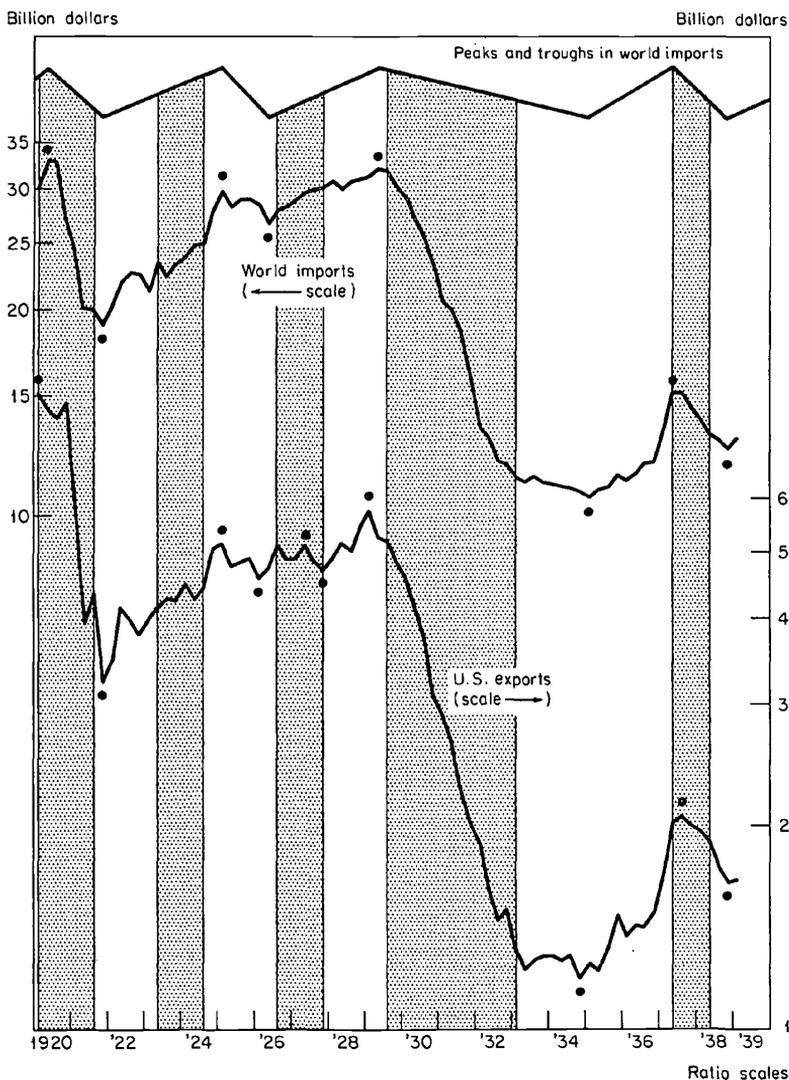
<sup>5</sup> In current dollars the recovery was much greater, of course.

<sup>6</sup> If the enormous export movements of the 1930's were included, the average for the cycles 1921-59 would amount to a 26 per cent rise in expansion and a 23 per cent fall in contraction.

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## CHART 4

### U.S. Exports and World Imports During Cycles in World Imports and Domestic Business, Quarterly Totals at Annual Rates, 1920-39

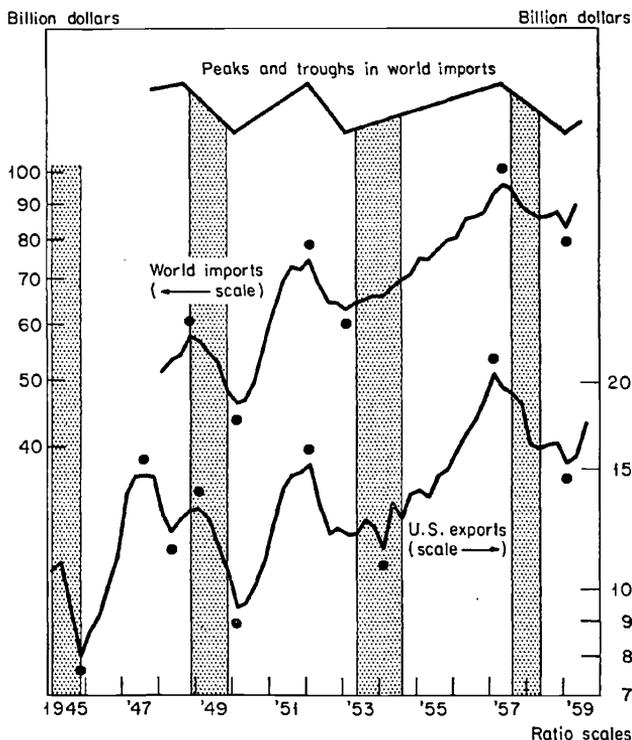


Seasonally adjusted.  
 In dollars of 1930 parity.  
 World imports exclude U.S. imports.  
 Shaded areas are U.S. business contractions.  
 Dots denote turns of series.

# Exports and United States Business Cycles

## CHART 5

### U.S. Exports and World Imports During Cycles in World Imports and Domestic Business, Quarterly Totals at Annual Rates, 1945-59



Seasonally adjusted.

Military grant aid excluded from exports for 1950-59.

World imports exclude U.S. imports.

Shaded areas are U.S. business contractions.

Dots denote turns of series.

World War I, the rate during business cycles was 4 per cent of that during export cycles, since 1945 it has been 48 per cent. In the interwar period, it was as high as 67 per cent when the 1929-37 cycle is included and 39 per cent when it is excluded.

Does the shift in the averages represent a sudden break in the behavior of exports or does a gradual change appear as a break because of our division of the historical period? Examination of successive cycles shows clearly that there was no positive conformity of exports before the turn of the century. The years 1904-24 may perhaps be considered as a period of transition from irregularity to positive conformity. In the first cycle

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of this period, 1904-07, exports for the first time rose and fell sharply with the tides in business. This was followed again by an inverse movement in the last cycle before World War I, 1908-12, with the rate of increase in the contraction of 1910-12 the largest in any contraction covered. The first interwar cycle, 1921-24, on the other hand, differs from the three later ones in that the standing of exports at the business peak was almost the same as that at the preceding and following troughs.<sup>7</sup> Thus one can either regard the two cycles 1904-07 and 1921-24 as exceptions, or one can view them as belonging to a period of transition.

Since we have stressed the drastic shift toward conformity of exports to business cycles, a word of caution is in order. The recent conformity of exports does not mean that every—not even nearly every—export movement now agrees with the trend in general business. A glance at the charts will suffice to show that at times exports have moved counter to business activity. In 1925, e.g., exports diminished while business expanded and the same holds for 1947-48 and 1951-52, and they rose in the business contraction of 1953-54.

For a more precise idea of the extent of agreement, we may observe the direction of export movements from stage to stage of individual business cycles. We have seen that before 1914 the percentage of rises in these interstage movements was nearly as high in business contractions as in expansions. The situation was very different in 1921-58, when 64 per cent of interstage changes were rises during the upswing of the business cycle and only 25 per cent during the downswing. Yet this means that even in the later period 30 per cent of interstage movements were counter-cyclical.<sup>8</sup>

The more detailed analysis in Chapter 6 will shed more light on the relations of exports and domestic business cycles. First, however, we want to proceed in other directions. Is the shift in the cyclical behavior of exports due to a shift in their response to changes in foreign demand or to a shift in the relations of foreign and domestic cycles? The following chapters will investigate these questions.

<sup>7</sup> A change in the difficult seasonal adjustment would convert the rise 1921-23 into a decline. The quarterly series moves inversely to both phases of this cycle.

<sup>8</sup> Another finding pointing in the same direction is that amplitudes of exports and of business cycle phases show no correlation for 1921-58.