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When and Why Exports Reverse Their Course

1. *The Problem and the Method*

The purpose of this chapter is to obtain information on the relation of U.S. exports to U.S. business cycles by focusing on cyclical turning points. In order to find out whether export peaks match business cycle peaks, or troughs, or neither, and whether domestic business cycle (DBC) turns cause export turns or vice versa, we must, of course, try to ascertain the role of the main factors other than the DBC in reversing exports. Thus the influence of turns in foreign demand must be examined and, in some cases, independent fluctuations in supply may also require attention.

The various possible relations between exports and DBC have been discussed in Chapter 1. Applied to turning points, this analysis leads to the following conclusions: Export troughs may be associated with DBC troughs for two reasons. The first is that the upturn in exports pulls the economy out of recession; the second is that a trough in foreign demand coincides with a U.S. business cycle trough. On the other hand, an export trough may occur near the DBC peak due to the favorable effect of a decline in domestic demand on exports. Export peaks may similarly be associated either with peaks or with troughs in the DBC. Only empirical investigation can ascertain the actual relationships, their shifts over time, and their variations by classes of export commodities. This is no simple matter, however. Most export series are choppy, which makes dating of turning points difficult. Decisions also depend in some instances, to an uncomfortable extent, on the validity of the adjustment for enormous seasonal variations. Once the turns are selected, they must be matched with like turns in world import cycles (WIC, also referred to simply as world cycles), and in DBC, and also with unlike turns in DBC. To avoid arbitrary decisions, this matching has been reduced, as far as possible, to an objective basis. It is done by National Bureau experts who are guided by a set of rules developed by Burns and Mitchell and adapted by me for this particular purpose. (See Appendix D.)

Considerable insights into the causes of export turns are gained when the several timing measures are used in combination. Since some turns in the WIC are far apart from those in the DBC, the separate impact of the two cycles can be observed and these observations applied in interpreting the remaining instances. The explanation of export turns is also greatly assisted by observation of corresponding turns in export prices. Simultaneous like turns in export prices and quantity support the attribution of turns in export quantity to WIC turns, while inverse price-to-quantity turns imply that the latter are caused by change in domestic demand.

Findings about export turns must, of course, be combined with findings about other aspects of export movements, e.g., rates of change, which will be sought by more formal methods in the following chapters. However, though of limited scope, the timing analysis lays the groundwork for the more general approach. In contrast to measures of average relationship, it copes with the special problem of export analysis: the possibility of alternately positive and inverse relations between business cycles and exports.

The analysis deals primarily with export quantities because their movements reflect the causal factors more clearly than those of values. For instance, a peak in the DBC may be associated with a peak in export prices and a trough in export quantities, while export values may fail to turn up as the fall in prices offsets the rise in quantities. Quantity turns thus yield a clearer picture, particularly when the inverse DBC effect plays a large role.

Since, however, divergence of quantity from value turns is the exception rather than the rule, the findings about the former also fit the latter in most instances. Nearly two out of every three value turns coincide exactly with their quantity counterpart and four out of five coincide at least roughly (i.e., are not more than one quarter apart).[1]

The frequent coincidence of value and quantity turns is due largely to the relative mildness of price movements. It is for this reason that price turns, which typically do not coincide with like quantity turns, rarely bring about a turn in export value, while most quantity turns cause value turns. The behavior of prices also is not responsible for systematic leads or lags of values relative to quantities. Sometimes prices continue to rise or fall for a while after volume has begun to decline or to expand. In such cases value lags behind quantity.

[1] After World War II, twenty-seven out of thirty turns coincide.

But in other instances prices lead, and the value turn precedes that in quantity.

That export quantity turns coincide so frequently with export value turns and neither lead nor lag behind them systematically is important for the evaluation of leads and lags of export quantities at world import turns. Since the series used represents the value, not the quantity, of world imports, divergence between value and quantity turns would affect the timing measures. As it is, however, no such bias is likely, though individual measures may, of course, differ somewhat from what they would have been if a world quantity series had been used.

2. *Foreign Demand as Cause of Export Turns*

a. ASSOCIATION OF EXPORT TURNS WITH TURNS IN WORLD IMPORTS

The most important factor causing U.S. exports to reverse their direction is turning points in world demand. Hence an analysis of the relation between export turns and world import cycle turns may usefully precede the discussion of the timing of export turns at DBC turns. In addition, the timing of exports at WIC turns is interesting in its own right.

During the full period covered, there are twenty-eight turns in world imports, fourteen before World War I and fourteen thereafter. Without exception, these reversals in world imports were accompanied by like turns in total export quantity and value, and in the great majority of instances also by turns in each of the commodity classes. Out of ninety-eight observations on these classes, export quantities turned eighty-five times at WIC turns and export value eighty-seven times (Table 14). In view of the innumerable special factors which at one time or another affect a particular class of export goods, also the probable countereffect of the DBC, and finally the likelihood of errors in the choice of turning dates, this proportion of corresponding turns is striking. It is even more so when we note that about half of these related turns in export quantity and value coincide roughly with the world turn, i.e., occur not more than one quarter earlier or later.[2]

Of those thirteen instances in which an export quantity series failed to turn when world imports did, six are turns missed by finished manu-

[2] The percentage of coincident peaks is almost the same as given above for all turns combined. The percentage of coincident troughs is higher in the later and lower in the earlier years.

TABLE 14

Timing of Twenty-Eight Turns in World Import Cycles (WIC) Related to Turns in U.S. Export Quantities (EQ) and U.S. Export Values (EV), 1880-1963

	Turns in Exports					
	Total (1)	Finished Manufactures (2)	Semi-manufactures (3)	Crude Materials (4)	Foods (5)	Sum of Commodity Classes (Cols. 2+3+4+5) (6)
			Export Quantities			
No. of WIC turns related to EQ turns	28	22	14	24	25	85
Roughly coincident[a]	15	10	8	12	10	40
Lead or lag by two or more quarters	13	12	6	12	15	45
No. of WIC turns not related to EQ turns	0	6	0	4	3	13
No. of EQ turns not related to WIC turns	8	2	4	22	15	43
			Export Values			
No. of WIC turns related to EV turns	28	22	14	26	25	87
Roughly coincident[a]	21	10	10	15	14	49
Lead or lag by two or more quarters	7	12	4	11	11	38
No. of WIC turns not related to EV turns	0	6	0	2	3	11
No. of EV turns not related to WIC turns	8	0	2	14	16	32

Based on seasonally adjusted quarterly series.

World imports exclude U.S. imports.

Data for 1933-38 are in dollars of 1930 parity, otherwise in current dollars.

Military grant aid is excluded from exports beginning with the third quarter of 1950.

Coverage: See turns in Tables 15-22.

[a]Interval of one quarter or less.

factures due to their strong upward trend which caused them to skip mild world cycles before 1913 as well as in the 1920's. The others are cases where crude materials or food exports moved differently from WIC.

The emphasis so far on the correspondence between export and world import turns must not mislead us, however. The rule that exports turn when world demand turns is not reversible, and there are many peaks and troughs in exports which cannot be explained by WIC. Within the period covered by WIC, there are forty instances where an export value series and fifty-one instances where an export quantity series reverses itself without relation to a corresponding WIC turn. This amounts to 26 and 31 per cent, respectively, of all such export turns. In some instances these noncorresponding export cycles have a counterpart in a mild swing of the slow-moving world imports. But often they do reflect independent swings with amplitudes which sometimes exceed those of the matched cycles.

That the number of these extra cycles is larger for quantity than for value is not due to chance. It indicates that value movements in some cases are milder than those of quantity, which implies that price changes are in the opposite direction. Inverse price-to-quantity changes suggest the influence of domestic factors. The extent to which the extra export cycles are due to domestic business fluctuations will be investigated below. First, however, we must take a closer look at the behavior of exports at world import turns.

b. LEADS AND LAGS OF EXPORTS AT WORLD CYCLE TURNS

Do U.S. exports recover and slump earlier or later than world imports? The answer depends on the commodity class considered; it also differs for the lower and the upper turning points. However, the timing of a given class of goods is fairly consistent at all peaks or all troughs over the long span covered (Tables 15–22). When all quantity classes are lumped together, leads are nearly twice as frequent as lags since some series typically begin to fall before world imports have reached their peak while improvement in others regularly precedes the WIC trough. Lags are typical only of food exports at troughs before 1913.

The interval between turning points in U.S. exports and world imports is, in most instances, brief. There are only a few medians of two quarters or more, all before 1913. Value turns are even closer to WIC turns than those in quantity (Tables 19–22), another indica-

tion of the fact that export value (EV) movements, due to the conformity of export prices to WIC, agree even better with WIC than export quantity (EQ) movements. (This is also shown by the smaller number of extra EV turns and by measures of conformity, etc.) [3]

Exports of semimanufactures, crude materials, and foods usually begin to decline before world imports do. From 1881 to 1959, the value of exports of these classes leads at the WIC peak in twenty-two instances, the quantity in twenty-five. By contrast, there are merely six and seven lags. Foods, which are the first to slump, also are the last to recover and lag in most instances at WIC troughs in the earlier period. In later years, their timing at WIC troughs becomes irregular.[4]

Revival of crude materials exports sometimes precedes and sometimes follows that in world imports. This irregularity and the relatively long intervals indicate that correspondence between troughs in such exports and in WIC is not close.

The timing of exports of finished manufactures differs from that of other classes.[5] Resumption of growth occurs more quickly, slackening more slowly. At WIC peaks before 1913, this means that average leads of finished manufactures export quantity (MEQ) are shorter than those of other classes. In the later period, lags become as frequent as leads, and the median interval between peaks in MEQ or MEV and WIC peaks is zero. The contrast between exports of manufactures and other classes is most pronounced at WIC troughs before 1913. While other classes lag, manufactures lead, particularly in terms of quantity. On the average, MEQ starts rising more than two and a half quarters earlier than world imports. At later world troughs, the role of leader is taken over by semimanufactures while finished manufactures, particularly in terms of value, alternately lead and lag like other classes.

The timing of the total quantity of U.S. exports (TEQ) and WIC turns can now be understood in terms of that of the various classes. At world import peaks, the strong tendency of crude materials export quantity (CEQ) and food export quantity (FEQ) to lead, combined with the mixed timing of MEQ, causes TEQ peaks to precede WIC

[3] With two exceptions, all median leads or lags in EQ are longer than in the corresponding EV series. The mean of the medians (disregarding signs) is one quarter for EQ and 0.7 quarter for EV. In evaluating these intervals, it may be recalled that the average duration of WIC was twenty quarters, fourteen of which were expansions and six contractions.

[4] This is due in part to governmental farm policies. See Section 9 of this chapter.

[5] Except that semimanufactures behave like finished manufactures at WIC troughs, though not at peaks.

peaks in the majority of instances before as well as after 1913. The median lead is a little shorter in the later period, when MEQ has greater weight, than in the earlier one.

The same holds for the timing of total export value at WIC peaks, except that in the early period two leads are replaced by coincidences. This is due to slight differences between the value and the quantity series, which caused the selection of later peaks in the former in 1903 and 1907.

The change in the commodity composition of exports between the earlier and later period causes a significant change in the timing of total export quantity and value (TEV) at WIC troughs. Before 1913, when FEQ has much weight and MEQ is not important, TEQ tends to lag. After 1920, the irregular leads and lags of its components result in TEQ troughs coinciding with WIC troughs in four out of seven instances and also on the average.

C. DIFFERING SECULAR TRENDS AS MAIN CAUSE OF TIMING DIFFERENCES BETWEEN CLASSES

In evaluating the timing of exports at world cycle turns, attention must be paid first to the nature of the data. U.S. exports, it must be remembered, are being related to other countries' imports. Since any given shipment is counted as an export before being counted as an import, a bias toward leads is thus imparted to the timing comparisons—a bias which may vary over time and from class to class according to the average duration of transportation. However, the effect of this bias appears to be slight, at least when the measuring units are as large as quarters. One indication of the minor role of shipping time is that the tremendous speeding up of transportation has not led to a general shortening of export leads. The briefness of leads and the frequency of coincidences point in the same direction, and the fact that turns in total export value coincide on the average with WIC turns further supports this view. This aspect of the measures thus may be assumed to be of minor importance.

The explanation of the divergencies between export and WIC turns and of variations in leads and lags by commodity classes lies mainly in the differing long-run trends of the various series. Export classes with rapid secular growth, like finished manufactures before World War I and in the interwar period, turn down later and up earlier than those which develop more slowly. Conversely, the falling trend of food exports accounts for early peaks and late troughs, particularly before 1913.

Cyclical sequences may also be expected to account for timing differences among commodity classes. One would expect turns in raw materials to precede those in finished goods due to the greater cycle sensitivity of the demand for the former. Actually, crude materials peaks do, on the whole, lead peaks in finished manufactures. But the explanation does not fit at troughs where the rise in crude materials tends to lag behind that in finished manufactures. Here the trend effect evidently was stronger than the cyclical one. Crude materials prices also do not lead finished manufactures prices at WIC troughs and hence crude materials export values (CEV) do not lead MEV any more than CEQ lead MEQ.

d. CONCLUSION

In sum, then, one may expect all classes of U.S. exports to turn at about the same time as world imports, with fast-growing classes beginning to rise somewhat earlier and to fall somewhat later and with the declining classes showing the opposite behavior.

The findings throw some light on the view that, since the mid-fifties, demand for American exports has become marginal. If this view is taken to imply that U.S. exports rise later and fall earlier than other countries' exports, it is not supported by the timing measures for the 1957 and 1959 WIC turns which fail to reveal a shift toward earlier U.S. export peaks or later troughs. At the 1957 WIC peak, total exports lead by one quarter as on many earlier occasions, and finished manufactures even lag by two quarters, which is more than the usual lag. The following trough of total and of finished manufactures coincides with that in world imports, while the upturn in semimanufactures even leads that of world imports by one year. It is possible, of course, that the supposed relation prevailed between U.S. exports and those of certain individual foreign countries, but it is not to be found in the relation of turning points in U.S. exports to those in total world trade. (The remarks on export turns of semimanufactures in 1960–61 in section 7 of this chapter suggest another possible application of the marginal supplier theory.)

3. *Domestic Business Cycles as Cause of Export Turns*

Having established the role of turns in world demand as a cause of reversals in U.S. exports, we can now attack our main problem: the effects of DBC turns and export turns on one another.

It is clear from the preceding findings that the direct relations between exports and DBC turns must be obscured to some extent by the impact of WIC turns. Assume, for instance, that an export peak coincides with a peak in domestic business. Does this indicate a causal relation between exports and domestic business? Does the downturn in the former cause that in the latter? Or is the coincidence due to a simultaneous downturn in world imports, so that the relation between export and DBC turn is merely derived from the relation to the WIC turn? Such questions must be answered if the timing of export turns relative to the DBC is to be interpreted.

Before analyzing individual peaks and troughs from this point of view, it is desirable to have a general idea of the relative location of world and domestic turns. The more closely they coincide, the more easily will an export peak caused by a WIC peak appear to match a DBC peak, and correspondingly for troughs.

Tables 15–18 present the needed information. They show, for instance, that from 1882 through 1902 not one out of thirteen U.S. business peaks or troughs is within two quarters of those in the WIC. From 1904 to 1913, however, there are four such close turns, and in the period 1920–58 half of all DBC turns belong in this class. This suggests that a large number of export turns will be close to DBC turns because of their relation to WIC turns in the later period, a smaller number only in the earlier one.[6] Good examples for this type of situation are the peaks in 1907, 1937, and 1957, or the trough of 1938.[7]

Tables 15–18 also provide evidence for the view that correspondence between turns in exports and like DBC turns is, in most cases, due to the intervention of WIC turns. To see this, one must scan the entries at those turns in the DBC which stand far apart from

[6] There are a few instances where an export and a DBC turn are associated through a WIC turn despite a long interval between the latter and the DBC turn. The most extreme cases of this type are represented by the troughs in MEQ and SEQ (semimanufactures export quantities) in 1932, which are probably due to the revival of world demand though the world trough occurs only ten quarters later. Chart 17 shows that the enormous fall in world imports actually ends in the first quarter of 1933. The slight further fall, which pushes the world trough out to 1935, is partly due to the weakness of prices and partly to delayed recovery of food imports.

[7] It may be noted that, even when a WIC and a DBC turn coincide, an export turn may match one without matching the other, as happens, for instance, in the DBC and WIC troughs of 1908. The FEQ trough of 1910 can be regarded as lagging behind the latter since world imports continued to expand until 1913. But the same FEQ trough coincides with a DBC peak and can not, therefore, be matched with the 1908 DBC trough.

TABLE 15

Leads (-) and Lags (+) of Peaks in U.S. Export Quantities *(EQ) at Peaks in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1880-1913*

Peaks in	Year and Quarter	Total	Finished Manufactures	Crude Materials	Foods
		Number of Quarters			
DBC	1882 I	n.r.	n.r.	n.r.	n.r.
WIC	1883 II	-1	0	-1	-1
DBC	1887 II	-1	n.r.	n.r.	-1
DBC	1890 III	n.r.	n.r.	n.r.	-2
WIC	1891 IV	+1	+1	-2	+1
DBC	1893 I	n.r.	n.r.	n.r.	n.r.
WIC	1894 I	-2	n.r.	+4	-2
DBC	1895 IV	n.r.	n.r.	n.r.	n.r.
DBC	1899 III	n.r.	+2	n.r.	-5
WIC	1900 II	+4	-1	-1	-8
DBC	1902 IV	+1	n.r.	+1	+1
WIC	1903 IV	-3	n.r.	-3	-3
DBC	1907 II	-1	+1	-1	-6
WIC	1907 III	-2	0	-2	-7
DBC	1910 I	n.r.	n.r.	n.r.	n.r.
DBC	1913 I	+2	0	n.r.	+1
WIC	1913 III	0	-2	+1	-1
Average lead or lag:					
DBC median		0	+1.0	0	-1.5
DBC mean		+0.2	+1.0	0	-2.0
WIC median		-1.0	-0.3	-1.3	-2.0
WIC mean		-0.4	-0.4	-0.6	-3.0
		Number of Turns			
DBC peaks:					
Related to EQ peaks		4	3	2	6
Not related to EQ peaks		6	7	8	4
WIC peaks:					
Related to EQ peaks		7	5	7	7
Not related to EQ peaks		0	2	0	0
EQ peaks:					
Not related to DBC peaks		6	4	11	6
Not related to WIC peaks		2	1	5	4

n.r. = not related.

Notes follow Table 24.

TABLE 16

Leads (-) and Lags (+) of Troughs in U.S. Export Quantities *(EQ) at Troughs in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1880-1913*

Troughs in	Year and Quarter	Total	Finished Manufactures	Crude Materials	Foods
		Number of Quarters			
WIC	1881 I	+5	-3	+4	+5
DBC	1885 II	+1	-3	0	n.r.
WIC	1886 I	-2	-6	-3	-1
DBC	1888 I	+2	n.r.	n.r.	+1
DBC	1891 II	n.r.	n.r.	n.r.	-1
WIC	1893 I	0	-2	0	0
DBC	1894 II	+5	n.r.	n.r.	+5
WIC	1895 I	+2	n.r.	+2	+2
DBC	1897 II	n.r.	n.r.	n.r.	n.r.
DBC	1900 IV	n.r.	+1	+6	+5
WIC	1901 IV	+2	-3	+2	+1
WIC	1904 II	0	n.r.	0	+1
DBC	1904 III	-1	n.r.	-1	0
WIC	1908 II	+7	+2	-3	+7
DBC	1908 II	n.r.	+2	-3	n.r.
DBC	1911 IV	n.r.	n.r.	n.r.	+2
Average lead or lag:					
DBC median		+1.5	0	-0.5	+1.5
DBC mean		+1.8	0	+0.5	+2.0
WIC median		+1.3	-2.7	+0.7	+1.3
WIC mean		+2.0	-2.4	+0.3	+2.1
		Number of Turns			
DBC troughs:					
Related to EQ troughs		4	3	4	6
Not related to EQ troughs		5	6	5	3
WIC troughs:					
Related to EQ troughs		7	5	7	7
Not related to EQ troughs		0	2	0	0
EQ troughs:					
Not related to DBC troughs		5	3	8	5
Not related to WIC troughs		2	1	5	4

n.r. = not related.

Notes follow Table 24.

TABLE 17

Leads (-) and Lags (+) of Peaks in U.S. Export Quantities (EQ) at Peaks in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1920-63

Peaks in	Year and Quarter	Total	Finished Manufactures	Semimanufactures	Crude Materials	Foods
			Number of Quarters			
DBC	1920 I	-3	+3	-2	0	n.r.
WIC	1920 II	-4	+2	-3	-1	n.r.
DBC	1923 II	n.r.	n.r.	n.r.	n.r.	n.r.
WIC	1925 I	-1	n.r.	-1	n.r.	-1
DBC	1926 III	+3	n.r.	n.r.	+2	n.r.
WIC	1929 II	-1	-1	-5	-4	-1
DBC	1929 III	-2	-2	-6	-5	-2
WIC	1937 II	+2	+1	+1	+3	+4
DBC	1937 II	+2	+1	+1	+3	n.r.
WIC	1948 IV	+1	-6	+1	n.r.	-5
DBC	1948 IV	+1	-6	+1	n.r.	-5
WIC	1952 I	0	-2	-2	-1	-3
DBC	1953 II	-5	-7	n.r.	n.r.	-8
WIC	1957 II	-1	+2	-1	-1	-2
DBC	1957 III	-2	+1	-2	-2	-3
DBC	1960 II	n.r.	n.r.	+1	+2	n.r.
Average lead or lag:						
DBC median		-1.0	-0.5	-0.5	+1.0	-4.0
DBC mean		-0.9	-1.7	-1.2	0	-4.5
WIC median		-0.7	0	-1.3	-1.0	-1.5
WIC mean		-0.6	-0.7	-1.4	-0.8	-1.3
			Number of Turns			
DBC peaks:						
Related to EQ peaks		7	6	6	6	4
Not related to EQ peaks		2	3	3	3	5
WIC peaks:						
Related to EQ peaks		7	6	7	5	6
Not related to EQ peaks		0	1	0	2	1
EQ peaks:						
Not related to DBC peaks		3	0	4	6	5
Not related to WIC peaks		2	0	2	6	3

n.r. = not related.

Notes follow Table 24.

TABLE 18

Leads (-) and Lags (+) of Troughs in U.S. Export Quantities *(EQ) at Troughs in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1920-63*

Troughs in	Year and Quarter	Total	Finished Manufactures	Semimanufactures	Crude Materials	Foods
			Number of Quarters			
DBC	1921 III	+1	+2	-1	+4	n.r.
WIC	1921 IV	0	+1	-2	+3	n.r.
DBC	1924 III	n.r.	n.r.	n.r.	n.r.	n.r.
WIC	1926 II	-3	n.r.	-1	n.r.	-2
DBC	1927 IV	0	n.r.	n.r.	0	+2
DBC	1933 I	-2	-2	-2	0	+2
WIC	1935 I	-1	-10	-10	-1	+7
DBC	1938 II	+2	+1	+1	+2	n.r.
WIC	1938 IV	0	-1	-1	0	n.r.
DBC	1945 IV	0	0	-1	-3	-3
DBC	1949 IV	+1	+2	+2	n.r.	+1
WIC	1950 I	0	+1	+1	n.r.	0
WIC	1953 I	+4	-2	+1	0	+4
DBC	1954 III	-2	-8	n.r.	n.r.	-2
DBC	1958 II	+3	+3	-1	+3	-1
WIC	1959 I	0	0	-4	0	-4
DBC	1961 I	n.r.	n.r.	+2	+4	n.r.
Average lead or lag:						
DBC median		+0.5	+1.0	-0.3	+1.7	0
DBC mean		+0.4	-0.3	0	+1.4	-0.2
WIC median		0	-0.5	-1.3	0	+0.7
WIC mean		0	-1.8	-2.3	+0.4	+1.0
			Number of Turns			
DBC troughs:						
Related to EQ troughs		8	7	7	7	6
Not related to EQ troughs		2	3	3	3	4
WIC troughs:						
Related to EQ troughs		7	6	7	5	5
Not related to EQ troughs		0	1	0	2	2
EQ troughs:						
Not related to DBC troughs		3	0	4	6	4
Not related to WIC troughs		2	0	2	6	4

n.r. = not related.

Notes follow Table 24.

TABLE 19

Leads (-) and Lags (+) of Peaks in U.S. Export Values (EV) at Peaks in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1880-1913

Peaks in	Year and Quarter	Total	Finished Manufactures	Crude Materials	Foods
		Number of Quarters			
DBC	1882 I	n.r.	+5	n.r.	n.r.
WIC	1883 II	-1	0	-1	-1
DBC	1887 II	-4	n.r.	n.r.	-1
DBC	1890 III	n.r.	+1	n.r.	-2
WIC	1891 IV	0	-4	-3	+1
DBC	1893 I	n.r.	n.r.	n.r.	-4
WIC	1894 I	-2	n.r.	-1	n.r.
DBC	1895 IV	n.r.	n.r.	+3	n.r.
DBC	1899 III	n.r.	+2	n.r.	-5
WIC	1900 II	+4	-1	+2	-8
DBC	1902 IV	n.r.	n.r.	n.r.	+1
WIC	1903 IV	0	n.r.	n.r.	-3
DBC	1907 II	+3	+1	-1	0
WIC	1907 III	+2	0	-2	-1
DBC	1910 I	n.r.	n.r.	n.r.	n.r.
DBC	1913 I	+2	+1	+3	+1
WIC	1913 III	0	-1	+1	-1
Average lead or lag:					
DBC median		+0.3	+1.3	+1.7	-1.0
DBC mean		+0.3	+2.0	+1.7	-1.4
WIC median		0	-0.7	-0.7	-1.0
WIC mean		+0.4	-1.2	-0.7	-2.2
		Number of Turns			
DBC peaks:					
Related to EV peaks		3	5	3	7
Not related to EV peaks		7	5	7	3
WIC peaks:					
Related to EV peaks		7	5	6	6
Not related to EV peaks		0	2	1	1
EV peaks:					
Not related to DBC peaks		8	1	6	5
Not related to WIC peaks		3	0	2	5

n.r. = not related.

Notes follow Table 24.

TABLE 20

Leads (-) and Lags (+) of Troughs in U.S. Export Values (EV) at Troughs in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1880-1913

Troughs in	Year and Quarter	Total	Finished Manufactures	Crude Materials	Foods
		Number of Quarters			
WIC	1881 I	+3	-3	+4	+5
DBC	1885 II	+1	n.r.	0	n.r.
WIC	1886 I	-2	+6	-3	-1
DBC	1888 I	+2	-2	n.r.	0
DBC	1891 II	n.r.	+5	n.r.	-2
WIC	1893 I	0	-2	0	n.r.
DBC	1894 II	+3	n.r.	+5	+3
WIC	1895 I	0	n.r.	+2	0
DBC	1897 II	n.r.	n.r.	+1	n.r.
DBC	1900 IV	n.r.	+1	n.r.	n.r.
WIC	1901 IV	+1	-3	+2	+1
WIC	1904 II	0	n.r.	n.r.	+1
DBC	1904 III	-1	n.r.	n.r.	0
WIC	1908 II	+3	+2	+2	+7
DBC	1908 II	+3	+2	+2	n.r.
DBC	1911 IV	n.r.	n.r.	n.r.	+2
Average lead or lag:					
DBC median		+2.0	+1.5	+1.5	+0.7
DBC mean		+1.6	+1.5	+2.0	+0.6
WIC median		+0.3	-1.0	+2.0	+1.0
WIC mean		+0.7	0	+1.2	+2.2
		Number of Turns			
DBC troughs:					
Related to EV troughs		5	4	4	5
Not related to EV troughs		4	5	5	4
WIC troughs:					
Related to EV troughs		7	5	6	6
Not related to EV troughs		0	2	1	1
EV troughs:					
Not related to DBC troughs		5	0	4	6
Not related to WIC troughs		3	0	2	5

n.r. = not related.

Notes follow Table 24.

TABLE 21

Leads (-) and Lags (+) of Peaks in U.S. Export Values (EV) at Peaks in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1920-63

Peaks in	Year and Quarter	Total	Finished Manufactures	Semimanufactures	Crude Materials	Foods
			Number of Quarters			
DBC	1920 I	0	+3	+1	0	n.r.
WIC	1920 II	-1	+2	0	-1	+2
DBC	1923 II	n.r.	n.r.	n.r.	n.r.	-3
WIC	1925 I	0	n.r.	0	0	-1
DBC	1926 III	n.r.	n.r.	-6	0	n.r.
WIC	1929 II	-1	-1	-1	-4	-1
DBC	1929 III	-2	-2	-2	-5	-2
WIC	1937 II	+1	+1	0	0	+4
DBC	1937 II	+1	+1	0	0	n.r.
WIC	1948 IV	+1	-5	+1	-7	-5
DBC	1948 IV	+1	-5	+1	-7	-5
WIC	1952 I	0	-2	-2	-1	-3
DBC	1953 II	-5	-7	-7	-6	-8
WIC	1957 II	-1	+2	-1	-1	-2
DBC	1957 III	-2	+1	-2	-2	-3
DBC	1960 II	n.r.	n.r.	+1	+2	n.r.
Average lead or lag:						
DBC median		-1.0	-0.5	-1.0	-1.0	-3.7
DBC mean		-1.2	-1.5	-1.8	-2.2	-4.2
WIC median		-0.3	0	-0.3	-1.0	-1.3
WIC mean		-0.1	-0.5	-0.4	-2.0	-0.9
			Number of Turns			
DBC peaks:						
Related to EV peaks		6	6	8	8	5
Not related to EV peaks		3	3	1	1	4
WIC peaks:						
Related to EV peaks		7	6	7	7	7
Not related to EV peaks		0	1	0	0	0
EV peaks:						
Not related to DBC peaks		3	0	1	3	4
Not related to WIC peaks		1	0	1	5	3

n.r. = not related.

Notes follow Table 24.

TABLE 22

Leads (-) and Lags (+) of Troughs in U.S. Export Values (EV) at Troughs in Domestic Business Cycles (DBC) and World Import Cycles (WIC), 1920-63

Troughs in	Year and Quarter	Total	Finished Manufactures	Semimanufactures	Crude Materials	Foods
			Number of Quarters			
DBC	1921 III	+1	+2	-1	+2	+1
WIC	1921 IV	0	+1	-2	+1	0
DBC	1924 III	n.r.	n.r.	n.r.	n.r.	-1
WIC	1926 II	-1	n.r.	-1	-1	-1
DBC	1927 IV	0	n.r.	-7	0	+3
DBC	1933 I	+7	+2	-2	0	+7
WIC	1935 I	-1	-6	-10	0	-1
DBC	1938 II	+1	+1	+1	+2	n.r.
WIC	1938 IV	0	-1	-1	0	n.r.
DBC	1945 IV	0	0	-1	-3	-3
DBC	1949 IV	+1	+2	+2	-6	+2
WIC	1950 I	0	+1	+1	-7	+1
WIC	1953 I	+4	-2	+1	0	+4
DBC	1954 III	-2	-8	-5	-6	-2
DBC	1958 II	+3	+3	-1	+4	-1
WIC	1959 I	0	0	-4	+1	-4
DBC	1961 I	n.r.	n.r.	+8	+4	n.r.
Average lead or lag:						
DBC median		+1.0	+1.7	-1.0	+0.7	0
DBC mean		+1.5	+0.3	-0.7	-0.3	+0.8
WIC median		0	-0.5	-1.3	0	-0.5
WIC mean		+0.3	-1.2	-2.3	-0.9	-0.2
			Number of Turns			
DBC troughs:						
Related to EV troughs		8	7	9	9	8
Not related to EV troughs		2	3	1	1	2
WIC troughs:						
Related to EV troughs		7	6	7	7	6
Not related to EV troughs		0	1	0	0	1
EV troughs:						
Not related to DBC troughs		2	0	1	3	2
Not related to WIC troughs		1	0	1	5	3

n.r. = not related.

Notes follow Table 24.

TABLE 23

Leads (-) and Lags (+) of Peaks *in U.S. Export Quantities (EQ) and Values (EV) at* Troughs *in Domestic Business Cycles (DBC), 1880-1913*

Domestic Business Cycles Troughs	Inverse Series, Crude Materials		Partly Inverse Series Foods		Total	
	EQ	EV	EQ	EV	EQ	EV
	Number of Quarters					
1885 II	-9	n.r.	-1	-1	n.r.	n.r.
1888 I	+6	+6	n.r.	n.r.	n.r.	n.r.
1891 II	0	-1	+3	+3	+3	+2
1894 II	+3	-2	-3	n.r.	-3	-3
1897 II	+4	-3	+4	+4	+4	+4
1900 IV	-3	0	n.r.	+2	+2	+2
1904 III	+3	+10	n.r.	n.r.	n.r.	n.r.
1908 II	+4	n.r.	n.r.	n.r.	n.r.	-1
1911 IV	+1	n.r.	-2	-2	n.r.	n.r.
Average lead or lag:						
Median	+2.3	-0.5	0	+1.3	+2.5	+1.0
Mean	+1.0	+1.7	+0.2	+1.2	+1.5	+1.3
	Number of Turns					
DBC troughs:						
Related to EQ or EV peaks	9	6	5	5	4	5
Not related to EQ or EV peaks	0	3	4	4	5	4
EQ or EV peaks Not related to DBC troughs	2	3	5	7	4	6

n.r. = not related.

Notes follow Table 24.

TABLE 24

Leads (-) and Lags (+) of Troughs *in U.S. Export Quantities (EQ) and Values (EV) at* Peaks *in Domestic Business Cycles (DBC), 1880-1913*

Domestic Business Cycles Peaks	Inverse Series, Crude Materials		Partly Inverse Series Foods		Total	
	EQ	EV	EQ	EV	EQ	EV
			Number of Quarters			
1882 I	0	0	+1	+1	+1	-1
1887 II	-8	n.r.	n.r.	n.r.	n.r.	n.r.
1890 III	-1	-1	n.r.	+1	-8	0
1893 I	0	0	0	n.r.	0	0
1895 IV	-1	-1	-1	-3	-1	-3
1899 III	-1	-8	n.r.	+2	-1	-4
1902 IV	-2	-2	-3	-3	-2	n.r.
1907 II	+1	n.r.	n.r.	n.r.	n.r.	n.r.
1910 I	0	-5	0	0	0	-4
1913 I	0	n.r.	n.r.	n.r.	n.r.	n.r.
Average lead or lag:						
Median	-0.5	-1.3	-0.3	+0.5	-0.7	-2.0
Mean	-1.2	-2.4	-0.6	-0.3	-1.6	-2.0
			Number of Turns			
DBC peaks:						
Related to EQ or EV troughs	10	7	5	6	7	6
Not related to EQ or EV troughs	0	3	5	4	3	4
EQ or EV troughs not related to DBC peaks	2	1	7	5	2	4

n.r. = not related.

Notes to Tables 15-24

The dates of all turns are indicated in Appendix A and in Charts 2-15. Those of TEQ, SEQ, CEQ, and FEQ can also be found in Tables 25-38.

Turns are matched by NBER staff, following mechanical rules.

Positive timing is shown for all series and periods, since all series are positively related to WIC.

Inverse timing relative to the DBC is shown for the one series which is classified as "inverse" by NBER rules, and for the two partly inverse series classified as "irregular" by NBER rules. Occasional inverse timing of series classified as "positive" is not shown in these tables, but is shown in Tables 25-38, except for MEQ which hardly ever turn at unlike DBC turns.

In some instances, the number of export turns compared with DBC turns exceeds the number compared with WIC turns, because some quarters covered by exports and the DBC are not covered by the world import series.

See notes to Table 14.

like WIC turns. None of the export quantity series, for instance, has a peak matching the DBC peaks in 1910 and 1923 or a trough in 1897 and 1924. Only in a very few cases does the table show a positive relation between exports and the DBC which is not accounted for by the WIC. It will be seen below that these few occurrences are, indeed, cases where export turns cause turns in domestic business.

Where the relation between export and DBC turns is not dominated by the relation to WIC turns, we expect it to be an inverse one, i.e., export peaks to be associated with DBC troughs and troughs with peaks. Tables 23 and 24 show the extent to which this expectation is justified in the cycles before 1913.[8] A glance at the systematic correspondence between DBC peaks and CEQ troughs should convince the reader that these tables have a story to tell.[9] This impression will be confirmed by the behavior of prices which will be included in the analysis in the next section.

The relative importance of changes in foreign and domestic demand varies greatly among commodity classes, which therefore have to be treated separately.

[8] For the period after 1921, inverse timing of exports at DBC turns has not been tabulated in this fashion because of the small number of cases. Those instances in which it does occur, however, are listed in Tables 25–38.

[9] In a few instances, the occurrence of an export turn at an unlike DBC turn may be due, in part, to a like WIC turn. This can happen when the WIC moves inversely to the DBC. For example, in 1893 export troughs coincide with a WIC trough and a simultaneous DBC peak.

4. *Failure of DBC Turns to Bring About MEQ Turns*

With few exceptions, the peaks and troughs in the quantity and value of finished manufactures (MEQ and MEV) can be ascribed to like turns in world demand. That they are also from 1900 on located, as a rule, near like DBC turns merely reflects the latter's positive association with the WIC. This can be seen clearly from the absence of like MEQ turns at all those DBC turns which are far removed from WIC turns.[10]

The finding that turns in exports of finished manufactures are, in general, caused by world demand implies that turns in domestic business do not, as a rule, bring on opposite turns in this type of exports. This is confirmed by the relations of quantity to price turns. Manufactures export prices (MEP) conformed, on the whole, to domestic business cycles, turning near like DBC turns. But these MEP turns are, in most instances, not accompanied by opposite turns in MEQ.[11]

Thus, in the experience of the United States, declines in exports of finished manufactures are not halted by the release of resources which accompanies slowing domestic business, nor does a business upturn put a stop to a rise in such exports. Moreover, DBC turns not only fail to cause opposite MEQ turns but also fail to prevent such turns from occurring at turns in world demand. A downturn in world imports is associated with a downturn in MEQ, even if it has been preceded by a domestic business downturn, which might be expected to have a favorable effect on exports; and the same is true, *mutatis mutandis,* of MEQ troughs at WIC troughs.

This finding disagrees, of course, with what traditional theory would lead us to expect and should, therefore, be regarded with some suspicion. However, in the following chapter it will be shown that measures of conformity and correlation also do not reveal an inverse

[10] There are no MEQ peaks in 1910, 1923, 1926, or 1960, and hence there are no MEQ troughs at the corresponding DBC troughs in 1911, 1924, 1927, 1961 (Tables 15–19). On the 1933 trough, see footnote 6. Whether the 1945 trough is due to the WIC is not known since world imports are available only from 1948.

[11] As will be shown in Chapter 7, the full-cycle conformity index of MEP to the DBC in 1921–61 is +56; the Kendall rank correlation coefficient for MEP and the clearings index is +.44.

For examples of the lack of association between MEQ and opposite MEP turns, see Charts 3, 7, and 12, the MEP peaks in 1900, 1907, 1928, and 1957, and troughs in 1905, 1925, and 1950.

The few instances where MEQ turns appear related to opposite DBC turns after 1900 (Chart 3) reflect the location of WIC turns near opposite DBC turns.

relation between the DBC and MEQ. Several possible ways to account for this will be explored there and the conclusion reached that the domestic business cycle appears, indeed, to have no sizable, systematic effect, one way or the other, on the quantity of finished manufactures exports since the beginning of this century.

In the nineteenth century the behavior of MEQ was somewhat different from later on and this is when the aforementioned exceptions to the rule that MEQ turns are not related to opposite DBC turns occurred. An interesting contrast to the later pattern is represented by the events of 1879 and 1880 (not included in Tables 15–24 but in Chart 3). In the last quarter of 1879, exports reached a steep peak at a low point in prices, and this was followed shortly by the deepest export trough matching a high price peak. The reason for this peculiar behavior was a unique event: the general price speculation caused by the resumption of specie payments in 1879. Due to the sudden surge of prices, many U.S. articles were excluded from foreign markets. There followed a collapse in the spring of 1880 and by summer most goods were again securing a market.[12]

None of the events of later years caused a reaction as strong as this one, but there are a few other indications of an inverse relation of MEQ, on the one hand, and MEP and DBC, on the other, before 1900. For instance, the halt in the secular decline of their prices in 1889 and its resumption in 1890 contributed to the peak and trough in finished manufactures exports in those years.

One reason for the contrast between the earlier and later relation of MEQ to the DBC is the declining share of cotton manufactures. Crude cotton exports, before World War I, were in very close inverse relation to the DBC, as will be described in the next section. It is plausible that export prices and quantities of the simple manufactured cotton goods of those years rose and fell together with crude cotton. But there is also some direct evidence on this since Lipsey's data make it possible to analyze a few subdivisions of manufactures exports for the cycles 1879–1913. This analysis reveals that a number of turns in the quantity of textile manufactures exports are, indeed, associated with opposite turns in the DBC and with opposite turns in the prices of these goods. The inverse relation is not as close as for crude cotton exports, but it is clear enough. It contrasts sharply with the relation to the DBC of turns in iron and steel exports,

[12] *Commercial and Financial Chronicle,* May 15 and September 25, 1880.

another subdivision of finished manufactures exports which is more representative of manufactures exports of later years than cotton. Peaks and troughs in the quantity of iron and steel exports have not, since the 1880's, been associated with opposite turns in either their own prices or the DBC.[13]

The insensitivity of the quantity of manufactures exports to U.S. business cycles will be discussed more fully in the next chapter. Here the factors that could account for it and for the corresponding imperfect conformity and small amplitude of manufactures prices will be noted only briefly. One of these is the high degree of differentiation of many goods in this class. This prevents fluctuations in domestic demand from affecting production for export during the short periods involved here. High supply elasticity of many manufactured goods is a second factor. Small price changes suffice in these cases to accommodate changes in domestic demand. Thirdly, it is plausible that the reaction of foreign demand for manufactured goods to such small price changes is weak in the short run. Together, these factors could explain the mild reaction of MEP and the lack of reaction of MEQ to the DBC.

5. *Peaks and Troughs in Domestic Business Matched by Opposite Turns in Crude Materials Exports, 1879–1913*

The class of exports most closely related to swings in domestic business is crude materials, and the explanation of their turns requires, therefore, more extensive discussion than finished manufactures.

The outstanding fact is that turns in crude materials exports (CEQ) from 1879 to 1913 are clearly associated with opposite turns in domestic business cycles *and* with like turns in world import cycles. Since DBC turns sometimes match like and sometimes match unlike WIC turns, the fact that CEQ is inversely related to the one and positively to the other results in what at first appears to be a confusing picture. However, closer inspection shows the timing of CEQ turns to be quite regular with respect to domestic as well as foreign cycles.

[13] Data on subdivisions of the major classes are not available for quantities and prices except for the period covered by Lipsey, i.e., 1879–1923. (See Robert E. Lipsey, *Price and Quantity Trends in the Foreign Trade of the United States*, Princeton for NBER, 1963.) The analysis of subdivisions of finished manufactures for this period will be discussed more fully in Chapter 6.

Consider, first, what happens to crude materials exports at the ten peaks in the DBC. Table 24 and Chart 4 reveal the striking regularity with which a deep CEQ trough matches these peaks. At nine out of the ten occasions, there is half a year or less between the two opposite turns. In that period, then, a downturn in domestic demand almost unfailingly brought an improvement in the quantity of crude materials exports and often also in their value. This effect was not only certain and sudden but surprisingly fast. At four domestic peaks there is a coincident CEQ trough; at four others the CEQ trough even slightly precedes the business peak.

How is the association between CEQ troughs and DBC peaks to be reconciled with the earlier finding on the former's association with WIC troughs which mostly do not coincide with DBC peaks? The answer is that a downturn in the domestic economy as well as an upturn abroad causes an upturn in exports of crude materials. Conversely, with a single exception in 1906, no CEQ trough occurs that is not related to either a DBC peak or a WIC trough.

Tables 25–38 present a summary view of this complex situation. They show for each turn in export quantity the related like turns in world imports, like and unlike turns in domestic business, and like and unlike turns in corresponding export prices. (These entries are explained in the notes to the tables.)

The evidence provided by the associated turns in columns 2–6 of the table, and other information where necessary, is then condensed into a classification of each turn shown in column 1. The purpose of this classification is, it should be stressed, to give the reader at a glance an idea of the *typical main* causes of export turns for a given commodity class and time period. Labeling a turn as due, say, to the WIC is not meant to rule out contributions by other factors. Also, there are borderline cases where the classification is debatable. But what matters here is not an individual case but the over-all picture, and this would not be changed by moving one turn or another from one category into another.

The classification of the 153 export quantity turns covered is, with a few exceptions, based on the following rules:

1. If an export turn is related to unlike turns in both domestic business and prices (fifty-two instances), it is attributed to the inverse effect of the DBC.

2. If an export turn does not satisfy rule 1 but is related to a like

turn in the WIC (sixty instances), the latter is regarded as the main cause of the export turn.

3. If an export turn is related to an unlike DBC turn, but not to an unlike price turn nor to a like WIC turn (fifteen instances), it is attributed either to the inverse effect of the DBC or to both this effect and the effect of the WIC.

4. If an export turn is not related either to a like WIC turn or to an unlike DBC turn (twenty-six instances), it is classified as due to causes other than the DBC and WIC. In cases where I hold turns in crop cycles or government intervention as mainly responsible, the turn is marked accordingly. This group also includes those rare instances where export turns do not match WIC turns but do match like DBC and price turns and where exports were regarded as the cause of a business reversal (four food turns, 1879–1913).

Let us now see what Table 26 reveals about CEQ troughs in 1879–1913. The most outstanding feature is the frequency with which DBC peaks and also peaks in crude materials export price (CEP) coincide, or roughly coincide, with CEQ troughs (columns 5 and 6). The corresponding spaces in columns 3 and 4 are empty. This signifies that the subsiding pressure of domestic demand appears to be mainly responsible for CEQ troughs. Accordingly, eight of the twelve entries in column 1 designate the DBC as the main factor.

That the upturn in CEQ was not due to an upturn in world demand is shown by the absence of WIC troughs at five of these eight CEQ troughs (column 2). At the remaining three, the simultaneous downturn of crude materials prices argues against foreign demand as the determining force. This leaves three CEQ troughs which appear to be due primarily to WIC troughs.[14]

The inverse impact of the DBC on crude materials exports, which stands out so clearly at quantity troughs, is blurred at value troughs, as would be expected. Since the relevant changes in CEQ are typically accompanied by price changes in the opposite direction, the movements of CEV tend to be milder than those of CEQ. Rising prices reduce or prevent a fall in value when quantity is on the downgrade,

[14] Since CEQ in this period consisted largely of cotton, it should be mentioned that the inverse relation between cotton exports and cotton prices in the framework of U.S. business cycles was noted by Frederick C. Mills, in "Elasticity of Physical Quantities and Flexibility of Unit Prices in the Dimension of Time," *Journal of the American Statistical Association*, December 1946, p. 450.

See also the note on cotton exports in Wesley C. Mitchell, *What Happens during Business Cycles*, NBER, New York, 1951, p. 63.

TABLE 25

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Crude Materials *Export Quantity, 1879-1913*

Peak in Crude Materials Export Quantity	Classification of Export Peak[a] (1)	Lead (-) or Lag (+) of Peak in: World Import Cycle (2)	Domestic Business Cycle (3)	Crude Materials Export Price (4)	Lead (-) or Lag (+) of Trough in: Domestic Business Cycle (5)	Crude Materials Export Price (6)
			Number of Quarters			
1881 I	DT	--	--	--	-8	+1
1883 I	WP	+1	--	--	--	--
1889 III	DT	--	--	--	-6	0
1891 III	WP, DT	+2	--	--	0	--
1895 I	DT	--	--	--	-3	0
1898 II	DT	--	--	--	-4	+2
1900 I	WP	+1	-2	+2	--	--
1903 I	WP	+3	-1	--	--	--
1905 II	DT	--	--	--	-3	-1
1907 I	WP	+2	+1	--	--	--
1909 II	DT	--	--	--	-4	-2
1912 I	DT	--	--	--	-1	-1
1913 IV	WP	-1	--	--	--	--
			Extra Peaks		*Extra Troughs*	
		1894 I	1882 I	1880 I	1885 II	1886 IV
			1887 II	1882 III	1900 IV	1892 III
			1890 III	1888 IV		1902 I
			1893 I	1890 III		
			1895 IV	1893 I		
			1910 I	1895 IV		
			1913 I	1904 I		
				1907 III		
				1910 IV		
				1913 I		

Notes to Table 25

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak: WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; CT = crop cycle trough.

General Note: Except for column 1, most entries are based on the same standard NBER rules which underlie Tables 15-24; columns 2, 3, and 5 show the same relationships as in those tables. There are some discrepancies, however, due to certain amendments to the rules required by the peculiar problem encountered in export turns.

The main difference arises because some turns in an export series may be related to like and others to unlike DBC turns here, whereas standard NBER analysis either treats all turns in a series as positively *or* all as inversely related to the DBC. We admit both relationships for an export series, but not for individual export quantity turns, which we relate only to either a like or an unlike DBC turn. This means that in the case of 26 EQ turns, out of the 153 turns covered, a choice has to be made between two related DBC turns. The main rules determining this choice are: (1) If the EQ turn is related to an unlike price turn, it is related to the unlike DBC turn. (2) If the EQ turn is not related to an unlike price turn, but is related to a like WIC turn, it is related to the like DBC turn. (3) If the EQ turn is not related either to an unlike price turn or to a like WIC turn, it is related to whichever of the two DBC turns is closer.

As to price turns, they may again be related to either like or unlike EQ turns. In the great majority of instances this presents no problem since, by standard rules, most price turns match only a similar *or* a different quantity turn, not both. But when a decision is required, the rule is to select the closer turn. Matched price-quantity turns are rarely more than two quarters apart.

Several further discrepancies between this table and Tables 15-24 arise from minor changes in rules which involve, for instance, the exclusion here of some relationships involving long leads of EQ turns to turns in other series. Also this table covers a somewhat longer period than Tables 15-24.

See notes to Table 14.

TABLE 26

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Crude Materials *Export Quantity, 1879-1913*

Trough in Crude Materials Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Crude Materials Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Crude Materials Export Price (6)
				Number of Quarters		
1882 I	DP	--	--	--	0	+2
1885 II	WT	+3	0	--	--	--
1890 II	DP	--	--	--	+1	+1
1893 I	DP	0	--	--	0	0
1895 III	DP	-2	--	--	+1	+1
1899 II	DP	--	--	--	+1	--
1902 II	WT	-2	--	-1	+2	--
1904 II	WT	0	+1	--	--	-1
1906 I	CT	--	--	--	--	-1[b]
1907 III	DP	+3	--	--	-1	0
1910 I	DP	--	--	--	0	-1[b]
1913 I	DP	--	--	--	0	0
			Extra Troughs		*Extra Peaks*	
		1881 I	1888 I	1881 II	1887 II	1888 IV
			1891 II	1886 IV		1900 III
			1894 II	1889 III		1910 IV
			1897 II	1892 III		
			1900 IV	1895 I		
			1908 II	1898 IV		
			1911 IV	1905 I		
				1908 IV		
				1911 IV		

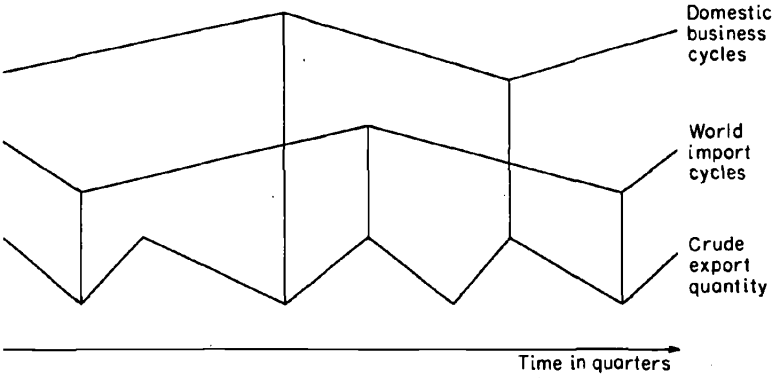
Note: See general note Table 25.

[a]See note a, Table 25.

[b]Alternative or minor peak.

CHART 19

Schematic Relations Among Turning Points in Domestic Business Cycles, World Import Cycles, and Crude Export Quantity, United States, 1879–1913



falling prices offset part of the quantity growth after the trough. The number and amplitude of value cycles is thus reduced and the turns shifted in the direction of like DBC turns. Hence, compared with twelve quantity troughs, there are only eight CEV troughs.[15] Moreover, the number attributable to domestic business peaks is reduced to four, while three others are again explained by world troughs.

Just as downturns in domestic demand cause upturns in CEQ, so upturns in demand bring peaks in exports (Table 25). The difference is only that the latter effect is slower than the former so that CEQ peaks lag about a year behind business troughs. This asymmetry between upper and lower turning points seems plausible enough. One would expect a rise in domestic absorption to encroach only gradually on exports. When, on the other hand, home demand begins to fall, there are immediately excess supplies which are eagerly sought abroad because of the preceding tightness.

Once it is recognized that CEQ peaks are associated with domestic expansion as well as with WIC peaks, their occurrence is seen to be quite systematic. There is no peak in WIC without an associated peak in CEQ, and there is no domestic expansion with rising CEQ without a CEQ peak occurring about midway. In other words, an upswing of CEQ was checked unfailingly by a downturn in world demand as well as by domestic expansion in its later stages. All the thirteen peaks in CEQ are accounted for by one or both of these factors: five by WIC peaks, seven by DBC troughs, and one by both (Table 25).

Value peaks differ from those in quantity for the same reason and in the same fashion as the corresponding troughs. Quantity peaks which are due to upturns in prices in connection with rising domestic demand are rarely reflected in value peaks. When, however, a peak in world demand is the cause of the quantity peak, value usually begins to fall at about the same time.

The WIC peaks are in 1883, 1900, 1903, 1907, 1913; the DBC troughs in 1881, 1889, 1895, 1898, 1905, 1909, 1912; the peak in 1891 is due to both factors.

One may be puzzled about how the occurrence of CEQ peaks in the midst of domestic expansion and also at WIC peaks is compatible with

[15] Export value turns are shown in Tables 19–22 and are interpreted in the same way as quantity turns.

the timing of peaks in world and domestic cycles relative to each other. The answer is that, prior to 1913, DBC peaks used to precede WIC peaks by several quarters. Thus it was possible for CEQ to turn downward some time before the DBC peak, next upward again as soon as this peak was reached, and downward a second time a year or so later when world imports began to fall. This can be seen clearly on Chart 4. For instance, one CEQ peak in 1912 coincides roughly with a DBC trough, while the next CEQ peak in 1913 is related to the 1913 WIC peak. Shortly before this WIC peak, there was a DBC peak which coincided with a CEQ trough. Thus it is possible for an export turn to be associated with opposite turns in U.S. and like turns in foreign cycles despite a positive relation between U.S. and foreign cycles.

The different explanation of the two types of CEQ peaks is supported by the behavior of prices. Those CEQ peaks which are brought on by domestic expansion are all matched by CEP troughs; those caused by receding world demand are not.[16]

6. *Effect of Cotton Crop on Turns in Crude Materials Exports, 1879–1913*

The argument so far has been that turns in crude material exports in 1879–1913 can be explained by turns in foreign and domestic demand. But what about the role of supply? In the period under review, from 45 to 70 per cent of CEQ consisted of raw cotton exports. Since the large cyclical swings of these exports are known to be closely related to the varying size of the cotton crop,[17] it seems probable that turns in CEQ also are determined to a considerable extent by turns in cotton crops. If this is correct, does it conflict with the interpretation that these same turns are due to changes in foreign and domestic demand?

To answer these questions, it must be ascertained, first, whether CEQ turns actually match turns in cotton exports and, if so, whether

[16] See Chart 19.

[17] The positive correlation between annual cotton exports and the cotton crop is mentioned, for instance, in M. Abramovitz, *Inventories and Business Cycles*, p. 194. "The correlation between the directions of change in the crop and exports, 1866–1942, is +.60. Apparently when the United States crop is large, the price of cotton tends to be depressed and more American cotton tends to be sold abroad for consumption and stockpiling. . . ."

R. Engberg in *Industrial Prosperity and the Farmer*, p. 175, mentions a coefficient of +.96 for the correlation of the volume of cotton exports and the size of the crop, 1881–1913.

they also correspond to turns in the cotton crop.[18] On the first point, I find that, with a single exception, every peak and trough in cotton exports has its counterpart in CEQ, but not all CEQ turns can be traced to cotton exports. In twelve instances turns in the two series coincide, in four others they are four to six months apart, while another nine CEQ turns do not match any cotton export turn. In some of these latter cases, however, slight differences between the two series or between their seasonal adjustments may be responsible for the discrepancy.

At any rate, the relation between CEQ turns and cotton export turns is close enough to suggest the possibility that variations in the cotton crop may be a major factor determining CEQ turns. Systematic comparison confirms this. There is, indeed, a high degree of similarity between turns in CEQ and turns in the cotton crop.[19]

To compare export turns with crop turns, the usual timing measures require slight modification. The cotton crop is, of course, measured annually, and it makes little sense to speak of leads and lags of quarterly exports in relation to this annual total. Therefore, it will merely be noted whether an export turn occurs during a year of like turn in the crop or not. The crop year matched with exports extends from the third quarter of the calendar year, when the cotton harvest begins, through the second quarter of the following calendar year. Thus an export trough in the first quarter of a calendar year is not regarded as matching a short crop in the fall of that same calendar year. This is not to deny that the crop of one year may affect exports in the preceding and succeeding ones, as it certainly does. But it serves to separate immediate and direct impacts from others. This is particularly necessary because over a considerable part of the period short and large cotton crops alternated, so that any quarter was close to both a crop peak and a crop trough. Thus a sharp distinction must be made between exports during one crop year and another in order to obtain a meaningful result.

Ten out of the twelve CEQ troughs occur in trough crop years, and seven out of eleven CEQ peaks in peak crop years. Conversely, there are only one trough and three peak years in cotton crops in

[18] The comparison is with a monthly series of cotton exports in million pounds from *Monthly Summary of Foreign Commerce*, U.S. Department of Commerce. Turns in this series were set by the National Bureau. The center month of the quarterly CEQ turn is here compared to the monthly turn in cotton exports.

[19] The cotton crop series is from *Cotton Crop of the U.S., 1790–1911*, Department of Agriculture, Circular 32, 1912 (for 1879–98); and *Agricultural Statistics, 1942* (for 1899–1913). Turns in this series were set by the National Bureau.

which CEQ did not reach a low or high point. There is thus no doubt about the fact that CEQ turns are closely linked to turns in the cotton crop.

Hence both supply and demand worked in the same direction, and it is likely that both contributed to causing crude materials exports to reverse their direction. Thus export peaks are due either to the combined effect of a peak cotton crop and peak foreign demand or to that of a peak crop and a trough in domestic demand, and export troughs can be similarly explained.[20]

Some may object that supply alone may be responsible for CEQ turns and that their close association with reversals in demand is merely due to the coincidence of demand turns and cotton crop turns. In addition to the implausibility of this interpretation, some pieces of evidence against it may be cited. The most important one is the timing of turns of crude material exports excluding cotton. Though only the value, not the quantity, of this series has been analyzed, the correspondence of the turns to like turns in the WIC and unlike ones in the DBC appears quite clearly. All turns in the series match turns in one or both reference chronologies.

Another aspect of the findings which suggests the influence of demand is that those CEQ turns which do not take place at cotton crop turns are still, as a rule, related to inverse turns in the DBC. Thus the two CEQ troughs which are not located in cotton crop trough years still coincide with DBC peaks, and three out of the four CEQ peaks which are not at cotton crop peaks are related to DBC troughs. On the other hand, there is only a single CEQ turn, the trough in 1906, which coincides only with a crop turn and not also with a turn in demand.

[20] This implies, of course, that cotton crop turns occur a number of times near like turns in world demand and even more frequently near unlike turns in the DBC. This inverse relationship between cotton output and business activity has been clearly established by Geoffrey Moore and is, in his words, "an unsolved puzzle" (Harvest Cycles," unpublished Ph.D. dissertation, Harvard University, 1947, p. IV-49). Moore finds that this is hardly due to chance since cotton output does not vary merely with the weather, but is subject to considerable control by growers. Sign correlations between acreage and output and between yield and output are +.65 and +.71, respectively (*ibid.*, pp. II-42 through II-45).

Other investigators have analyzed the variations in the cotton crop and have found them to be determined by such factors as absolute or relative movements in cotton prices or by the grower's ability to finance the crop. (See, e.g., R. C. Engberg, *Industrial Prosperity and the Farmer*, New York, 1927, Chap. VII.) But whether these forces account for the inverse relation of the crop to business cycles in 1888–1914 or whether this relation was due to chance has not been shown, as far as I know.

The varying location of CEQ turns within crop years is another indication of the contribution of domestic consumption. When, for instance, a business expansion continues into the crop trough year, as in 1881/82 or in 1892/93, CEQ shows improvement only in the second quarter of the calendar year following the small crop, simultaneously with the first decline in domestic demand. When, however, the DBC contraction starts just before the small crop is harvested, exports are on the upgrade immediately, so that the third quarter of the crop trough year is their lowest point.

It seems reasonable to conclude that CEQ turns in 1879–1913 are, in general, due to the combined effect of like turns in the cotton crop and either like turns in foreign or unlike turns in domestic demand.[21]

7. *Diminishing Impact of Turns in DBC on Those in Exports of Crude Materials and Semimanufactures After World War I*

Measures of conformity and amplitude in Chapter 6 will reveal the sharp shift after World War I in the behavior of CEQ during domestic business cycles. The highly regular inverse relation of the earlier period gives way to a fairly regular positive one. Tables 27 and 28 show that evidence of this shift is also found in the turning points of CEQ, but it is less sharp and less sudden than the conformity measures would suggest. Half of the CEQ turns in the interwar period (eight out of sixteen) still match unlike DBC turns and this also holds for the 1940's and 1960. However, the four CEQ turns of the 1950's are all due to reversals in world demand and not attributed to the inverse DBC effect. The weaker impact of the latter after World War I is reflected in the smaller proportion of corresponding turns and in the greater uncertainty surrounding some matching decisions. Nevertheless, the timing comparisons disclose that the inverse influence of the DBC on CEQ was still present in the later period as well.

Among the factors which have prevented reversals in domestic business from causing opposite turns in CEQ, the following seem to be

[21] The percentage of the cotton crop which is exported also turns at about the same time as CEQ. This may be due to the shift in demand; but it can also result from the supply side, namely, when world demand is more elastic than the domestic one, which is not unlikely. In this case a change in supply will, other things being equal, result in a similar change in the share of exports.

the most important: the greater synchronization of world and domestic business cycles; the reduced influence and changed behavior of cotton exports; and the great upheavals of this period, such as the Korean War and the Suez crisis.

As for the first factor, it has been shown above that turns in WIC are closer to turns in DBC in the later than they are in the earlier period. Hence it could happen more frequently than before that a simultaneous turn in WIC offsets the effect of a DBC turn, with the result that CEQ either do not turn at all or turn the same way as the WIC. For instance, the downturn in world demand prevented an upturn of CEQ at the 1929 DBC peak. On two other occasions, in 1920 and 1957, WIC peaks even brought peaks in CEQ despite nearly coincident DBC peaks. Similarly, WIC troughs in 1938 and 1959 contributed to like turns in CEQ.

The role of cotton exports has changed in many ways, and this is perhaps the most important reason for the shift in the timing of CEQ turns. First, the share of crude cotton in crude materials exports fell gradually from about 60 per cent in the earlier period to 20 per cent in 1951–60. Hence it is not surprising that turns in CEQ do not match turns in cotton exports, as a rule, after 1920. Moreover, even cotton export turns themselves are only loosely linked to the cotton crop in an era of surplus stocks and government disposal programs. So even if turns in the cotton crop had occurred as frequently near opposite DBC turns after 1920 as before World War I, they would not have contributed much to an inverse relation between CEQ and DBC turns due to their small influence on the former.

But not only did cotton production play a smaller role, it also played a different one. Insofar as crop turns did affect CEQ turns, they pulled toward like rather than unlike turns in domestic business. The main such instances are the CEQ peak and trough in 1927, caused largely by a peak cotton crop in 1926 and a trough crop in 1927, and matching like turns in the DBC. The rise and fall in output here greatly exceeded, in its effect on exports, the countervailing force of the mild domestic cycle. Conversely, the coincidence of a small crop with high domestic demand, frequent before 1913, is rare thereafter. Thus, a crop trough could not often have contributed to a downturn in CEQ even if the link between crop and CEQ turns had been as strong as before.

This changed role of supply was reinforced occasionally by procyclical price and subsidy policies of the government. For instance, the

TABLE 27

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Crude Materials *Export Quantity, 1920-63*

Peak in Crude Material Export Quantity	Classification of Export Peak[a] (1)	Lead (-) or Lag (+) of Peak in: World Import Cycle (2)	Domestic Business Cycle (3)	Crude Materials Export Price (4)	Lead (-) or Lag (+) of Trough in: Domestic Business Cycle (5)	Crude Materials Export Price (6)
			Number of Quarters			
1920 I	WP	+1	0	n.a.	--	n.a.
1921 III	DT	--	--	--	0	0
1927 I	CP	--	-2	--	--	0
1928 II	DT	--	--	--	-2	--
1932 I	O	--	--	--	--	+1[b]
1933 III	DT	--	--	--	-2	+1
1935 IV	O	--	--	--	--	0[b]
1938 I	DT	-3	-3	--	+1	-1[b]
1946 III	DT	n.a.	--	--	-3	--
1951 IV	WP	+1	--	-2	--	--
1957 I	WP	+1	+2	+3	--	--
1960 IV	DT	--	--	--	+1	-3
			Extra Peaks		*Extra Troughs*	
		1925 I	1923 II	1920 III	1924 III	1939 II
		1929 II	1929 III	1924 I	1949 IV	1945 III
		1948 IV	1948 IV	1927 IV	1954 III	1950 I
			1953 II	1937 II	1958 II	1953 III
			1950 II	1948 II		

Note: See general note, Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; CP = crop cycle peak; CT = crop cycle trough; O = other.

[b]Alternative or minor trough.

TABLE 28

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Crude Materials *Export Quantity, 1920-63*

Trough in Crude Materials Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Crude Materials Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Crude Materials Export Price (6)
				Number of Quarters		
1920 III	DP	--	--	--	-2	0
1922 III	DP	-3	--	--	+3	+2[b]
1927 IV	CT	--	0	--	--	0
1931 III	DP	--	--	--	-8	--
1933 I	O	--	0	--	--	--
1934 IV	WT	+1	--	--	--	--
1936 IV	DP	--	--	--	+2	+2
1938 IV	WT	0	-2	+2	--	--
1945 I	WT, DP	n.a.	--	+2	0	--
1948 II	DP	--	--	--	+2	0
1953 I	WT	0	--	+2	+1	--
1959 I	WT	0	-3	--	--	--
1962 I	O	--	--	--	--	--
			Extra Troughs		*Extra Peaks*	
		1926 II	1921 III	1921 III	1926 III	1924 I
		1950 I	1924 III	1927 I	1957 III	1951 II
			1945 IV	1933 IV	1960 II	1957 IV
			1949 IV	1950 I		
			1954 III	1960 I		
			1961 I			

Note: See general note, Table 25.

[a]See note a, Table 27.

[b]Alternative or minor peak.

recovery of cotton exports—and thus of CEQ—in 1959 was aided by the lowering of support prices.[22]

Finally, in a few instances, the great international disturbances of the era after World War I prevented the occurrence of CEQ troughs in the neighborhood of DBC peaks. Three of these events occurred in the midst of U.S. expansions. (This may not be entirely due to chance, i.e., the expansions may have been prolonged by these events.) In 1926 the British coal strike caused a large rise in coal exports which, together with the peak cotton crop mentioned above, prevented a small dip in CEQ from developing into a trough at the 1926 business peak. More recently, the Korean War and the Suez crisis prevented CEQ from turning down after the DBC troughs of 1949 and 1954.

The impact of fluctuations in domestic demand was offset at times by the factors mentioned. It was not eliminated, however, as can be seen not only from the remaining instances of inverse turns but also from the behavior of crude materials exports prices. Throughout the 1920's the movements of CEP mirror those of CEQ. Four of our turns in CEQ coincide with opposite turns in CEP during that period; and a glance at Chart 9 shows a considerable number of additional matching turns terminating subcyclical movements, such as CEQ peaks and CEP troughs in the second quarter of 1922 and in the first quarter of 1925, or CEP peaks and CEQ troughs in the first quarters of 1923 and 1924. After the precipitous price fall of the early 1930's, the inverse relation reappears in 1933, prevails through 1938, and again from the 1946 to the 1951 CEQ peaks. During the remainder of the 1950's there is but little change in prices, and what there is does not appear to be inverse to CEQ. In 1960, however, an upturn in prices again precedes a downturn in quantity.

Value turns in exports of crude materials differ from quantity turns in the same fashion in the later period as before World War I. They again match more often like and less often unlike DBC turns than is true of turns in quantity. When the quantity exported rises to a peak in connection with falling prices before a DBC trough, value sometimes fails to grow so that there is no inverse CEV peak to correspond to the CEQ peak. This occurs, for instance, in 1921 and 1938. Similarly, there are no CEV troughs matching the CEQ

[22] International Cotton Advisory Committee, *Cotton*, "Monthly Review of the World Situation," November 1959.

troughs at the DBC peaks in 1920 and 1923 because of the related rise and fall of prices.

Export turns close to like turns in the DBC, on the other hand, which are often due to turns in foreign demand and are thus not related to opposite turns in prices, sometimes appear only in value and not in quantity, like the CEV peak in 1937.

This explains the results shown in Tables 17, 18, 21, and 22, namely, that from 1920 to 1963, seventeen out of twenty-three turns in CEV match like DBC turns while only thirteen out of twenty-five CEQ turns are so related.

The timing of turns in the quantity of semimanufactures exports is intermediate between that of finished manufactures and that of crude materials (Tables 29 and 30). As might be expected, reversals in this class of exports are associated more closely with opposite turns in domestic demand and less closely with turns in world demand than is true of reversals in exports of finished manufactures. Conversely, the influence of the DBC is smaller and that of the WIC larger than for crude materials.

In four instances, a SEQ turn is associated with a like WIC turn, while CEQ at the same time experiences only a minor turn or none at all. This happens in 1921, 1937, and again in 1949 and 1950. On the other hand, five CEQ turns located at opposite turns in the DBC have no counterpart in SEQ (1920, 1933, 1936, 1938, 1960).

That turns in semimanufactures are more often due to world demand and less often to domestic demand and supply than CEQ turns is also shown by the behavior of semimanufactures prices. Most turns in SEP match like SEQ turns. Only in the 1920's is the relation an inverse one and again briefly in 1948; since the trough of 1950, six turns in price have matched like quantity turns.

Value of semimanufactures usually turns at the same time as quantity. The few divergencies again cause SEV to conform better to the WIC and less well to the inverse DBC in most instances than SEQ does, except in 1960–61.[23]

To summarize, the tendency of peaks and troughs in domestic business to cause troughs and peaks in crude materials and semimanufactures exports was weaker after World War I than earlier. It had been reinforced in 1879–1913 by the frequent coincidence of large cotton crops with business cycle troughs and small crops with

[23] There is a quantity but no value peak at the DBC trough of 1921. The 1929 peak in value is due to the WIC peak, while the 1928 peak in quantity can be attributed to the upturn in prices connected with the DBC trough.

TABLE 29

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Semimanufactures *Export Quantity, 1920-63*

Peak in Semimanufactures Export Quantity	Classification of Export Peak[a] (1)	Lead (-) or Lag (+) of Peak in: World Import Cycle (2)	Domestic Business Cycle (3)	Semimanufactures Export Price (4)	Lead (-) or Lag (+) of Trough in: Domestic Business Cycle (5)	Semimanufactures Export Price (6)
			Number of Quarters			
1919 III	WP	+3	+2	+3	--	--
1922 II	DT	--	--	--	-3	0
1924 IV	DT	+1	--	--	-1	-1
1928 I	DT	--	--	--	-1	-1
1937 III	WP	-1	-1	0	--	--
1947 III	WP, DT	n.a.	--	--	-7	--
1949 I	WP	-1	-1	--	--	--
1951 III	WP	+2	--	0	--	--
1957 I	WP	+1	+2	0	--	--
1960 III	O	--	-1	-3	--	--
			Extra Peaks		*Extra Troughs*	
		1929 II	1923 II	1923 II	1933 I	1934 IV
			1926 III	1925 IV	1949 IV	1946 I
			1929 III	1929 II	1954 III	1950 I
			1953 II	1948 III	1958 II	1954 II
					1961 I	1958 II

Note: See general note Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; O = other.

TABLE 30

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Semimanufactures *Export Quantity, 1920-63*

Trough in Semimanufactures Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Semimanufactures Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Semimanufactures Export Price (6)
			Number of Quarters			
1921 II	WT	+2	+1	--	--	--
1922 IV	DP	--	--	--	+2	+2
1926 I	DP	+1	--	--	+2	-1
1932 III	O	--	+2	--	--	--
1938 III	WT	+1	-1	+3	--	--
1945 III	WT	n.a.	+1	+2	--	--
1948 III	DP	--	--	--	+1	0
1950 II	WT	-1	-2	-1	--	--
1953 II	WT	-1	--	+4	0	--
1958 I	WT	+4	+1	+1	--	--
1961 III	O	--	-2	--	--	--
			Extra Troughs		*Extra Peaks*	
		1935 I	1924 III	1922 II	1920 I	1920 II
			1927 IV	1924 III	1929 III	1929 II
			1954 III	1927 IV	1937 II	1937 III
				1934 IV	1957 III	1951 III
					1960 II	1957 I
						1959 IV

Note: See general note, Table 25.

[a]See note a, Table 29.

business peaks. The more nearly positive relation of crop cycles to business cycles, the dwindling role of the cotton crop, the greater parallelism of world and U.S. business cycles, and the great international crises of the latter years all counteracted, to some extent, the influence of variations in domestic demand. Nevertheless, in the interwar period and through the 1940's, about one in every two turns in these export classes *is* associated with an opposite turn in the DBC. It is only since 1950 that the inverse DBC effect seems temporarily or permanently, to be quite weak.

NOTE ON SEMIMANUFACTURES EXPORT TURNS IN 1960–61

The latest turning points in the quantity of semimanufactures exports in 1960–61 are interesting because they differ from their predecessors. They are the only such turns covered that are neither associated with a like WIC turn nor with an unlike DBC turn except for the SEQ trough in 1932. We are faced with the puzzling question of why exports of semimanufactures should have turned downward at a time of rising world imports *and* domestic recession, while during some thirty years (1922–38 and 1948–60) WIC expansions had never been associated with falling SEQ.

Some readers may be inclined to look for special factors affecting one or a few commodities for an explanation. However, the evidence does not support this view. In general, factors affecting individual commodities, other than wheat and cotton in the early days, have not been found to account for any turns in major export classes. In particular, none of the "special" events of 1960 seems to provide the explanation. This includes the turn in copper exports, which was apparently the strongest such case. Fear of political upheavals in producing areas led to an unusually large stockpiling of copper in 1959–60, which contributed to the subsequent sharp fall in copper exports. However, copper stockpiling occurred during a general spurt in inventory investment, so that the part played by special forces is questionable. Secondly, the fall in copper exports accounts for only a minor part of the SEQ decline.

The inverse effect of the DBC can also not account for the SEQ peak since the latter occurred one quarter after the U.S. business cycle peak and most of the SEQ decline took place during the U.S. recession. The associated fall in SEP would also preclude such an interpretation.

By way of contrast, the peak in exports of crude materials which came shortly after the peak in semimanufactures exports may be due

to an inverse DBC effect. In this case a considerable part of the CEQ decline occurred during the U.S. business expansion and was accompanied by rising prices of crude materials. It is because the CEQ peak does not seem to present the same kind of problem as the SEQ peak that we are concerned here with the latter only.

Despite the rise in total world imports, therefore, one must look to foreign demand for an explanation of the decline in semimanufactures exports. This means there must have been a change in the relation of world imports of semimanufactures to either (1) total world imports or (2) U.S. exports of semimanufactures, or a change in both of these relations.

As far as we can judge from available world data, the first possibility, namely that world imports of materials fell while total world imports rose, must be rejected.[24] The former did not decline in 1960–61, but merely grew more slowly than other commodity classes (finished manufactures and foods).

There remains then the second possibility that a mere slowdown in world imports sufficed—contrary to earlier times—to cause a downturn in U.S. exports of semimanufactures. This interpretation is interesting because it seems to accord with the view, advanced by experts in the late 1950's and early 1960's, that the United States has become a marginal source of supply for certain types of export goods. Shipments of such goods from the U.S., it is held, tend to increase sharply in the later stages of a foreign boom when foreign supply becomes insufficient. When these pressures abate, U.S. exports become expendable and decline. The great reserve capacity in the United States is said to account for the marginal supplier role.

This view is mentioned in a number of articles on fluctuations in U.S. nonagricultural exports by Department of Commerce economists. It is supported especially in an investigation by Francis G. Masson and John B. Boddie, showing

> that since 1956 U.S. exports to the industrialized countries ceased to expand when industrial production in these countries increased by less than about 7 per cent annually . . . The emergence of this relation in 1955–56 marks the close of the postwar era—the point at which productive capacity abroad was adequate to supply domestic and foreign requirements for goods except during periods of very intense demand pressure. Also, the great reserve capacity of industry in the United States and slow growth in domestic U.S.

[24] Since world data are not classified in the same way as U.S. exports, the only feasible comparison is to world imports of industrial materials.

demand made it possible for foreign demand to be reflected rapidly in expanded exports to foreign countries.[25]

It is plausible that the relation of U.S. exports to foreign imports is similar to their relation to foreign production referred to by Masson and Boddie. This would mean that the new type of SEQ peak in 1960 could be explained by the new role of the United States as marginal supplier.

There is, however, one major difficulty with this explanation: During the 1960–61 SEQ and CEQ declines, foreign industrial growth was not slow but unusually rapid and the Masson and Boddie equation explains not a fall but a steep rise in U.S. nonagricultural exports to industrialized countries, a rise that was due to finished manufactures (capital goods) exports.[26] To fit the facts the marginal supplier hypothesis thus must be taken to mean that rapid growth in foreign industrial output causes, at first, a large rise in U.S. exports of semimanufactures and crude materials. But this rise stops and reverses itself as soon as inventories have been built up, whereas exports of finished manufactures continue their advance as long as foreign output maintains its growth. In their case supply is less elastic and order backlogs may have to be worked off.[27]

Since this hypothesis fits to date only the downturns of semimanufactures and crude materials exports in 1960, it cannot be told whether we are faced with a unique occurrence or with a new pattern. It should be noted at any rate, however, that the marginal supplier hypothesis is more complicated than appears at first glance and that it requires specific assumptions about differences among foreign and domestic demand and supply elasticities and price rigidities.

8. *Relation Between Food Export Turns and Domestic Business Cycle Turns, 1879–1913*

Food consumption does not vary as much during business cycles as the demand for raw materials does. Hence one would not expect

[25] Department of Commerce, *Survey of Current Business,* February 1963, p. 23. For other articles see various issues of 1958, 1961, 1962.

[26] It should be noted that the total value of U.S. exports continued to rise in 1960–61 just as the total value of world imports did.

[27] The *Survey of Current Business,* December 1961, p. 18, comments that the "European slowdown mainly affects our exports of industrial materials. In investment goods the backlog is still large enough to permit production to continue on a rising trend." It should be noted that the SEQ peak was not followed by a MEQ peak.

food exports to be inhibited by business expansion or promoted by contraction to the same extent as exports of crude materials are. Also, crop growing conditions in the United States and abroad cause sharp fluctuations in these exports, which consist mainly of grains. Turns in food exports, therefore, are likely to be largely supply determined and not closely associated with opposite turns in domestic business activity.

It is not surprising, then, that Tables 23 and 24 show no unlike FEQ turn at several of the DBC turns which are matched by CEQ turns. No FEQ troughs are registered at the DBC peaks in 1890, 1899, 1907, and 1913, at all of which CEQ did turn up. Nor do we find FEQ peaks after the DBC troughs in 1888, 1904, and 1908 corresponding to the CEQ peaks linked to these dates.

What is noteworthy, however, is the rather unexpected fact that quite a number of reversals in food exports *are* associated with opposite turns in domestic business. In some of these instances, a downturn in foreign demand reinforced the effect of a domestic upturn, or a foreign trough that of a domestic peak. Also in a few instances, a harvest peak occurred near a DBC trough so that falling supply contributed to the downturn in exports. But not all cases are to be explained in this way. There is, for example, an export trough at the DBC peak of 1910 which is not associated with a WIC trough and which, moreover, occurs during a peak crop year. My conclusion that it was, in this case, the rising home demand which curtailed exports agrees well with comments made at the time: "This falling off in the exportation of foodstuffs is apparently due, in a large part at least, to increased consumption at home, rather than to a decline in production." The same report elaborates on the large food output in 1910 and notes the "unusually high export prices." [28]

Other instances of the influence of home demand are the FEQ trough in 1882 and the peaks in 1905 and 1911 (Tables 31 and 32).

The timing of turns in food export prices relative to quantity turns also suggests that the DBC had some inverse effect on food exports. Most food export price (FEP) turns match unlike FEQ turns while only a few are near like ones. (Out of seventeen FEP turns, twelve match unlike and three match like FEQ turns.) Two out of the three instances in which price and quantity move in the same direction are due to similar change in world demand. And in the majority of instances such reversals of prices are associated with like

[28] The Secretary of Commerce and Labor, *Eighth Annual Report,* Washington, D.C., 1910.

TABLE 31

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Foods *Export Quantity, 1879-1913*

Peak in Foods Export Quantity	Classification of Export Peak[a] (1)	Lead (-) or Lag (+) of Peak in: World Import Cycle (2)	Domestic Business Cycle (3)	Foods Export Price (4)	Lead (-) or Lag (+) of Trough in: Domestic Business Cycle (5)	Foods Export Price (6)
			Number of Quarters			
1880 II	DT	--	--	--	-5	+1[b]
1883 I	WP	+1	--	--	--	--
1885 I	DT	--	--	--	+1	--
1887 I	XP	--	+1	--	--	-1
1890 I	XP	--	+2	--	--	0
1892 I	WP, DT	-1	--	-2	-3	+1[b]
1893 III	WP	+2	--	--	+3	--
1898 II	O	--	--	0	-4	--
1903 I	WP	+3	-1	--	--	--
1905 IV	DT	--	--	--	-5	--
1911 II	DT	--	--	--	+2	0
1913 II	WP	+1	-1	--	--	--
			Extra Peaks		*Extra Troughs*	
		1900 II	1882 I	1882 III	1888 I	1896 III
		1907 III	1893 I	1888 IV	1900 IV	1899 II
			1895 IV	1902 II	1908 II	1905 I
			1899 III	1910 III		
			1907 II			
			1910 I			

Note: See general note, Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; CT = crop cycle trough; XP = domestic business cycle peak caused by export peak; XT = domestic business cycle trough caused by export trough; O = other.

[b]Alternative or minor trough.

TABLE 32

Leads and Lags of Turns in Selected Series at Troughs *in U.S. Foods Export Quantity, 1879-1913*

Trough in Foods Export Quantity	Classification of Export Trough[a]	Lead (-) or Lag (+) of Trough in:			Lead (-) or Lag (+) of Peak in:	
		World Import Cycle	Domestic Business Cycle	Foods Export Price	Domestic Business Cycle	Foods Export Price
	(1)	(2)	(3)	(4)	(5)	(6)
				Number of Quarters		
1882 II	DP	--	--	--	-1	+1
1884 I	CT	--	--	--	--	--
1885 IV	WT	+1	--	--	--	--
1888 II	XT	--	-1	--	--	+2
1891 I	XT	--	+1	--	--	+2
1893 I	DP	0	--	--	0	0[b]
1895 III	DP	-2	--	--	+1	-1[b]
1902 I	DP	-1	--	--	+3	+1
1904 III	WT	-1	0	+2	--	--
1910 I	DP	--	--	--	0	+2
1912 II	O	--	-2	--	--	--
			Extra Troughs		*Extra Peaks*	
		1881 I	1885 II	1886 IV	1887 II	1898 II
		1908 II	1894 II	1890 I	1890 III	
			1897 II	1896 III	1899 III	
			1900 IV	1899 II	1907 II	
			1908 II	1911 II	1913 I	

Note: See general note, Table 25.

[a]See note a, Table 31.

[b]Alternative or minor peak.

reversals in business. Altogether there are eight out of a total of twenty-three FEQ turns which correspond to both unlike FEP and unlike DBC turns. This may be compared with the ratio of fourteen out of twenty-five CEQ turns of the same description. Home demand, it may be concluded, plays a lesser role in food than in crude materials exports. Nevertheless, it also contributes to changes in the direction of food sales.

But there is still another type of food export turn which needs to be discussed, a type not encountered in the analysis of finished manufactures and crude materials. Tables 31 and 32 show two FEQ peaks and three troughs which are not associated with WIC turns and yet are located at *like* DBC turns. Moreover, these curious peaks and troughs match opposite turns in food prices. The explanation is to be sought in the relation of business cycles and exports that we usually disregard because of its unimportance in the United States during the period under discussion. This is the impact of exports on business activity. Some business revivals in the late nineteenth century have always been attributed to a surge of food exports due to the coincidence of a rich American harvest with a poor foreign one. It is these crop revivals which stand out so clearly in the tables. In 1888 and 1891, crop troughs brought price peaks and business cycle troughs, while the situation was the reverse in 1887 and 1890. These findings are confirmed and, in turn, support the views long held by economic historians.

The main instance regarded as crop revival in the literature within our period is the trough of 1891. (The 1879 trough is not included in this analysis.) It is described as follows by Mitchell: "As in 1879, the country was suddenly lifted from depression to prosperity by the concurrence of bad harvests in Europe and abundant harvests in America." [29]

Rendigs Fels regards 1891 as the only occasion where a general upturn was caused by crop conditions: "On three occasions, crop conditions exerted a powerful stimulus. All three occurred in the vicinity of a lower turning point. In 1879 and 1897, contraction of business had already ended before favorable conditions in the United States combined with poor crops abroad to give a strong push to an expansion that otherwise might have been weak and slow. In 1891 crop conditions may have caused the upturn itself." [30]

It can be seen from Table 32 that the 1891 FEQ trough is, indeed,

[29] *Business Cycles*, Berkeley, 1913, p. 51.
[30] Rendigs Fels, *American Business Cycles, 1865–97*, Chapel Hill, 1959, p. 220.

one of the rare cases where an export trough matches a domestic business cycle trough despite the absence of a world trough. The price peak which follows shortly upon the quantity trough confirms the attribution of the latter to the supply side. The crop revival hypothesis requires, further, that not only the quantity but also the value of food exports should experience an upturn. This requirement too is met by the findings. Despite the price peak, there is a deep trough in the value of food exports in 1891.

The second of the above-mentioned cases of coincidence of a FEQ and a DBC trough, in 1888, has received little attention in the literature due to the mildness of the 1888 business recession. Fels, however, mentions crops ("good crops at home, not so good crops abroad") as one of three factors *responsible* for the business revival.[31] That in this instance, also, rising sales are due primarily to greater output, not to greater foreign demand, is shown by the decline of prices which set in shortly after the export trough.

The DBC trough of 1897 has often been interpreted in the same way as that of 1891.[32] Fels has objected to this view and his argument is upheld by the findings on export turns. No trough is listed at this point. Exports merely resumed the steep rise which had been interrupted for one or two quarters.

In sum, some turns in FEQ are associated with opposite turns in the DBC due to the influence of domestic demand. Others occur near like DBC turns due to the influence of foreign demand. And a third type is again related to like DBC turns due to the influence of these exports *on* business. These different relations can be picked up by the foregoing analysis but not by conformity indexes and correlations according to which FEQ were unrelated to DBC (see Chapter 6).

Practically all turns in the value of food exports (FEV) coincide with those in quantity. Most of the few exceptions are due to divergent decisions on turning points induced by very slight discrepancies between the two series. Only in a few instances is this agreement in the timing of value and quantity turns explained by parallel price changes and like price turns. For the most part, value turns up (down) when quantity does, despite an accompanying downturn

[31] *Ibid.*, p. 161. That the FEQ trough lags behind the DBC trough by one quarter does not contradict this interpretation since there is practically no change in the series between the two quarters and since the turn in food exports value did coincide with the DBC turn.

[32] See, e.g., Mitchell, *Business Cycles,* pp. 60 and 63; *Financial Review,* New York, 1898; F. W. Taussig, *International Trade,* New York, 1927, p. 290.

(upturn) of prices. This means, of course, that the price movement is milder than the opposite change in quantity. On those occasions in which both a turn in foreign demand and an opposite turn in domestic demand are factors in the FEQ turn, the moderate amplitude of the price change may be explained by the offsetting of the two changes. For instance, when foreign demand begins to rise while home demand begins to fall, one would except a large rise in exports but only a mild drop in price. When no turn in WIC coincides with the FEQ turn, however, it must be concluded that the foreign demand for U.S. food exports must have been more responsive to price changes, at least at certain times in the 1879–1913 period, than would have been expected.

9. *Relation Between Food Export Turns and Domestic Business Cycle Turns, 1920–63*

Even after World War I, there were still a few cases when a peak or trough in domestic demand contributed to a trough or peak in food exports. More than half of the FEQ turns in the interwar period are close to opposite DBC turns, and four of them are also associated with opposite price turns—namely, the FEQ troughs of 1920, 1923, and 1936, and the peak in 1921. Contemporary comments refer to "lower prices elsewhere" or to "higher price range in the U.S. than in world markets" as an explanation for small exports before the 1923 and 1936 export troughs.[33]

In the era of agricultural surpluses after World War II, inverse effects of domestic demand on exports are not to be expected any longer, and FEQ turns accordingly are no longer to be found near opposite DBC turns. The only instance in which rising prices supported by rising domestic demand may have contributed to a downturn in FEQ occurs in 1947. Even then, however, the main factor is the reversal in foreign demand due to the recovery of foreign agriculture and the exhaustion of foreign dollar resources.[34]

With the weakened role of home demand, the timing of food export turns may be expected to depend mainly on world demand. Tables 33 and 34 show, indeed, that all FEQ turns after World War

[33] See *Commerce Yearbook,* Washington, 1923, p. 485, and *Foreign Trade of the United States,* Trade Promotion Series #174, Washington, 1936, p. 2. A two-month shipping tie-up in the Pacific may have caused a slight shift in the FEQ trough in 1936.

[34] See, e.g., U.S. Department of Commerce, *Foreign Trade of the United States, 1936–49,* Washington, 1951, pp. IX and XI.

II correspond to WIC turns. However, the intervals are rather long, and the FEQ troughs in 1954 and 1958 match the DBC troughs more closely than the troughs in WIC. At first it may appear strange that food exports turn up more nearly when U.S. business revives than when world trade revives. The explanation is that a new factor determining export turns has entered the picture—the government surplus disposal program.

In both 1954 and 1958, government intervention, spurred by recession, became effective shortly before the business upturn. In the earlier case, a new surplus disposal program was instituted; in the later one, the existing program, which had slowed down in the preceding year, was speeded up. The rise in world trade which started in 1953 failed to give a lift to food exports, and they began to rise only a year later in consequence of the new program. GATT ascribes the total increase from 1954 to 1955 to this factor.[35]

While they had lagged behind the WIC in 1954, food exports led the 1959 upturn in world imports by one year. The near coincidence of the FEQ trough with the 1958 DBC trough is again due to government action. A temporary slowing down in the disposal program was followed by renewed efforts, which resulted in heavy shipments to India and other countries.[36]

The government thus contributed to the positive correlation of exports and U.S. business cycles in the 1950's. When this intervention is called a new factor in export turns, however, one exception must be made. There was one occasion in the 1930's when government action caused coincidence of food exports and business cycle troughs. This was at the end of 1933 when the Wheat Disposal Program caused a sudden lift in previously stagnating exports.[37]

To summarize, despite erratic harvest influences, food export turns in the interwar period, as in the period before 1913, are in most cases associated with like turns in world imports or unlike turns in the domestic business cycle. In contrast to earlier years, however, FEQ turns which cause, and are therefore associated with, like DBC turns are not found in later years. After World War II there is a further change. Food export peaks are again accounted for by peaks in world demand, but troughs now show a new relation to domestic business troughs, a closer one than could be explained by the coinci-

[35] GATT, *International Trade, 1955,* Geneva, 1956, p. 19.

[36] *Survey of Current Business,* December 1958, pp. 17 and 19.

[37] U.S. Department of Commerce, *Foreign Trade of the United States, 1933,* Trade Promotion Series No. 156, Washington, 1934, p. 20.

TABLE 33

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Foods *Export Quantity, 1920-63*

Peak in Foods Export Quantity	Classification of Export Peak[a] (1)	Lead (-) or Lag (+) of Peak in: World Import Cycle (2)	Domestic Business Cycle (3)	Foods Export Price (4)	Lead (-) or Lag (+) of Trough in: Domestic Business Cycle (5)	Foods Export Price (6)
				Number of Quarters		
1921 III	DT	--	--	--	0	+2
1924 IV	WP	+1	--	+1	-1	--
1927 II	O	--	--	--	+2	--
1929 I	WP	+1	+2	--	--	--
1934 I	G	--	--	--	--	+1
1938 II	DT	--	--	--	0	--
1947 III	WP	+5	+5	+2	--	--
1951 II	WP	+3	+8	+4	--	--
1956 IV	WP	+2	+3	--	--	--
			Extra Peaks		*Extra Troughs*	
		1920 II	1920 I	1920 III	1933 I	1924 II
		1937 II	1923 II	1923 I	1945 IV	1946 I
			1926 III	1937 II	1949 IV	1950 II
			1937 II	1958 III	1954 III	1955 IV
			1960 II		1958 II	1960 I
					1961 I	

Note: See general note, Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; O = other; G = government.

TABLE 34

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Foods *Export Quantity, 1920-63*

Trough in Food Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Foods Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Foods Export Price (6)
				Number of Quarters		
1920 III	DP	--	--	--	-2	0
1923 III	DP	--	--	--	-1	-2
1925 IV	WT, DP	+2	--	--	+3	--
1928 II	O	--	-2	--	--	0[b]
1933 III	G	--	-2	--	--	--
1936 IV	DP	--	--	--	+2	+2
1945 I	WT, DP	n.a.	--	+4	0	--
1950 I	WT	0	-1	+1	--	--
1954 I	WT, G	-4	+2	+7	--	--
1958 I	WT, G	+4	+1	--	--	+2
			Extra Troughs		*Extra Peaks*	
		1921 IV	1921 III	1922 I	1929 III	1925 I
		1935 I	1924 III	1924 II	1948 IV	1948 I
		1938 IV	1938 II	1934 II	1953 II	1952 II
			1945 IV	1960 I	1957 III	
			1961 I		1960 II	

Note: See general note, Table 25.

[a]See note a, Table 33.

[b]Alternative or minor peak.

dence of the latter and world troughs. This new relation is due to the intervention of the government which, spurred on by domestic recession, effected an upturn in these exports around the time of the domestic business trough.

10. *Explanation of Timing of Turns in Total Exports, 1879–1913*

The insight gained into the factors causing the major classes of export goods to reverse their direction of change can now be put to use to explain the turns in total exports. Nearly all of these in 1879–1913 are due to turns in crude materials exports, in food exports, or both. Of the nineteen peaks and troughs in total export quantity (TEQ) which are covered by the analysis, ten coincide roughly with a peak or trough in both crude materials and food exports; another eight coincide with one or the other of the two classes. Exports of finished manufactures, on the other hand, contribute only rarely to a turn in total exports in this period.

But CEQ and FEQ turns are only a necessary, not a sufficient, condition for the occurrence of TEQ turns. Only about half of the class turns cause simultaneous TEQ turns, while the remainder either lead or lag by more than a quarter or are not near a like TEQ turn at all. In order to understand the relative importance of the several causal factors in TEQ turns, one must know, therefore, which types of CEQ and FEQ turns are and which are not reproduced in the total.

Comparisons of Tables 25, 26, 31, 32, 35, and 36 reveal that there is a significant difference in this respect between turns due to changes in world demand and turns due to the domestic business cycle. While the great majority of those peaks and troughs in CEQ and FEQ which are ascribed to peaks and troughs in the WIC reappear in total exports, the same does not hold for CEQ and FEQ turns corresponding to inverse DBC turns. Here the findings on troughs differ from those on peaks. When a downturn in CEQ and FEQ is due to the inverse effect of the domestic cycle, it is typically *not* reflected in a downturn of total exports. Every upturn in FEQ, on the other hand, and five out of eight upturns in CEQ have their counterparts in TEQ.

The reason for the relatively weak influence of inverse CEQ and FEQ peaks on TEQ peaks (and to some extent of inverse CEQ troughs on TEQ troughs) is often not their small amplitude but their timing. In most instances, the turns in CEQ and FEQ which

TABLE 35

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Total *Quantity, 1879-1913*

Peak in Total Export Quantity	Classification of Export Peak[a]	Lead (-) or Lag (+) of Peak in:			Lead (-) or Lag (+) of Trough in:	
		World Import Cycle	Domestic Business Cycle	Total Export Price	Domestic Business Cycle	Total Export Price
		(1)	(2)	(3)	(4)	(5)	(6)
				Number of Quarters		
1880 IV	DT	--	--	--	-7	-1[b]
1883 I	WP	+1	--	--	--	--
1887 I	XP	--	+1	--	--	-1
1892 I	WP, DT	-1	--	--	-3	--
1893 III	WP	+2	--	--	+3	--
1898 II	DT	--	--	--	-4	+2
1901 II	DT	--	--	--	-2	+2
1903 I	WP	+3	-1	--	--	--
1907 I	WP	+2	+1	+2	--	--
1913 III	WP	0	-2	-1	--	--
			Extra Peaks		*Extra Troughs*	
		1900 II	1882 I	1882 III	1885 II	1890 II
			1890 III	1888 IV	1888 I	1895 I
			1893 I	1890 IV	1904 III	1905 I
			1895 IV	1895 IV	1908 II	1908 IV
			1899 III	1900 III	1911 IV	1911 IV
			1910 I	1904 I		
				1910 I		

Note: See general note, Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; XP = domestic business cycle peak caused by export peak; XT = domestic cycle trough caused by export trough.

[b]Alternative or minor trough.

TABLE 36

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Total *Export Quantity, 1879-1913*

Trough in Total Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Total Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Total Export Price (6)
				Number of Quarters		
1882 II	DP	--	--	--	-1	+1
1885 III	WT	+2	-1	--	--	--
1888 III	XT	--	-2	--	--	+1
1893 I	DP	0	--	--	0	0[b]
1895 III	DP	-2	--	--	+1	+1
1899 II	DP	--	--	--	+1	--
1902 II	DP	-2	--	--	+2	0[b]
1904 II	WT	0	+1	--	--	-1
1910 I	DP	--	--	--	0	0
			Extra Troughs		*Extra Peaks*	
		1881 I	1891 II	1886 IV	1887 II	1890 IV
		1908 II	1894 II	1890 II	1890 III	1900 III
			1897 II	1895 I	1907 II	1907 III
			1900 IV	1898 IV	1913 I	1913 II
			1908 II	1901 IV		
			1911 IV	1905 I		
				1908 IV		
				1911 IV		

Note: See general note, Table 25.

[a]See note a, Table 35.

[b]Alternative or minor peak.

fail to cause turns in TEQ do not coincide with each other. On the other hand, most of the turns caused by the WIC occur at about the same time in CEQ and FEQ, and hence also in TEQ. In other words, reversals in world demand, because of their simultaneous effect on all classes of exports, are usually reflected in turns of the total. Similarly, the strong and rapid effect of some downturns in the DBC caused upturns in both export classes and, consequently, in the total. On the other hand, the gradual impact of rising domestic demand following upon a domestic business cycle trough usually affects crude materials at a somewhat different time than foods. In these cases TEQ tends to exhibit minor peaks not recognized as cyclical turns, as for instance, in 1885, 1889, 1895, 1905, 1909, and 1912 (Chart 2).

Though the inverse effect of the domestic cycle, thus, is less often responsible for peaks in total exports than it is for peaks in the component classes, it is still sufficient—together with some turns in world demand and some turns in crops at opposite DBC turns—for about half of all TEQ turns to occur at *unlike* turns in the DBC. This result stands out more sharply when it is remembered that there are only two cases of TEQ turns matching *like* DBC turns that are not due to nearby WIC turns—the peak in 1887 and the trough in 1888—both of which are due to the effect of food exports on domestic business as discussed above.

The extent to which turns in total exports are affected by domestic demand or supply is also revealed by the timing of total export prices (TEP). The relation of TEQ peaks and troughs to troughs and peaks in TEP is similar to that between FEQ and FEP and much less close than that between CEQ and CEP. About half of all turns in total quantity match unlike turns in total prices, but the relation is closer at TEQ troughs than at TEQ peaks (Tables 35 and 36).

The former are, as a rule, associated with downturns in TEP. Of nine TEQ troughs, six coincide roughly with TEP peaks, two others with minor TEP peaks, and none with a TEP trough. Thus, TEQ typically begins to rise when a fall in domestic demand or a larger crop causes prices to weaken. The role of domestic demand in this weakening is attested by the fact that, in five of the seven instances in which a TEQ trough matches a TEP peak, there is also a peak in the DBC. (Conversely, half of all DBC peaks are characterized by TEQ troughs and TEP peaks.)

In none of the instances in which an upturn in world demand

aided the upturn in total exports was its effect strong enough to bring about a simultaneous recovery of prices. On the contrary, declining domestic demand and/or a larger crop were able to force prices down despite the expansion in foreign demand.

Downturns in TEQ are less frequently related to price troughs than TEQ upturns are to price peaks. Only four out of ten export peaks match price troughs, while two even match price peaks. Thus, the unfavorable effect of expanding domestic demand is not as clearly revealed by the behavior of prices as the favorable effect of contracting domestic demand is. The reason may be, in some instances, that in the period of secular price decline domestic expansion merely caused this decline to slow down but not to reverse itself so that no price troughs occurred. In some instances, also a downturn in world demand occurred at about the time of the TEQ peak and contributed to the downward tendency of prices. At any rate, the behavior of prices confirms that the inverse effect of the DBC plays a lesser role at peaks than at troughs of total exports.

Only about one-half of the turns in total export value (TEV) coincide roughly with TEQ turns. The discrepancies are, however, in several instances due to slight variations between the two series, double turns, or questionable seasonal corrections. When this is taken into account by recognizing minor or alternative turns in a few cases, it appears that the main real difference between value and quantity turns stems from the rising price trend prevailing around the turn of the century. This causes value troughs to lead and value peaks to lag behind their quantity counterparts in a few instances. Despite these differences, however, the explanation of quantity turns holds, in general, for value turns too.

Having traced the turns in total exports to those in their components and thereby gained an understanding of the role of the causal factors behind them, we can now explain the peculiar location of TEV turns in U.S. business cycles which previously could not be accounted for.[38] Turns in total exports, 1879–1913, we found, are certainly not randomly distributed in domestic business cycles. Peaks are found, for instance, in six out of seven consecutive business expansions, while troughs cluster around DBC peaks or troughs. Although not irregular, however, the timing of export turns in domestic business cycles differs from that of turns in other economic activities.

While in most time series peaks tend to cluster in one stage of

[38] See my *American Exports During Business Cycles, 1879–1958,* Occasional Paper 76, New York, NBER, 1961.

the business cycle and troughs in another, export peaks tend to occur in two quite different stages, and the same goes for troughs. The first and more frequent set of turns are peaks which lag behind DBC troughs by about a year and export troughs located shortly before or at DBC peaks. A second and smaller set of export peaks is found in domestic contractions and a second set of troughs at domestic troughs. These two locations correspond, as the preceding analysis has disclosed, to two causal factors. The first set of turns, the export peak in mid expansion and trough at the DBC peak, is due largely to the inverse effect of the DBC (aided sometimes by an inverse WIC and sometimes by an inverse crop cycle). The second set of turns, the export peak in midcontraction and trough at the DBC trough, is due to the impact of the WIC, whose peaks tend to lag behind DBC peaks while some of its troughs are close to domestic ones.

Thus, as a rule, export rises come to an end either after a stretch of domestic expansion and due to its adverse effects, or due to a downturn in world demand occurring during domestic contraction. A fall in exports, on the other hand, is terminated either by a drop in domestic demand at the DBC peak or by a rise in foreign demand at a WIC trough which coincides with a DBC trough.

The regularities found in the timing of turns in total exports relative to U.S. business cycles can thus be attributed, in part, to the direct impact of these business cycles on exports and, in part, to regularities in the timing of turns in world demand relative to U.S. business cycles.

11. *Explanation of Timing of Turns in Total Exports, 1920–63*

In the later period, turns in total exports roughly coincide with turns in finished manufactures exports about as frequently as with those in any of the other commodity classes. In other words, because of their greater instability, exports of semimanufactures, crude materials, and foods cause turns in total exports about as often as the much larger but more stable exports of finished manufactures. There is, however, a difference between peaks and troughs in this respect. A downturn in total exports is due most often to semimanufactures and/or foods (there is only a single TEQ peak which does not roughly coincide with a SEQ and/or FEQ peak), and least often

to finished manufactures. An upturn in total exports, on the contrary, is less frequently due to foods than to any of the other classes.

About half the turns in each commodity class coincide roughly with a turn in total exports. As in the earlier period, these coinciding turns are for the most part those caused by reversals in foreign demand, while turns due to the inverse impact of the DBC are mostly not reflected in TEQ. Of the thirty-eight turns in one or another class of exports which we have attributed mainly to the WIC, twenty-nine coincide roughly with turns in TEQ in 1920–60. But of twenty-three class turns inverse to the DBC, only six coincide with TEQ turns.

The explanation for the different effect of WIC and DBC turns on total exports is similar to that for the earlier period: foreign demand affects all types of exports at about the same time, while the influence of domestic demand is timed differently in different classes. Moreover, and most important in the latter period, exports of finished manufactures do not turn at all near unlike turns in the DBC. Hence, even simultaneous inverse turns in crude materials and foods sometimes fail to produce a turn in the total due to an opposing movement in finished manufactures. This happened, for instance, in 1921, 1936, and 1945. However, variations in exports of semimanufactures differ less from those in finished manufactures than crude materials and foods. Therefore, most inverse turns in SEQ *are* reflected in at least minor peaks and troughs of TEQ.

Since the number of reversals at opposite turns in domestic demand is smaller in each class of exports in the later compared with the earlier period, and since a large proportion of the inverse class turns that do occur is not reflected in total exports, there remain, after 1920, only a few TEQ peaks and troughs matching troughs and peaks in the DBC (Tables 37 and 38). Two such instances are the TEQ peak and trough in 1924 and 1925; two others come in 1947 and 1948. The case of the 1947 peak is exceptional insofar as it was at that time the deliberate policy of the government to reduce exports by tightening controls in order to ease pressures on limited domestic supplies.[39]

Thus the inverse effect of domestic demand plays, after World War I, but a minor role in reversals of total exports. The meaning of this finding should not be overlooked. Judging by the record of the last thirty or forty years, one need not fear that growth of

[39] *Foreign Trade in the United States, 1936–49,* p. IX.

TABLE 37

Leads and Lags of Turns in Selected Series at Peaks *in U.S.* Total *Export Quantity, 1920-63*

Peak in Total Export Quantity	Classification of Export Peak[a]	Lead (-) or Lag (+) of Peak in:			Lead (-) or Lag (+) of Trough in:	
		World Import Cycle	Domestic Business Cycle	Total Export Price	Domestic Business Cycle	Total Export Price
	(1)	(2)	(3)	(4)	(5)	(6)
				Number of Quarters		
1919 II	DT	--	--	--	-1	--
1924 IV	DT	+1	--	--	-1	-1
1927 II	CP	--	-3	--	--	0
1929 I	WP	+1	+2	-2	--	--
1934 II	G	--	--	--	-5	0
1937 IV	WP	-2	-2	-2	--	--
1947 III	WP, DT	n.a.	--	--	-7	--
1949 I	WP	-1	-1	--	--	--
1952 I	WP	0	+5	-3	--	--
1957 I	WP	+1	+2	+3	--	--
			Extra Peaks		*Extra Troughs*	
		1920 II	1920 I	1920 III	1921 III	1922 I
			1923 II	1924 I	1927 IV	1945 IV
			1960 II	1925 III	1949 IV	1950 II
				1948 I	1954 III	1955 I
					1958 II	1958 III
					1961 I	

Note: See general note, Table 25.

[a]Factors selected as mainly responsible for timing of export turns: WP = world import cycle peak; WT = world import cycle trough; DP = domestic business cycle peak; DT = domestic business cycle trough; CP = crop cycle peak; CT = crop cycle trough; O = other; G = government.

TABLE 38

Leads and Lags of Turns in Selected Series at Troughs *in U.S.* Total *Export Quantity, 1920-63*

Trough in Total Export Quantity	Classification of Export Trough[a] (1)	Lead (-) or Lag (+) of Trough in: World Import Cycle (2)	Domestic Business Cycle (3)	Total Export Price (4)	Lead (-) or Lag (+) of Peak in: Domestic Business Cycle (5)	Total Export Price (6)
			Number of Quarters			
1921 IV	WT	0	-1	+1	--	--
1925 III	DP	+3	--	--	+4	0
1927 IV	CT	--	0	--	--	0[b]
1932 III	O	--	+2	--	--	--
1934 IV	WT	+1	--	--	--	--
1938 IV	WT	0	-2	+2	--	--
1945 IV	WT	n.a.	0	0	--	--
1948 II	DP	--	--	--	+2	-1
1950 I	WT	0	-1	+1	--	--
1954 I	WT, G	-4	+2	+4	--	--
1959 I	WT	0	-3	-2	--	--
			Extra Peaks		*Extra Troughs*	
			1924 III	1924 III	1920 I	1920 III
			1961 I	1927 II	1923 II	1924 I
				1934 II	1929 III	1928 III
					1937 II	1937 II
					1953 II	1951 II
					1957 III	1957 IV
					1960 II	

Note: See general note, Table 25.

[a]See note a, Table 37.

[b]Alternate or minor peak.

total exports will be stopped by an upturn of domestic business, nor should one hope to halt a fall in exports by inducing a downturn in the home economy. Peaks and troughs in the DBC cannot even be expected to prevent exports from turning in conformity with world demand. Most TEQ turns since 1929 and all of them since 1949 are associated with WIC turns despite the frequent proximity of the latter to like turns in the DBC.

The timing of peaks and troughs in total export prices relative to those in TEQ also shows the weakness of the DBC's influence in the later period. While quantity troughs before 1913 were associated typically with price peaks, they tend to match price troughs in the latter years. In only three of the eleven instances covered did a downturn in prices contribute to the upturn in quantity, while there are six matching price and quantity troughs. More particularly, beginning with 1938, five of the six TEQ troughs are associated with TEP troughs. On all these occasions, the effect of the world import cycle was strong enough to permit both quantities and prices to revive.

The situation at TEQ peaks is not quite symmetrical to that at troughs. They are less frequently accompanied by TEP peaks, but neither do they match TEP troughs after 1934. No downturn in total exports, in other words, can be attributed to an upturn in prices during the past thirty-odd years. In the interwar period, however, this relationship still resembled somewhat that of the period before World War I. Three of the six TEQ peaks match TEP troughs, but the latter are in two instances due to factors other than the DBC.

Due partly to the predominantly positive relation between price and quantity movements and partly to the relative mildness of price fluctuations, the value of total exports turned together with export quantity in all instances after World War II and in fifteen out of twenty-one cases during the whole period of 1920–60. The few occasions on which there is a short lead or lag of value over quantity are due to slight discrepancies between the series. The only real difference occurs at the TEQ trough of 1932 and peak of 1934, which are not reflected in TEV due to offsetting price changes. Thus, the explanation of turns in total export quantity also applies to their value.

The analysis may again be used to explain the location of turns in total exports in U.S. business cycles. There is a considerable shift here between the earlier period and 1920–60, particularly for export troughs. Whereas exports used to revive most often in the vicinity of domestic business peaks before 1913, they now tend to do so near

domestic troughs. Seven of the eleven TEQ troughs are within two quarters of a DBC trough, and an eighth one lags by three quarters. In most instances, these upturns are associated with like ones in world demand. However, government policies also play a certain role. The timing of the farm program contributed to the recovery of exports at the domestic troughs of 1954 and 1958, and the devaluation to that of 1932.[40]

Of the three remaining instances in which total exports take a favorable turn at a DBC stage other than the trough, two are associated with DBC peaks. They are manifestations of what remains of the inverse relation which earlier was the rule. The third case, the export trough of 1934, lags behind the DBC trough by almost two years due to the aforementioned double trough of world imports in those years.

The location of total export peaks in domestic business cycles does not differ as radically between the earlier and later periods as that of troughs. Six of the ten more recent TEQ peaks are less than one year away from a domestic business peak. Most of these are caused by WIC peaks. They correspond to that set of the earlier period which lagged behind DBC peaks and thus came during domestic contraction. Since the earlier period's regular lags of world peaks at U.S. peaks have become mixed leads and lags in the later years, the position of export peaks has changed likewise. Thus, the WIC and TEQ peaks of 1937 and 1949 lag behind DBC peaks as before, while in 1929 and 1957 world trade and exports turned earlier than domestic business.

Two of the three remaining TEQ peaks come in the course of U.S. expansions, and their location thus is similar to that of the more numerous set of the earlier period. However, the causal factors are different now. The main reason for the downturns of 1934 and 1952 was not rising domestic demand but the collapse of an agricultural export program in the former case and the downturn of world demand after the Korean War in the latter one. If these cases are regarded as exceptions, one must conclude that a downturn in total U.S. exports is more likely in the neighborhood of a domestic business peak than near a trough.

In sum, then, there has been a shift of both the peaks and the troughs in total exports into the vicinity of like turns in U.S. business

[40] The only TEQ trough which occurred at a DBC trough but was not due either to a WIC trough or to government policies is the trough of 1927. This was largely attributable to crop failure.

cycles. The main reason for this shift is, as explained above, the weakening of the inverse effect of the DBC on exports. This accounts for the absence of export troughs at peaks of later business cycles and for the occurrence of only two export peaks in the course of expansion in this period. Another reason for the shift is the closer correspondence of world and domestic cycle turns in the later period relative to the earlier one. This pulls those export turns that are due to WIC turns toward like DBC turns. A third, if minor, factor operating in the same direction was represented by some government programs which on a few occasions caused total exports to turn up at about the time of a business cycle trough.