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PART III

The Variability of Seasonal Movements

CHAPTER VIII

REGIONAL ASPECTS

GENERAL CHARACTERISTICS

Part II discusses the seasonal problem in various groups of industry and trade, utilizing data on the flow of commodities in the country as a whole. Such data obviously give no indication of the variety of seasonal swings which in combination make up a single pattern. Among other sources of such variety concealed by any series that covers so wide a territory as the United States, regional differences are undoubtedly important.

A seasonal index for total production of any commodity may be interpreted as a measure of the burden imposed by seasonality on labor engaged in the industry, on capital funds needed to facilitate actual work and on the industries supplying the raw materials; but only upon the assumption that labor is perfectly mobile, that capital funds flow freely from locality to locality, that enterprises engaged in supplying the essential raw materials cater to the wide-spread market of the country. Only such an assumption justifies the algebraic addition of a high seasonal month in one region to a low seasonal month in another region to produce the index for the country as a whole. However, it is difficult to assume that the factors involved in the production and flow of commodities—labor, capital, materials—are perfectly mobile.

This chapter presents, therefore, for commodities whose movement has been measured for the entire country indexes for much smaller territorial units, usually states. The analysis is limited by the volume of data easily available but they seem to be sufficient to illustrate several types of regional variability.

To ascertain the mobility of productive factors among the various parts of this country is a task to be fulfilled only by dint of intensive study of the country's economic and social regions. To this task a purely statistical analysis of seasonal variations can contribute but little. But it can, using series for territorial units smaller than the country (for example, states or Federal Reserve districts), serve to illustrate the diverse types of regional variations in seasonality and to suggest their scope.

The tentative conclusions of such an analysis, presented in this chapter, may be summarized as follows:

1. In those industries in which climatic factors directly determine the timing of the seasonal swing, regions show divergent seasonal patterns and amplitudes (wheat marketings, Portland cement shipments). An assumption of nonmobility in the productive factors involved would lead to the conclusion that the seasonal index for the country as a whole under-estimates the magnitude of the seasonal burden.

2. In several instances where activity is directly influenced by climate the seasonal patterns still show considerable persistence from region to region (butter production, gasoline consumption). In these instances variations in seasonal amplitude are appreciable and tend to reflect the regional differences in the severity of seasons.

3. The seasonal behavior of manufacturing and distributive activity does not show great regional diversity, owing partly to the origin of seasonal swings in manufacturing industry in variations of the number of working days in the month, summer vacations, etc., and of those in retail trade in holidays. Thus for both groups the seasonal factors are conventions of such character as are likely to be similar throughout the country. If differences in seasonal behavior appear they tend to be reflected in disparate seasonal amplitudes; the seasonal pattern persists. Such differences in seasonal amplitude are likely to be associated with variations in manufacturing and merchandising practice from one region to another.

DETAILED COMMENTS

1. Wheat Marketing by Farmers

Seasonal changes in wheat marketing by farmers are imposed by inexorable climatic factors which may differ in severity and timing from region to region. The data reveal clearly that the totals for the country conceal appreciable variations in the seasonal amplitude and in the timing of their constituent parts.

The essential features of the typical seasonal swings in marketing in various states are presented in Table XIV; the states are divided into six groups on the basis of their showing.

TABLE XIV

WHEAT MARKETING BY FARMERS, PRINCIPAL WHEAT-PRODUCING STATES

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH STATE

State	Timing		Amplitude	
	Peak	Trough	Average Deviation	Range
Kansas	July	June	46.6	173
Nebraska	July	June	39.4	143
Maryland	August	June	56.1	197
Virginia	August	June	44.9	155
North Carolina	July	January	36.1	124
Indiana	July	June	70.6	315
Colorado	August	June	69.9	243
Missouri	July	April-May	69.5	264
Illinois	July	June	68.3	301
Iowa	August	June	61.5	242
Oklahoma	July	March	60.3	321
Ohio	July	June	49.0	175
New York	September	July	41.0	129
Michigan	September	June	34.2	104
Pennsylvania	August	April	29.8	135
Oregon	September	June	107.2	394
Washington	September	June	102.3	424
Idaho	September	April	80.9	317
Montana	October	July	75.6	243
North Dakota	September	July	66.4	224
South Dakota	September	April, July	58.8	209
Minnesota	September	July	52.7	191
California	August	April-May	96.9	386
Kentucky	July	April	85.1	374
Texas	July	May	66.8	307

The seasonal indexes grouped as above are presented graphically on Chart 43.

Among the factors which determine both the timing and amplitude of the seasonal movement in marketing the following may be suggested: (a) the degree to which winter or spring wheat is the predominant type grown; (b) the degree to which wheat in general is the predominant crop; (c) the climate of the state, which may make later harvesting and keeping the grain in sacks on the field for some time possible (Far West); (d) the importance of the wheat crop in relation to the general economic activity of the state.

The first group of only two states is by weight probably the most significant. Both Kansas and Nebraska are important winter wheat areas and together account for about 40 per cent of winter wheat harvested. The peak of marketing is in July; the range of fluctuations is relatively narrow.

The next group of three southern states, in which wheat is not of importance, shows wider ranges. Two states, Maryland and Virginia, market their wheat quite rapidly. North Carolina, which is more of an industrial state than either of the other two, has a rather mild swing, comparable in some ways to the swing of the other three industrial states, New York, Pennsylvania and Michigan, but differing in timing because of the difference in climate.

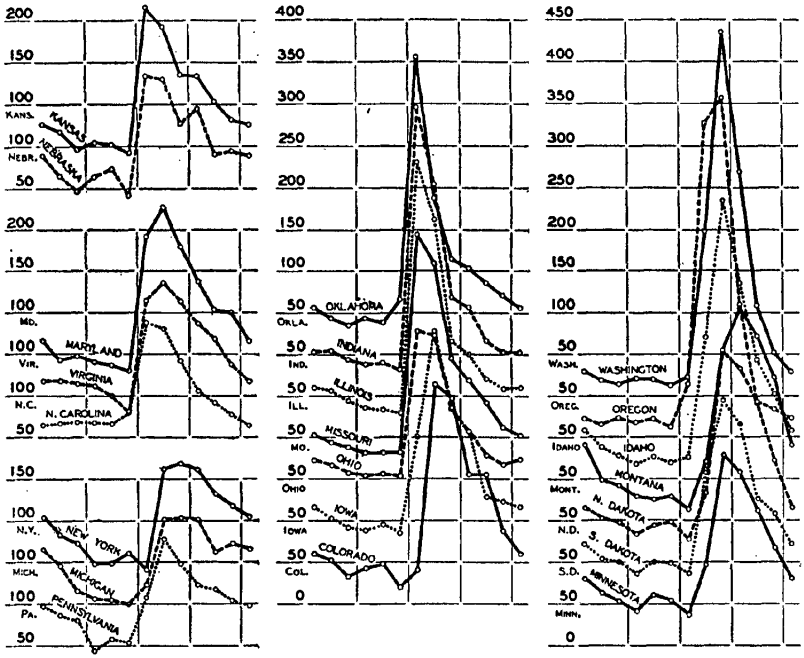
The third group consists of states in which winter wheat is relatively important but comes into competition with other crops. To their location in the Middle West or North is due their similarity in timing. Competition of other crops for labor and machinery and the necessity of removing the wheat from the fields quickly may account for the rather extreme violence of their swing. This seems to be especially true of the first four states of the group, Illinois, Indiana, Oklahoma and Missouri. The swing is milder in the other three, especially in Ohio, which is the most industrialized state of the seven.

The next group exhibits patterns typical of marketing in the great industrial states. The farmers market the wheat, which is a relatively unimportant part of the farm economy, in a leisurely fashion. Only in these three states are marketings above normal, that is, above the line of 100, for fully six months in the year. The range is also very narrow. The

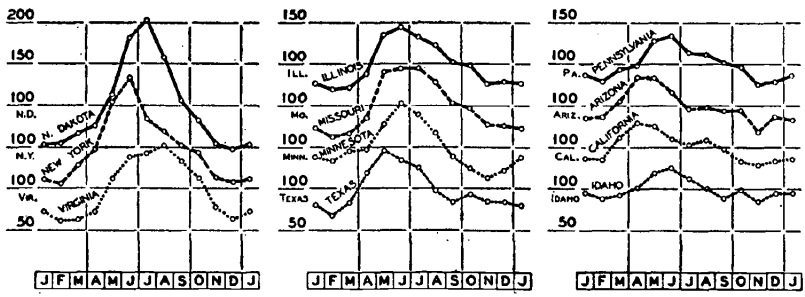
CHART 43

SEASONAL MOVEMENT OF WHEAT AND BUTTER, SELECTED STATES

WHEAT MARKETING BY FARMERS IN SELECTED STATES, 1909-1921



BUTTER, FACTORY PRODUCTION IN SELECTED STATES, 1921-1925



peak is in August or September. Were it not for climatic differences, North Carolina and Ohio would have been added to this group.

The fifth group covers states in which spring wheat is the chief crop. The peak of marketing in these is in September, in one even in October. Since wheat-growing is the main occupation of the farmers and the weather becomes severe early in the winter, marketing proceeds at a much more intensive rate immediately after the harvest. This group has the widest ranges. However, the states in it with the largest acreage, Minnesota and the Dakotas, have the mildest seasonal swings. Other factors disregarded, the greater the area covered by the crop the more stable will the total marketing movement appear, since it will be a sum total of possibly divergent regional movements.

The three states of the last group, California, Texas and Kentucky, are characterized by rather large seasonal swings. The immediate disposal of wheat may be accounted for in Kentucky by the pressure exerted by tobacco and in Texas by cotton. In California the dry weather would make it possible to leave wheat on the fields for some time after harvest, and quick marketing may here be attributable to the pressure of the fruit crops for the release of labor and machinery.

The above grouping may be incorrect for one or two states, but on the whole the division seems logical. Where timing is concerned, the climatic factor and consequently the type of wheat grown are of primary importance. Where amplitude is concerned timing may be of some moment, for the later wheat is harvested the greater may be the pressure for removing it from the fields. But other factors intervene: the extent and the climatic heterogeneity of territory; the degree to which the farmers depend upon the cash returns from wheat crops; and the competitive pressure for labor and machinery on the part of other crops.

To illustrate the extent of seasonal disturbance, upon the assumption of non-mobility of productive factors, the seasonal swing may be computed without algebraic cancellation of peaks and troughs in the index for the country as a whole. Statistical Bulletin No. 12, which contains the marketing percentages for the twenty-five states, also presents their average, taken algebraically. If we convert this average into a

seasonal index, and take the deviations from 100, the quantitative measure of the seasonal swing assumes the following form:

July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Av.
+62	+109	+96	+52	+7	−16	−35	−46	−54	−60	−58	−56	54.3

If however the negative and positive deviations from 100 in each state for a given month are added without regard to sign, the total average seasonal swing becomes:

113	116	96	54	32	29	37	46	54	60	58	59	62.8

This second set of figures yields an estimate of the effect of the seasonal disturbance on the flow of wheat, upon the assumption that the factors involved have no mobility at all as among the twenty-five states that are assigned equal weights (and be it added, perfect mobility within the states). The first set of figures, derived from the total index for the twenty-five states, assumes perfect mobility of factors as among the states (and within states). The average disturbance is clearly greater when no cancellation of standings below and above 100 is allowed.

As far as any such method may be used to estimate the burden imposed by seasonal disturbances, the true approximation would probably lie between the two measures. In some respects there is mobility among the states, for example, in labor supply. There is less mobility in storage equipment. On the other hand, even the state figures may conceal rather significant differences in seasonal pattern as among the various regions within one and the same state.

2. Butter Production

In butter production we have another example of an industry in which seasonal variations are most obviously due to climatic influences. It will be remembered from Chapter III that the principal factor in the determination of the seasonal swing in butter production is the increased supply of raw milk during the summer. It might be supposed then that the various parts of the country would show divergent seasonal patterns, since in some regions the climate makes possible year-round out-door pasturage while in others the season is confined to the summer. We find, however, that although

there are differences in seasonal amplitude from state to state, there is a marked persistence of seasonal pattern.

Table XV brings out the principal results of the seasonal analysis.

TABLE XV

BUTTER, FACTORY PRODUCTION, IMPORTANT BUTTER-PRODUCING STATES

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH STATE

State [a]	Timing		Amplitude	
	Peak	Trough	Average Deviation	Range
North Dakota	July	December	44.2	155
South Dakota	June	November	34.7	111
Mississippi	August	February	32.2	100
New York	June	February	32.0	128
Massachusetts	June	November	31.8	143
Virginia	August	February	31.8	91
Kentucky	July	February	30.0	92
Montana	July	December, February	29.8	98
Tennessee	August	February	29.8	84
Wyoming	July	February	29.3	96
Nebraska	June	November	29.1	99
Oklahoma	June	November	28.1	91
Ohio	June	February	27.0	90
Missouri	June-July	February	26.9	83
Kansas	June	November	25.2	83
Iowa	June	November	25.2	85
Illinois	June	February	23.2	76
Wisconsin	June	November	22.8	80
Minnesota	June	November	22.8	89
Indiana	June	February	22.7	76
Colorado	June	November	22.0	79
Michigan	June	November-December	21.9	81
Texas	May	February	20.7	78
Oregon	May-June	February	20.0	67
Washington	June	February	16.8	65
Pennsylvania	June	November	15.1	58
Arizona	April	November	15.1	66
California	April	November	14.2	49
Utah	June	November	14.0	63
Nevada	July	February	12.5	48
Idaho	June	November	9.4	39

[a] In order of declining seasonal amplitude.

While the amplitude varies within a rather wide range, the pattern, as delineated by the low and high months, exhibits a considerable degree of persistence. In all the states the peak occurs in the spring or summer, the earliest being in April and the latest in August. But June preponderates heavily, being the peak month in eighteen states, and one of two peak months in two additional states. In all the states the trough occurs during the autumn or winter; fourteen states show the lowest standing in November and fourteen in February.

This similarity of pattern is confirmed by a graphical comparison of the seasonal indexes for selected states, given in Chart 43. The selection was carried through in such a way as to represent adequately each of the three groups of states: those showing rather wide seasonal swings, those showing mild seasonal swings, and the middle group. Within each group a variety of seasonal patterns was chosen. And in spite of this attempt to represent all departures from the prevailing pattern, the similarity in the timing of the seasonal swings presented is striking. It would seem that in spite of differences of climate, and consequent differences in pasture and feeding, a surplus of milk and hence the peak in butter production occur in all regions in the summer.

Because of this close synchronism of the seasonal swings in the various states, the *average* seasonal index for the country as a whole comes out approximately the same when the separate state indexes assigned an equal weight are added together algebraically and when they are added without regard to sign. The results of such computations, in a form similar to that for wheat marketings, are as follows:

With algebraic cancellation:

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
−23	−30	−19	−3	+32	+49	+38	+20	−1	−9	−28	−27

Without algebraic cancellation:

23	30	20	13	32	49	38	22	10	11	28	27

Significant differences appear only in two months, April and September. The average disturbance in one index is 23.2, in the other 25.2. The introduction of lack of mobility does not materially change the picture of the *average* swing for the country as a whole.

To explain the variations in the size of the seasonal swing from state to state is rather difficult. There seems to be little geographic or other consistency. Thus, in the group of large amplitudes are states with quite different characteristics—New York and Massachusetts, North and South Dakota, Virginia and Montana. Similarly among the states of mild amplitude we find Pennsylvania next to Arizona, Michigan next to Colorado and Texas. The only apparently significant feature is that the states in the Far West—Colorado, Oregon, Washington, California, Nevada, Idaho, Utah—all show rather mild seasonal variations.

The most plausible explanation of a mild seasonal swing would lie either in a combination of summer and winter dairying, which ought to produce a continuous milk supply to the butter factories, or in the absence of any raw milk market whatever and the consequent lack of an appreciable milk surplus in summer.

3. Portland Cement Shipments

Regional differences in the construction industry, as revealed by the data on building permits and building contracts, have already been studied by Joseph B. Hubbard.[3] To carry further the analysis of seasonal variations which are of such importance to the industry as a whole, we have studied data on shipments of Portland cement by states, reported since 1924 by the United States Bureau of Mineral Resources.

Two considerations guided the choice of the states for analysis: (1) an attempt was made to include widely different climatic conditions so as to secure a representation for each of the most important regions of the country; (2) preference was given to states presenting a substantial demand for cement over smaller states which absorbed only a minor share of the country's total production. The fourteen states thus included were: Pennsylvania, New Jersey, New York, and Maryland (for the East); Illinois, Kansas, Missouri, Ohio (for the four corners of the Middle West); California (for the Pacific Coast); Arizona, Texas, Alabama, Louisiana, Florida (the last three states representing the South). In 1928 these fourteen states received 106 million barrels out of 176 million shipped.

[3] See his An Analysis of Building Statistics for the United States, *Review of Economic Statistics*, January 1924, pp. 32-62.

The indexes are presented graphically in Chart 44; Table XVI indicates the variations in timing and amplitude.

The differences in amplitude revealed by these series for various states are large and significant. The regional differences are much more marked than for the groups in the Harvard analysis cited above, owing undoubtedly to the fact that we have taken single states, that is, smaller divisions than the regions demarcated by Hubbard.

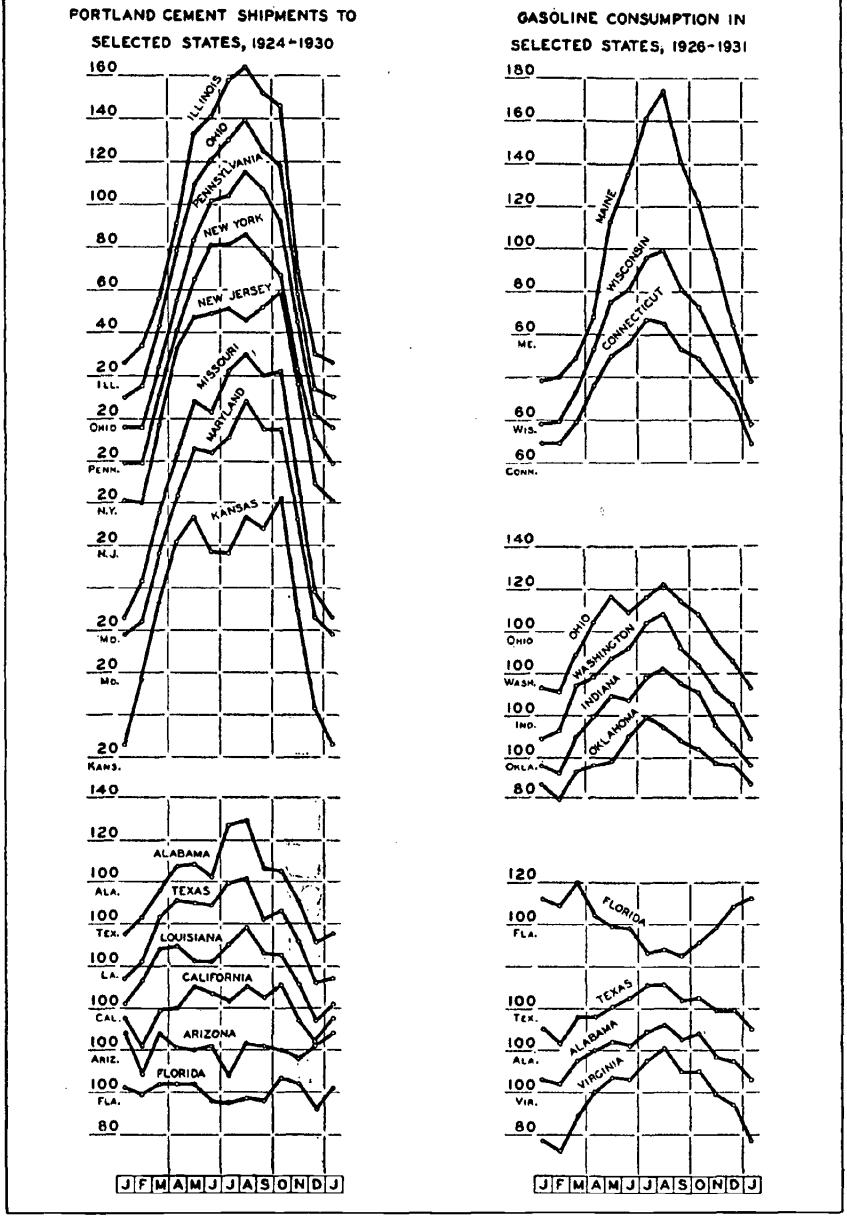
It may be seen also that the violence of the seasonal swing is largely explained by severity of climatic conditions. Illinois and Ohio are the most northern states of the fourteen analyzed and their large seasonal swings are without doubt attributable to their severe winters. The same is true of the next six states. There is a marked drop in the size of seasonal variations between Kansas and Alabama, the average deviation and the range being cut in half. Finally, the very mild seasonal patterns in Louisiana, California, and especially Arizona and Florida, are obviously due to their warm climate.

The first eight states have remarkably similar seasonal patterns, all showing small shipments in November and even smaller shipments from December through March. High levels prevail during the summer. The peak occurs in August in six of the eight states. New Jersey and Kansas show a somewhat different behavior during the summer. In New Jersey there is a minor trough in August and a secondary peak in July. In Kansas a similar summer pattern is repeated in accentuated form, possibly because of the influence of crops: June and July are low months and October shows a sharp peak. During the July harvest labor may be drawn away from construction, returning to it in August, September and especially October. But the same explanation could hardly apply to an industrial state like New Jersey.

The patterns of the seasonal swings in California, Alabama, Louisiana and Texas are somewhat similar to those observed in the colder states, although of course the amplitudes are much narrower. In California low levels prevail in November through February, and fairly high levels in the summer. In Alabama, as in the other states, while the peak in shipments occurs in August, the movement to and from the peak is much sharper. The same is true to a somewhat less extent of Louisiana and Texas. This rapid decline after August, in contrast

CHART 44

SEASONAL MOVEMENT OF PORTLAND CEMENT AND GASOLINE, SELECTED STATES



to the more gradual decline through the later autumn and early winter characteristic of northern states, may be attributable to the influence of the cotton harvest, which during October, November and December draws away the available labor force.

Florida and Arizona have entirely different patterns. Slightly lower levels prevail in summer, the peak is in either

TABLE XVI

PORTLAND CEMENT SHIPMENTS, SELECTED STATES

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH STATE

State [a]	Timing		Amplitude	
	Peak	Trough	Average Deviation	Range
Illinois	August	January	49.0	138
Ohio	August	January	43.7	129
Pennsylvania	August	January-February	40.4	119
Missouri	August	January	38.0	124
New York	August	January-February	36.2	107
Maryland	August	January	33.8	110
New Jersey	October	February	32.8	99
Kansas	October	January	31.9	116
Alabama	August	December	14.0	58
Texas	August	December	13.5	49
Louisiana	August	December	10.0	44
California	October	February	7.7	29
Arizona	January, March	July	4.4	20
Florida	October	December	4.2	15

[a] In order of declining seasonal amplitude.

October or January and high levels prevail during the winter, undoubtedly because of climatic conditions, the mild winter temperature being more favorable for outdoor work than the hot summers.

4. Gasoline Consumption

A sales tax on gasoline in most states furnishes data for a study of the seasonal swings in gasoline consumption in the various parts of the country. The main features of the indexes for eleven states, representative of different regions, are given in Table XVII.

It is remarkable that in spite of considerable climatic differences between the states the seasonal pattern in gasoline consumption persists (Chart 44). In Alabama and Texas, where the cold weather is not as severe as in such states as Maine and Wisconsin, and where therefore the roads are more usable in winter, the peak of gasoline consumption is nevertheless in July or August and the trough in February. Whether

TABLE XVII

GASOLINE CONSUMPTION, SELECTED STATES

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH STATE

State	Timing		Amplitude	
	Peak	Trough	Average Deviation	Range
Maine	August	January	41.0	136
Wisconsin	August	January	24.2	81
Connecticut	July	January-February	16.7	58
Washington	August	January	14.7	59
Ohio	August	February	14.6	51
Indiana	August	February	13.7	50
Oklahoma	July	February	9.2	40
Virginia	August	February	11.5	49
Alabama	August	February	6.9	28
Texas	July-August	February	6.2	28
Florida	March	September	9.0	35

this pattern is attributable to a country-wide summer vacation custom or in these southern states to the concentration, in the winter, of the cotton season which prevents much use of cars for pleasure, cannot be determined with any degree of assurance. The fact remains that gasoline consumption, like butter production, shows a generally similar seasonal pattern in regions differing greatly in climate. The only notable exception is Florida, possibly because of its rôle as a winter resort. The peak of gasoline sales is in March, generally low levels prevail in summer, and the trough is in September. The influx of vacationists, evidently of considerable magnitude as compared with the resident population, serves to increase gasoline consumption in winter.

Variations in seasonal amplitude, on the other hand, accord with expectations. In states of considerable weather contrast between summer and winter the seasonal swing in gasoline consumption is wide. This is especially true of Maine and Wisconsin. The influx of summer tourists to Maine probably serves to heighten the summer peak which would have appeared in any case. In Washington, Ohio, Indiana and Oklahoma the seasonal swing is about average. In such states as Alabama and Texas, owing to few extremes of temperature, it is mild.

5. Stocks and Consumption of Cotton

The industries discussed so far are susceptible to the influence of climatic factors. The material variation of these factors from region to region should, of course, make for considerable regional variations in the seasonal behavior of the activity affected. It is interesting to see whether there are significant regional differences in activity when the general seasonal pattern is determined not directly by climatic factors but by conventions and social habits.

The data on stocks and consumption of cotton that are available by states admit of such an analysis. While stocks of cotton at public warehouses and even at consuming establishments are subject to the influence of organic and climatic factors which determine the inflow and concentration of the raw material, consumption of cotton is a purely manufacturing activity, performed under conditions which are relatively independent of climatic or organic forces. These diverse aspects of activity show striking differences in the regional variability of seasonal behavior.

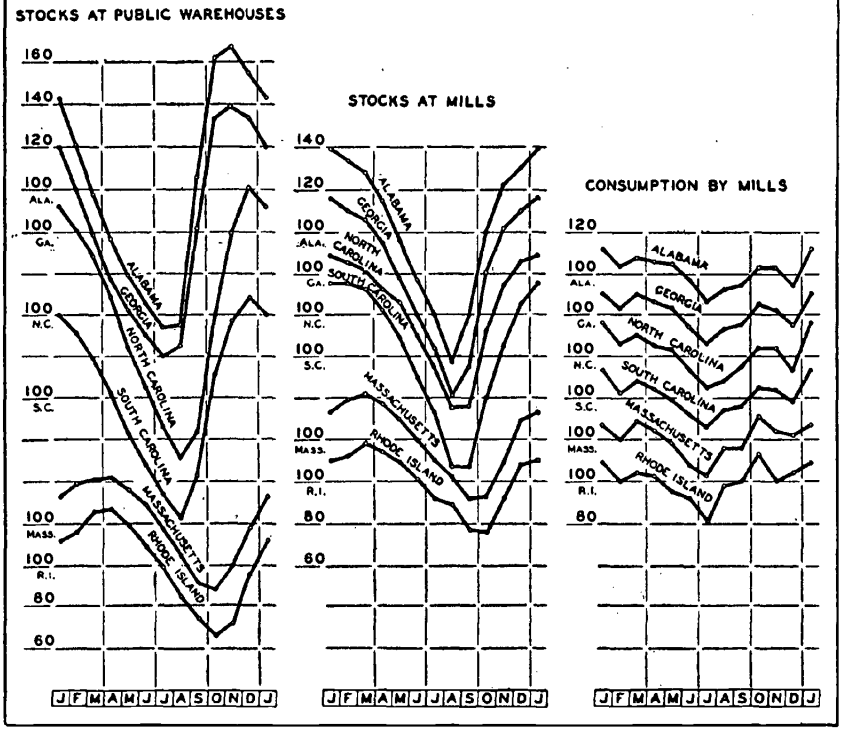
Table XVIII gives the essential features of the seasonal indexes for these three groups of series for each of six states, chosen so as to represent the two important regions of the industry, the South and New England.

It may be seen from Table XVIII and Chart 45 that the nearer the activity is to the influence of the organic seasons the greater is the regional diversity in seasonal behavior. Thus in cotton stocks at public warehouses the amplitude of the seasonal index varies from an average deviation of 42.2 and a range of 133 for the southern state of Alabama to 16.8

and 54 for the northern state of Massachusetts. This difference in amplitude is accompanied by an essential difference in seasonal pattern. In the southern state stocks are lowest at the end of July or August, rising to a peak in November or

CHART 45

SEASONAL MOVEMENT OF COTTON, SELECTED STATES, 1923-1930



December. In the northern state stocks do not begin to rise until after October and are highest at the end of April.

A somewhat smaller but still a substantial regional diversity is to be observed in the seasonal behavior of stocks kept by consuming establishments. Here also the seasonal amplitude is much higher in the southern states, declining almost by half in the New England states. And again there is a difference in the seasonal pattern. In the southern mills stocks

are lowest at the end of August, rising to a peak in January or February. In the northern mills stocks do not begin to rise until after September or October, reaching a peak by the end of March.

TABLE XVIII

STOCKS OF COTTON AT PUBLIC WAREHOUSES, STOCKS AT MILLS AND CONSUMPTION BY TEXTILE MILLS, SELECTED STATES

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH STATE

State	Timing		Amplitude	
	Peak	Trough	Average Deviation	Range
STOCKS AT PUBLIC WAREHOUSES				
Alabama	November	July	42.2	133
Georgia	November	July	37.9	119
North Carolina	December	August	38.3	130
South Carolina	December	August	31.4	105
Massachusetts	April	October	16.8	54
Rhode Island	April	October	18.2	61
STOCKS AT MILLS				
Alabama	January	August	28.2	102
Georgia	January	August	26.8	95
North Carolina	January	August	22.2	74
South Carolina	January-February	August-September	27.2	88
Massachusetts	March	September	15.3	50
Rhode Island	March	October	12.2	42
CONSUMPTION BY TEXTILE MILLS				
Alabama	January	July	6.5	26
Georgia	January, March	July	6.3	24
North Carolina	January	July	7.8	31
South Carolina	January	July	5.9	27
Massachusetts	October	July	6.3	28
Rhode Island	October	July	5.5	32

One of the reasons for this difference in seasonal behavior in stocks of consuming establishments may lie in the volume of stocks held. In southern mills the average ratio of stocks held to monthly consumption has been about 1.0 during recent years (varying from 1.3 for South Carolina to 1.0 for North Carolina). In northern mills the ratio has been about 2.7

or 2.8. These ratios confirm the comment made in Chapter IV concerning the different cotton purchasing policies of southern and northern mills.

Regional diversity of seasonal behavior disappears almost entirely when we consider the manufacturing series, consumption of cotton by textile mills. Seasonal amplitude is about the same in southern mills as in northern. There is also a marked similarity of pattern. In all six states consumption is lowest in July, and while in the southern states the peak is in January (or March) and in the northern in October, inspection of the indexes shows that in all states January, March and October are months of high levels of activity. Apparently the relatively stable manufacturing activity is not affected by regional diversity in the supply of raw materials or by possible differences in the seasonal behavior of consumers' demand.

6. Department Stores—Sales and Stocks

Distributive trades, when studied by regions, appear to show as little diversity of seasonal behavior as manufacturing activity. An effective illustration is afforded by the seasonal indexes for department store sales and stocks computed by the Federal Reserve Board for eleven Reserve districts (one district is omitted for lack of data) for the period 1919-27. Although the Reserve districts are much larger territorial units than states, still they segregate regions in which the seasonal behavior of natural factors is quite divergent. Thus the Atlanta, Richmond and Dallas districts represent the southern states while such districts as Boston and Chicago cover the North-northeast. If climatic or conventional differences have any influence on the seasonal behavior of retail trade this should appear in the comparison of the seasonal indexes for these regional units.

Table XIX presents the most conspicuous features of the seasonal indexes.

The similarity of the seasonal pattern appears clearly (Chart 46). The primary peak in sales in all districts is in December, accounted for by Christmas buying. The much lower secondary peak shifts from April to May. Similarly, the primary troughs in sales fall in July or August in all districts

CHART 46

SEASONAL MOVEMENT OF DEPARTMENT STORE SALES AND STOCKS BY FEDERAL RESERVE DISTRICTS, 1919-1927

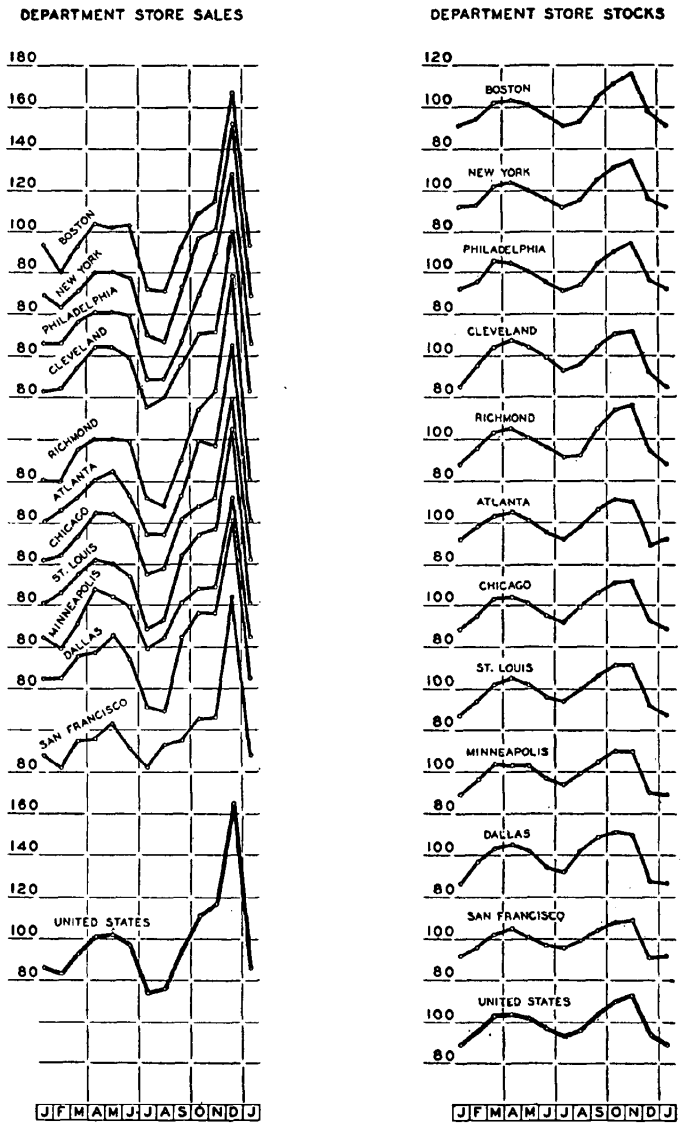


TABLE XIX

DEPARTMENT STORES, SALES AND STOCKS, ELEVEN FEDERAL RESERVE DISTRICTS

TIMING AND AMPLITUDE OF SEASONAL VARIATIONS IN EACH DISTRICT

Federal Reserve District	Timing				Amplitude	
	Primary Peak	Secondary Peak	Primary Trough	Secondary Trough	Average Deviation	Range
			SALES			
Boston	December	April	August	February	16.7	96
New York	December	April-May	August	February	18.3	105
Philadelphia	December	April-May	July-Aug.	Jan.-Feb.	18.0	99
Cleveland	December	April-May	July	January	15.0	86
Richmond	December	April-May	August	February	19.2	110
Atlanta	December	May	July-Aug.	January	17.8	91
Chicago	December	April	July	January	15.0	84
St. Louis	December	April	July	January	17.0	96
Minneapolis	December	April	July	February	13.7	73
Dallas	December	May	August	Jan.-Feb.	17.3	92
San Francisco	December	May	July	February	13.0	82
United States	December	May	July	February	16.0	91
			STOCKS			
Boston	November	April	January	July	6.2	25
New York	November	April	January	July	6.0	22
Philadelphia	November	March	July	January	6.2	23
Cleveland	November	April	January	July	6.7	26
Richmond	November	April	January	July	7.3	28
Atlanta	October	April	December	July	6.0	22
Chicago	November	April	January	July	6.2	23
St. Louis	Oct.-Nov.	April	January	July	6.2	24
Minneapolis	Oct.-Nov.	March	January	July	5.8	21
Dallas	October	April	January	July	7.0	24
San Francisco	November	April	December	July	4.8	18
United States	November	April	January	July	6.0	24

while the secondary troughs are concentrated in January or February.

Stocks exhibit a similar persistence of seasonal pattern from district to district. The primary peak is in November in most of the districts, in October in some, an obvious preparation for the peak sales during December. For like reasons, the secondary peak in stocks occurs in most districts in April, in some in March. Stocks are lowest in January or December; there is almost as deep a secondary trough in July. Obviously, the conventional factors which make for variations in stocks are the same the country over.

Seasonal amplitude varies considerably from district to district. There does not seem to be any definite association of this seasonal amplitude with climatic factors. While the widest swing in sales is in the southern district of Richmond, the next widest is in New York, a northern district. However, all the southern districts, Richmond, Atlanta and Dallas, do show seasonal swings in sales larger than the average. Wherever sales show wide seasonal swings, stocks do also. There are, however, interesting exceptions to such a correlation; for example, in New York. It seems most justifiable to assume that the seasonal amplitude in sales and stocks is determined not only by regional climatic differences. Size of department stores, merchandising and stock-keeping policies, closeness to the source of supply, the type of goods carried and the seasonality in the flow of consumers' incomes are probably also of considerable significance.