WHEAT STUDIES

OF THE

FOOD RESEARCH INSTITUTE

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COMPARATIVE LEVELS OF WHEAT PRICES IN THE UNITED STATES AND CANADA

UNDER the existing tariff, wheat prices tend to be higher in the United States than in Canada, although Canadian wheat averages higher in intrinsic quality. The premium on American wheats varies from year to year, within a season, and with the basis of comparison. It is seldom as high as the tariff duty, except for brief periods, and then only for certain wheats; but on some wheats a premium exists even in years when the United States has a substantial export surplus.

Satisfactory comparisons of American and Canadian wheat prices or price averages are exceedingly difficult to make. The simplest comparison, between terminal prices of American and Canadian spring wheats of similar qualities, showed an average margin in favor of American wheat of about 26 cents in 1923–24 and 1925–26, or somewhat more if prices were weighted by volume of sales. The margin was much lower in 1924–25, when the American crop was large and the Canadian was short. Less reliable comparisons of No. 2 Hard Winter at Kansas City and No. 2 Red Winter at Chicago with No. 3 Manitoba Northern at Winnipeg showed lower margins than in the case of spring wheats in 1923–24, and in 1924–25, for hard wheat, a margin in favor of Winnipeg. In 1925–26, however, with a very short crop of American winter wheat, the margin was about as high as in the case of spring wheats. Per bushel values of the American crop of bread wheats east of the Rockies are usually higher than for the Canadian spring-wheat crop, but by less than the premium on American spring wheats.

STANFORD UNIVERSITY, CALIFORNIA

June 1927

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The central feature of the series is a periodic analysis of the world wheat situation, with special reference to the outlook for supplies, requirements, trade, and prices. Each volume includes a comprehensive review of the preceding crop year, and three surveys of current developments at intervals of about four months. These issues contain a careful selection of relevant statistical material, presented in detail in appendix tables for reference purposes, and in summary form in text tables and charts.

Each volume also includes six special studies bearing on the interpretation of the wheat situation and outlook or upon important problems of national policy. Typical subjects are listed on the fourth cover page of this issue.

The series is designed to serve the needs of all serious students of the wheat market, in business, government, and academic circles, by summarizing and interpreting basic facts and presenting current developments in due perspective.

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COMPARATIVE LEVELS OF WHEAT PRICES IN THE UNITED STATES AND CANADA

I. GENERAL CONSIDERATIONS

The question of the relative levels of wheat prices in the United States and Canada is of importance in several connections. It is fundamental to the discussion of the protective action of the tariff. Information on the subject is necessary to perfect our understanding of the importing and exporting of wheat, including exports of Canadian wheats to the United States. (Cf. WHEAT STUDIES, November 1926.) Without knowledge of the relative positions of wheat prices in the two countries, one is not in position confidently to picture the probable operation of the McNary-Haugen plan as applied to wheat under the present tariff. In our recent studies of that subject (WHEAT STUDIES, February, March, 1927) we mentioned a few estimates of the price advantage of American wheat. Here we attempt a preliminary measurement of the margin between wheat prices in the two countries. The specific analysis is confined to the last three crop years (1923–24 to 1925–26) and is chiefly limited to terminal markets.

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The problem of comparison of wheat prices in a single market is not simple, but it is much more difficult to make comparisons among different markets. As an illustration of a single market, consider Liverpool. In Liverpool are sold—to mention the principal varieties—hard spring wheat from Canada, hard red winter and soft red winter wheats from the United States, hard winter wheat from Russia, semi-hard wheat from Argentina, soft white wheats from Australia and the Pacific Coast of the United States, in most years soft white wheat from India, and occasionally hard spring wheat from the United States. From year to year these different wheats vary in quantity, quality, and adaptability to European uses. The problem of European millers is to secure the cheapest blending of wheats to make acceptable flours for their countries. These wheats appear on the Liverpool market in their seasonal order, but each is usually off the market (or at least not quoted) for longer or shorter periods of the year.

The Liverpool price of wheat, therefore, is not a single figure but a range of prices. At any moment one of the wheats will be highest, another will be lowest, and between these the others will be variously ranged. The price order of the different wheats, once established, may be maintained through the season, or the order may shift. Frequently Australian wheat stands the highest, with Canadian next; Argentine and Russian wheats are likely to stand low. American wheats also are likely to stand at a relative discount in Liverpool and other importing markets, because, apart from occasional heavy exports of good hard winter wheat, the United States exports mostly the culls of the crop, whereas other countries export their representative wheats. The spread between prices of these different wheats may be surprisingly wide over short intervals[1] and substantial throughout a season.

A comparison of the prices of wheats at separate markets in different countries is made difficult by the fact that no two countries are comparable in respect to varieties, quantities, and qualities of wheat, and regional relations of production, milling, freight rates, and consumption. Moreover, in order to make satisfactory comparisons of crop prices in different countries it is

[1] For example, on one day recently the range extended from 146 cents for American soft red winter wheat to 173 cents for Canadian hard spring wheat.

necessary to use the appropriate crop years. Thus the crop year for the winter wheats begins in July and closes in June, while the crop year for spring wheats in the United States and Canada begins in September and closes in August. When one adds to these factors the difficulties of securing representative quotations, to say nothing of suitable weightings, it is not surprising that a comprehensive measurement of the difference between wheat prices in the United States and in Canada has never been undertaken.

Theoretical reasoning about the relative levels of wheat prices in the two countries does not lead to very positive conclusions. Broadly speaking, the Canadian wheat is cleaner, harder, and in general of higher milling quality than American wheats, and for this reason might be expected to be higher-priced. On the other hand, in Canada wheat is raised predominantly for export, while in the United States the export surplus is a much smaller fraction of the crop, there are many important wheat-deficiency regions, in occasional years we have a shortage of representative milling wheats, and flour standards are more exacting. With a substantial tariff on wheat, there is accordingly a tendency for wheat prices in the United States to be on a "domestic basis," higher than an "export basis," for most of the crop in some years, and for portions of the crop in most years at least for part of the season. These considerations may be expected often to overbalance the quality factor.

The general statement that wheat prices tend to stand higher here than in Canada, however, is quite inadequate. Wheat prices in the United States are greatly influenced, behind the tariff wall, by competition between different wheats, between wheats and other cereals, and between cereals and other foodstuffs. We are always exporting wheats and these must be sent out in competition with wheats from other sources of exports, at prices fitting into the range of world prices. In every month of every season certain wheats in this country are cheap enough to be exported in some volume, while others are too dear to be exported. Pacific white wheat and durum are raised for export in a sense that does not hold for other wheats, and we export representative wheats of these varieties in all years, in quantities varying chiefly with the size and quality of the crops. In years of good crops of hard winter wheat, as in 1924–25 and 1926–27, we export substantial amounts of high-grade hard winter.[1] Apart from this, we usually export considerable quantities of inferior soft red winter and hard winter wheats. We usually export small amounts of low-grade hard spring wheat, but only occasionally any considerable volume of representative hard spring. Canadian spring wheat is nearly always cheap enough to be exported, though over short periods the Winnipeg price may be too high to permit any considerable export.

In making the present study we have considered various possible bases for price comparisons, selected certain ones for detailed analysis, and by checking the several analyses one against another have reached a few conclusions which appear to be consistent with the non-statistical evidence available.

II. POSSIBLE BASES OF PRICE COMPARISONS

Farm Prices

From one point of view it might seem that the most desirable comparison would be between farm prices in the two countries. Official estimates of average farm prices, available by crop years for both countries for the years 1909–25, are summarized in Table 1. These show, as one might expect, higher average farm prices in the United States than in Canada. This was true, indeed, in every year except 1919–20, when the Canadian crop was very short, the American unusually large and poor, and war controls were in operation in both countries. As one might expect, the figures also show appreciably higher margins, in general, under the 25-cent tariff before the war (to March 1, 1914) and the still higher

[1] Often the exports of hard winter, though grading mostly No. 2, are mixed so as barely to make this grade.

tariff since May 27, 1921,[1] than under the 10-cent tariff in 1914–17 and in the following period of no duty. The difference for the crops of 1920 was exceptionally large because much of the American crop was marketed at the higher level of prices prevailing in the summer of 1920, while the Canadian crop felt more heavily the decline in prices that occurred later in 1920 and in 1921. The difference for the crops of 1924 was exceptionally small, chiefly because the American crop was large and left the farms most heavily before prices had risen to the season's average, while the small Canadian crop was marketed later when prices were higher. The difference in 1925–26, on the other hand, was exceptionally large, because the Canadian export surplus was large while most American wheats sold on a domestic basis for the greater part of the year.

TABLE 1.—AVERAGE FARM PRICE OF WHEAT IN THE UNITED STATES AND CANADA, CROPS OF 1909–25*

(Cents per bushel)

Crop of	United States	Canada	Margin
1909	100.7	84.8	15.9
1910	91.7	75.4	16.3
1911	88.3	64.1	24.2
1912	83.3	62.0	21.3
1913	79.3	67.5	11.8
1914	99.4	98.0[a]	1.4
1915	98.2	90.7	7.5
1916	144.4	130.9	13.5
1917	205.8	193.8	12.0
1918	206.3	201.8	4.5
1919	218.6	236.8	–18.2
1920	182.9	162.4	20.5
1921	104.4	80.7	23.7
1922	98.0	84.9	13.1
1923	92.4	66.8	25.6
1924	127.8	122.2	5.6
1925	145.9	111.6	34.3

* United States data from *Agriculture Yearbook, 1925*, p. 764; figure for 1925 supplied by Bureau of Agricultural Economics. Canadian data from *Census and Statistics Monthly*, 1910–17, and *Monthly Bulletin of Agricultural Statistics*, 1917–25.

[a] Adjusted by Food Research Institute because of obvious error in Saskatchewan figure.

But these comparisons leave much to be desired. The wheat crops of the two countries, as a whole, are not comparable; the national average farm price is inherently a very complex concept; and the data are not computed on comparable bases. In the United States farm prices reported monthly by local correspondents are combined into state averages for each date by using the weights derived from acreage data, and these in turn into national averages on the basis of production data; and the monthly averages are weighted by current farm marketings to get a weighted annual average.[2] For international price comparisons such an average is not highly suitable. The Canadian figures are based on much less complete data, are not available monthly, are weighted much more roughly, and, especially during the period of war control and the recent period of extensive Pool operations, are distorted by these influences. During the period of disturbed exchanges, notably 1919–21, the comparisons are affected by the relative depreciation of the Canadian dollar. Moreover, one is comparing average farm prices for the crop year July–June in the United States with averages using largely September–December or September–January in Canada. The American data cover much wheat grown in deficiency areas, where farm prices are relatively high, as well as wheat grown in surplus areas, whereas nearly all of the Canadian wheat is grown in surplus areas. In general, the Canadian wheat is grown much farther from its market than are American wheats, though railway freight rates are higher in the United States than in Canada. Considering all these factors, one cannot accept, without important reservations, the comparisons shown in Table 1.

In comparisons of farm prices in the two countries one cannot yet go further. State and national averages are available for the United States, as of a given day in each month, but no more adequate information by counties, by weeks, by varieties or grades. Canada has not even monthly data. For both countries there is scattered information on street prices and country-elevator prices collected by farmer elevator companies, co-operatives, and line elevator companies, but they are not comparable and

[1] Thirty cents to April 6, 1924; thereafter 42 cents.

[2] See Charles F. Sarle, "Reliability and Adequacy of Farm-Price Data," U.S. Department of Agriculture *Bulletin No. 1480*, March 1927.

cannot be weighted. The average prices paid by wheat growers' co-operatives obviously cannot be employed for this purpose. Nor can one calculate farm prices back from terminal prices, among other things because changes in costs of movement prevent one from assuming that farm prices at different times bear the same relations to terminal prices. In short, comparisons of farm prices, at least as possible at present, are of but limited value.

Border Prices

One is tempted to seek comparisons of prices at adjacent points on opposite sides of the international border; for example, c.i.f. mill prices at Great Falls, Montana, and Medicine Hat, Alberta. The wheats in the areas surrounding these two milling points are comparable, but the meaning of prices paid by mills at each point is modified by the range of distribution of the flours and the transportation costs of shipping wheat and flour out. We are not in position, for either Great Falls or Medicine Hat, to know the range of distribution of the flours produced. So far as outbound wheat movement is concerned, it costs about 10 cents a bushel more to ship wheat from Great Falls to Duluth than from Medicine Hat to Fort William. The high-protein wheats of Montana are premium No. 1 wheats at Minneapolis; corresponding high-protein wheats of Alberta are merely No. 1 wheats at Fort William. Under the circumstances, therefore, comparisons of c.i.f. mill prices at Great Falls and at Medicine Hat—or cash prices at sample markets if they existed at those points—would be quite as likely to mislead as to instruct.

This holds true of all border comparisons. It would be misleading to accept as generally applicable the difference in the local wheat prices on the two sides of the boundary, for example at Noyes and Emerson or at Esteban and Rowbells. In order for prices to be comparable, there must be volume of sales, breadth of trading, and freedom of movement, and these exist only at terminals.

Export Values

In accordance with common practice in the study of international trade, we might compare the reported values per bushel of the export wheats of the United States and Canada as shown by official statistics of exports. Wheats are shipped from both countries in bulk and the formulas for exporters' declarations of value are practically identical in the two countries The wheats being exported eastward from the two countries must bear to each other some such relationship, qualities considered, as obtains within the range on the Liverpool market. Differences in valuation would rest either on intrinsic qualities or on fortuitous circumstances of price. But in order for exporters' valuations to be comparable, they must rest upon a common geographical datum line. Exporters' valuations on Canadian spring wheat passing out of Montreal could be held roughly comparable with corresponding valuations on American spring wheat passing out of New York. But much Canadian wheat passes out of American ports and much American wheat passes out of Canadian ports, and is valued for export at the point it leaves the country of origin;[1] and there is considerable difference between f.o.b. values at the head of the Great Lakes and at North Atlantic ports. These valuations might conceivably be separated to make them comparable, but they are not segregated in the published reports.

A comparison of export values per bushel is shown by the following figures for the past three years, as derived from official export statistics:

Year Sept.–Aug.	Average export values per bushel	
	United States	Canada
1923–24	117 cents	100 cents
1924–25	160 cents	155 cents
1925–26	149 cents	145 cents

These figures might lead to the inference that in the last three crop years the export prices of American wheats stood somewhat higher, in one year substantially higher, than those of Canadian wheats, whereas there is reason to believe that, in general, at corresponding dates, Canadian wheats have sold higher than American wheats in

[1] Moreover, British importers' valuations of Canadian and American wheats, respectively, cannot safely be used for comparisons because British official trade statistics credit imports to country of shipment, not to country of origin.

importing markets. We suggest that the explanation of the difference lies mainly in two circumstances. Most important is the fact that much more Canadian than American export wheat is valued for export at the head of the lakes, where prices are lower than at the seaboard. Secondly, Canadian exports are more routine, American exports more opportunistic. With large volume of exportable surplus, Canada must take the breaks as well as the bulges in Liverpool; the United States, with a smaller exportable surplus, is often in the fortuitous position of being off the world market when Liverpool is low and on an export basis when Liverpool prices rise. In any event, for such reasons as these, published figures on values of exported wheats are not suitable for comparison of levels of wheat prices in the two countries.

Furthermore, regional relations of wheat growing inject special complications into price comparisons. The wheat of the Canadian Prairie Provinces streams westward to Pacific ports, or eastward through Winnipeg to Fort William or Port Arthur and thence to lower lake ports, from which it flows out through North Atlantic ports. The wheats of the United States have no such uniformity of movement. The American hard spring wheat has an eastward movement, corresponding to that of Canadian wheat, though comparatively little moves to the seaboard. But soft and hard winter wheats are widely distributed northward to milling centers in Great Lakes cities and as far east as the Atlantic Ocean; they pass to export partly through Atlantic ports and partly through gulf ports, in proportions varying from year to year. The relations between ocean freight rates from gulf ports and Atlantic ports vary from year to year, and this may result in variations in the prices of wheats in the hard and soft winter wheat regions. These circumstances, and the changing competition between millers and exporters, provoke fluctuations that prevent one from using export prices of wheats as measures of domestic prices.

Comparisons of Futures Prices

Price comparisons are frequently made on the basis of quotations of futures. For the purpose of the present inquiry, however, such comparisons would be misleading. The use of futures prices, for the purpose in hand, would rest on assumptions in respect of relations between cash and futures that are not justified by our information. The quality of wheat deliverable (without discount) on the Winnipeg future (No. 1 Manitoba Northern) is much higher than the quality of wheat similarly deliverable on American futures markets.[1] The months of trading on the Winnipeg Grain Exchange are not identical with those on the exchanges in the United States. Endeavoring to use the nearest future, one always faces a troublesome question in determining when to transfer from one month to another, since the quotations overlap and run concurrently over a considerable period. Abnormal price reactions appear in the months when options are closed out. Lastly, exceptional bias would be introduced on the not infrequent occasions when, for particular reasons, the cash rises to premium over the future.[2] For these and other reasons that need not be entered into here,[3] we shall make no use of quotations of futures in Canada and the United States to indicate positions of wheat prices in the two countries.

Use of Terminal Prices

We are therefore restricted largely to comparisons of cash prices at terminal markets. Terminal prices are available for the principal markets, covering large volumes of transactions. But the seasonal relations of prices and volumes of marketings introduce qualifying considerations. During July and August, Canadian old-crop spring wheat is likely to be dear relative to American new-crop winter wheats. During October–December, when new-crop Canadian hard spring wheat comes to market in large volume, it is likely to be low relative to American winter wheats. During the winter also, American winter wheats are likely to

[1] Cf. Wheat Studies, March 1927, III, 241.

[2] In grain and milling circles one speaks of reversed carrying charges when the future stands at a discount under the cash. In the vernacular of the tin trade a word has been coined to designate this condition, namely "backwardation," being the premium of spot over futures.

[3] Cf. Wheat Studies, March 1927, III, 241–42.

stand high relative to Canadian spring wheat. American spring wheat often runs a course roughly parallel to that of Canadian spring wheat. Durum and Pacific white wheats stand detached and are subject to separate influences. At the various seasons, special meaning attaches to prices of wheats that are being marketed in large volume; quotations that represent millions of bushels mean more than those that are merely nominal.

The terminals best adapted to the purposes of the study are Winnipeg for Canada, Minneapolis for American hard spring wheat, Kansas City for hard winter wheat, and Chicago for soft red winter wheat. Minneapolis prices are more trustworthy than those of Duluth because, on account of location of mills and volume of transactions, the quotations are more representative of actual conditions. For hard winter wheat, Kansas City is regarded as preferable to Chicago, on account of volume of trading, relation to export via gulf ports, and extent of manufacture of flour. For soft red winter wheat, Chicago is regarded as superior to St. Louis on account of volume of transactions and the more representative nature of prices on the cash market.

Two kinds of price comparisons are desirable. One is a comparison between prices of wheats of comparable grades or milling qualities. The other is a comparison of per bushel values of crops, contrasting the unit value of the Canadian hard spring crop with that of the American crops of the hard spring wheat, hard winter wheat, and soft winter wheat. Direct comparisons of current prices are much more readily made than are comparisons of crop values per bushel, and are of greater significance; but the latter would also be significant, in a different sense, if it could be made with equal certainty. We shall make a series of direct price comparisons and then undertake a tentative comparison of per bushel values of crops.

Our study covers three recent crop years in which the crops were as follows, in million bushels:

	1923–24	1924–25	1925–26
American	797	864	676
Canadian	474	262	433

In this period the tariff duty on wheat imported into the United States for domestic consumption was 30 cents a bushel, until April 6, 1924, since when it has been maintained at 42 cents a bushel.

Durum and Pacific Wheats

We have made no price comparisons of durum or Pacific wheats. In the majority of years durum wheat stands substantially lower than Marquis or other spring bread wheats, and a price reached for No. 1 Dark Northern Spring would be excessive for durum. In an occasional year, however, as a result of crop failure in this country and/or unusual shortage abroad, durum wheat goes to high premiums. For the present crop, the average price of durum wheat is probably higher than that of Marquis, but this state of affairs is anomalous; and if wheat growers substitute durum for Marquis on the hypothesis that durum enjoys superior international prospects, the result will be disappointing in the future.

Without going into figures, it may be stated that, as a rule, the average price of Pacific wheats is lower than that of wheats raised east of the Rocky Mountains, to a variable extent dependent upon the size of the Pacific crop and the price level in the Orient, to which a large proportion of the exports must be sent. So far as domestic consumption is concerned, distance protects Pacific wheat prices. The Pacific states bring in considerable wheat and flour from the east, and the freight rate for the long haul has the effect of raising flour prices to the advantage of the local wheat grower. This, however, is offset, more or less in different years, by the low price that must be accepted for export wheat. Years ago the soft white wheats of Australia and India were the competitors of Pacific Coast wheats. Latterly, however, hard Canadian spring wheat and flour have invaded the Oriental markets with disastrous results to Pacific exporters.

But the lack of satisfactory price series for durum and Pacific wheats, and the considerable differences between these and Canadian hard spring wheat, render it impossible to make any satisfactory comparisons.

III. COMPARATIVE PRICES OF SPRING WHEATS

The simplest comparisons can be made between prices of spring wheats in the two countries. Both are hard wheats. The crop years are roughly identical, covering the months of September to August. The leading markets are Minneapolis and Winnipeg, and both markets are well to the east of the wheat-growing regions which supply them. Both markets are highly organized, and sensitive to domestic and international influences.

The first comparison is between cash closing prices of high-grade spring wheats. The cash closing price at Winnipeg is a single figure. The cash closing prices at Minneapolis are reported as three ranges—ordinary to good, good to choice, choice to fancy. On account of the recognized superiority of No. 1 Manitoba Northern over No. 1 Dark Northern we have used the high of the range of cash closing prices of "choice to fancy" at Minneapolis, for comparison with the cash closing prices at Winnipeg. Prices of Hard Spring wheat would have been preferable, but regular quotations have not been available. Table 2 contains the averages of these daily prices, with margins, for the thirteen 4-week periods of the three crop years, together with the averages for each year.

The second comparison is between the highest cash sales prices of No. 1 Dark Northern and cash closing prices of No. 1 Manitoba Northern. The top prices for cash sales at Minneapolis are paid for premium No. 1 Dark Northern wheats which are fairly comparable with elevator-run No. 1 Manitoba Northern at Winnipeg. There is only a narrow margin between the high and low cash prices of No. 1 Manitoba Northern at Winnipeg, and we use the cash closing prices as representative and fairly comparable with highest cash prices at Minneapolis. Table 3 (p. 306) contains the averages of these daily figures, with margins, for the thirteen 4-week periods of the three crop years, as well as averages for each year.

Third is a comparison of the averages of daily high and low cash closing prices of No. 1 Dark Northern with the cash closing prices of No. 3 Manitoba Northern. As a rule, No. 3 Manitoba Northern corresponds in milling value to No. 1 Dark Northern; hence this comparison is probably a fair

TABLE 2.—COMPARISON BETWEEN HIGHEST CASH CLOSING PRICES OF NO. 1 DARK NORTHERN SPRING AT MINNEAPOLIS AND CASH CLOSING PRICES OF NO. 1 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; 4-week averages of daily prices)

Sept.-Aug. in 4-week periods	1923-24			1924-25			1925-26		
	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin
1st	127.5	106.1	21.4	144.4	141.0	3.0	169.7	140.3	29.4
2nd	127.7	97.8	29.9	163.9	160.3	3.6	168.8	124.8	44.0
3rd	122.1	97.6	24.5	167.1	161.9	5.2	175.6	137.1	38.5
4th	122.2	94.0	28.2	184.0	167.6	16.4	184.2	156.1	28.1
5th	124.2	95.0	29.2	213.8	186.5	27.3	188.4	155.9	32.5
6th	129.0	98.6	30.4	223.8	200.4	23.4	183.7	156.7	27.0
7th	130.5	99.5	31.0	218.7	193.8	24.9	175.7	149.0	26.7
8th	127.8	97.2	30.6	189.7	158.6	31.1	168.3	151.2	17.1
9th	130.5	100.4	30.1	188.2	164.0	24.2	169.5	157.8	11.7
10th	132.9	105.6	27.3	194.9	184.8	10.1	164.5	152.9	11.6
11th	146.2	117.5	28.7	183.3	166.9	16.4	169.1	153.5	15.6
12th	154.6	138.6	16.0	185.3	162.6	22.7	179.6	159.4	20.2
13th	150.2	143.0	7.2	181.2	168.5	12.7	161.2	151.6	9.6
Average	132.7	107.0	25.7	187.6	170.5	17.1	173.7	149.7	24.0

* Figures based on price material published in WHEAT STUDIES, November 1926, III, No. 1, and corresponding data for July and August 1926 drawn from the *Daily Market Record* of Minneapolis and the *Grain Trade News* of Winnipeg. Copies of the additional data may be obtained from the Food Research Institute on request.

one. Table 4 contains the averages of these daily figures, with margins, for the thirteen 4-week periods of the three crop years, together with the averages for each year.

These three comparisons may be discussed together. Scrutiny of the tables indicates that, with a few exceptions, the results are similar both in respect of margins and of variations through the season. We are convinced that the fairly close concordance of the results obtained with the three different comparisons is not accidental, but reflects the fact that, in each comparison, the prices are for wheats of fairly similar milling quality, and that common influences affect the margins shown.

The years 1923–24 and 1925–26 show closely similar results in average margins, though not in their movements within the year, while in 1924–25 the margins were considerably smaller over most of the year. In all years the margins varied considerably in the course of the year. Combining the three comparisons, the average margin for the crop year 1923–24 was 26.0 cents and for 1925–26 it was 26.1 cents, while for 1924–25 it was only 16.0 cents. The concordance of the three methods in 1924–25 was much less marked than in the other two years; it will be recalled that the Canadian crop of 1924 was short, resulting in relative increase in the price of Canadian wheat. The results of these comparisons suggest that for comparable milling grades of American and Canadian hard spring wheats, in what may be called an ordinary year, the American price averages about 26 cents a bushel above the Canadian price, while in a year of short Canadian crop the margin is materially reduced. For several reasons, however, this generalization must be regarded as tentative: none of the three years is altogether typical; the period is short; and in most of 1923–24 the tariff duty was only 30 cents a bushel. But some such generalization, we believe, will prove true to the facts over a period of several more years.

The preceding comparisons take no account of the commercial grades in Canada under No. 3 or of the various wheats classified as "no grade." As a rule, clean wheat of high grades predominates in the Canadian crop, but sometimes only a relatively small percentage grades No. 1 and a large percentage is classed as "no grade," as in the case of the crop of 1926. For practical purposes, "tough" No. 1 and No. 2 have close to the value of normal No. 3 Manitoba Northern in Canada. By and large, from the Canadian prices one may make closer inferences applicable to the entire crop than in the case of the United States. No. 1 Dark

TABLE 3.—COMPARISON BETWEEN HIGHEST CASH SALES PRICES OF NO. 1 DARK NORTHERN SPRING AT MINNEAPOLIS AND CASH CLOSING PRICES OF NO. 1 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; 4-week averages of daily prices)

Sept.-Aug. in 4-week periods	1923–24			1924–25			1925–26		
	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin
1st	129.3	106.1	23.2	145.1	141.0	4.1	176.7	140.3	36.4
2nd	129.0	97.8	31.2	167.1	160.3	6.8	175.5	124.8	50.7
3rd	123.2	97.6	25.6	171.2	161.9	9.3	182.3	137.1	45.2
4th	123.2	94.0	29.2	186.8	167.6	19.2	191.0	156.1	34.9
5th	124.6	95.0	29.6	213.1	186.5	26.6	193.1	155.9	37.2
6th	129.7	98.6	31.1	229.9	200.4	29.5	186.5	156.7	29.8
7th	131.4	99.5	31.9	222.6	193.8	28.8	180.2	149.0	31.2
8th	128.3	97.2	31.1	188.9	158.6	30.3	170.4	151.2	19.2
9th	131.0	100.4	30.6	189.7	164.0	25.7	172.4	157.8	14.6
10th	133.9	105.6	28.3	195.7	184.8	10.9	168.1	152.9	15.2
11th	146.8	117.5	29.3	187.6	166.9	20.7	173.6	153.5	20.1
12th	154.4	138.6	15.8	187.2	162.6	24.6	182.6	159.4	23.2
13th	150.3	143.0	7.3	184.9	168.5	16.4	166.2	151.6	14.6
Average	133.5	107.0	26.5	190.0	170.5	19.5	178.4	149.7	28.7

* See footnote to Table 2.

Northern Spring wheat is far above the average of our crop. Probably No. 3 would be nearer to it. Of the hard spring wheat inspected—which includes a large proportion of the marketed crop, but by no means the whole—the percentages grading No. 1, in the three crops under review, were 39.6, 63.6, and 49.2 per cent, respectively.[1] Therefore, there is a bias in the comparisons, and the margins given are higher than would hold for the crops as units. There is, however, reason to believe that because of the tariff and in spite of the higher quality of that the United States Department of Agriculture computes weighted prices for carload sales of specified wheats in stated markets.

Table 5 (p. 308) shows a comparison similar to those shown in Tables 2–4, but by months instead of by 4-week periods, between the weighted average prices of cash sales of No. 1 Dark Northern at Minneapolis and weighted average prices of high and low cash sales of No. 3 Manitoba Northern at Winnipeg. The Minneapolis price is computed by the United States Department of

TABLE 4.—COMPARISON BETWEEN AVERAGE OF HIGH AND LOW CASH CLOSING PRICES OF NO. 1 DARK NORTHERN SPRING AT MINNEAPOLIS AND CASH CLOSING PRICES OF NO. 3 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; 4-week averages of daily prices)

Sept.-Aug. in 4-week periods	1923–24			1924–25			1925–26		
	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin
1st	122.5	98.5	24.0	137.5	134.6	2.9	159.3	134.6	24.7
2nd	122.5	91.1	31.4	154.2	151.2	3.0	155.1	118.5	36.6
3rd	117.3	89.5	27.8	156.4	150.8	5.6	162.6	130.0	32.6
4th	116.7	85.7	31.0	171.5	157.1	14.4	174.2	148.6	25.6
5th	118.6	87.2	31.4	193.6	175.3	18.3	179.7	146.7	33.0
6th	122.6	91.5	31.1	203.7	189.4	14.3	176.0	145.8	30.2
7th	123.3	92.1	31.2	198.7	185.0	13.7	167.7	139.1	28.6
8th	120.0	90.0	30.0	169.4	149.0	20.4	162.3	139.5	22.8
9th	121.8	93.5	28.3	168.9	155.2	13.7	165.1	147.2	17.9
10th	124.1	99.0	25.1	179.6	176.0	3.6	160.9	143.8	17.1
11th	135.1	110.2	24.9	170.1	157.8	12.3	164.3	144.3	20.0
12th	143.7	130.3	13.4	171.3	154.2	17.1	174.1	149.9	24.2
13th	140.8	134.2	6.6	170.4	161.1	9.3	156.0	138.8	17.2
Average	125.3	99.4	25.9	172.8	161.3	11.5	166.0	140.5	25.5

* See footnote to Table 2.

Canadian spring wheat, terminal prices of the American spring-wheat crop as a whole usually average higher than terminal prices of the Canadian spring-wheat crop.

We have also attempted a comparison of weighted average prices of cash sales of selected grades in the two markets. Weighted prices have a particular advantage in such comparisons in that they take account of the volumes of wheat moving at different prices. Computation of weighted prices is very difficult; for the present inquiry it is made possible only by the fact that the United States Department of Agriculture computes weighted prices for carload sales of specified wheats in stated markets.

Table 5 (p. 308) shows a comparison similar to those shown in Tables 2–4, but by months instead of by 4-week periods, between the weighted average prices of cash sales of No. 1 Dark Northern at Minneapolis and weighted average prices of high and low cash sales of No. 3 Manitoba Northern at Winnipeg. The Minneapolis price is computed by the United States Department of Agriculture. The carload sales of No. 1 Dark Northern at Minneapolis, which are used as weights, cover a large volume of representative spring wheat, and it might be assumed that the course of sales of this grade corresponds to the way in which all the No. 1 wheat of the crop was sold; but a comparison of the spring wheats and their prices in Minneapolis and Duluth (an export market) supports the inference that the weighted price of No. 1 Dark Northern at Minneapolis may stand above the average for that grade in the crop.

For Winnipeg the daily high and low cash prices have been secured for us from the records of the Winnipeg Grain Exchange. The average milling value of the

[1] *Agriculture Yearbook, 1924*, p. 576, and *1925*, p. 759; also, "Receipts of Wheat for June 1926," Bureau of Agricultural Economics of U.S. Department of Agriculture.

wheat represented in the Winnipeg prices is somewhat higher than that represented in the weighted average at Minneapolis. A weighted price for Canadian spring wheat is not directly available. A comparison of arithmetic averages of closing or cash prices of Canadian wheats with weighted average prices of American wheats has indicated such bias, on occasions, as to make the comparison too misleading to be used. We have therefore endeavored to devise an approximate weighting for the Canadian prices. There is in Winnipeg no record of sales factors, among them the fact that the Pool is building up a capital as well as marketing the crop. Although weighting Canadian prices by arrivals is not as good a weighting as we possess for the American markets, we are convinced that for the present it is the best one obtainable for the purposes of this inquiry.

The weighted prices naturally behave differently from the unweighted series. The seasonal variations do not closely resemble those observed in the comparisons on the other three bases. It is striking that for the

TABLE 5.—COMPARISON BETWEEN WEIGHTED AVERAGE CASH SALES PRICES OF NO. 1 DARK NORTHERN SPRING AT MINNEAPOLIS AND AVERAGE OF HIGH AND LOW CASH PRICES (WEIGHTED BY INSPECTIONS) OF NO. 3 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; monthly averages of daily prices)

Month	1923–24			1924–25			1925–26		
	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin	Minneapolis	Winnipeg	Margin
Sept.	126	96	30	135	141	− 6	158	131	27
Oct.	126	91	35	151	151	0	158	120	38
Nov.	119	90	29	154	153	1	167	136	31
Dec.	119	86	33	171	158	13	177	149	28
Jan.	124	89	35	198	185	13	178	148	30
Feb.	127	93	34	194	188	6	173	145	28
Mar.	126	91	35	180	167	13	167	137	30
Apr.	126	92	34	160	146	14	166	147	19
May	130	98	32	173	174	− 1	164	144	20
June	137	107	30	169	161	8	167	144	23
July	147	123	24	166	153	13	175	149	26
Aug.	138	137	1	167	154	13	156	135	21
Average	126	93	33	160	156	4	165	136	29

* Minneapolis prices from *Agriculture Yearbook, 1925*, p. 765, and *Crops and Markets* (unpublished averages furnished by Bureau of Agricultural Economics); Winnipeg prices computed from data obtained from the W. Sanford Evans Statistical Service at Winnipeg and from the Winnipeg *Grain Trade News*.

comparable to those in American markets. The prices cannot properly be weighted by shipments from the head of the lakes, since shipments do not correspond to concurrent sales. It is, however, possible to use arrivals, as reported in daily inspections at Winnipeg. The prices of the day represent the approximate c.i.f. values of the arrivals of the day. These correspond to growers' prices c.i.f. head of the lakes, just as the carload cash prices in Minneapolis correspond to growers' prices c.i.f. Minneapolis. This does not hold in the direct sense for the Pool, which has its own weighted price for the season. The average Pool price, however, contains a bias, for the purpose of the present inquiry. This is due to several crop years 1923–24 and 1925–26 the margins were notably higher, chiefly as a result of heavy movement of Canadian wheat in periods when current margins were highest. For the crop year 1924–25, however, the margins were notably lower; indeed, in two months the weighted Winnipeg price was higher than the Minneapolis price, which was not observed in the three previous comparisons. The results of this comparison do not contradict, but merely qualify, the inferences to be drawn from the three previous comparisons; since, however, the weighted prices at Winnipeg and Minneapolis were not computed in the same fashion, the results are suggestive rather than conclusive.

Other things being equal, the price differences in American and Canadian hard spring wheats would be reflected in the comparable flours ground from them. A good comparison is between first spring patents at Buffalo and top spring patents at Toronto. We have therefore collected these prices for the three crop years under consideration and converted them into prices per bushel, on the assumption that five bushels of wheat go to make one barrel of patent flour. During the crop year 1923–24 the Buffalo flour averaged about 21 cents per bushel of wheat above the Toronto flour; in 1925–26 it averaged about 17 cents per bushel higher; during the crop year 1924–25, however, the average prices were practically identical. If one could assume that conversion charges and selling costs were the same in the two places, one would infer from these figures that the Buffalo mills paid, in the two years 1923–24 and 1925–26, respectively, 21 and 17 cents per bushel more for wheat than was paid at Toronto. But of course no such assumption as to conversion charges and other costs is justified in the absence of specific information. The comparison supports the evidence afforded by other comparisons to the effect that, under the present tariff, Buffalo millers ordinarily have to pay considerably more than Canadian millers for hard spring wheat to mill into flour for domestic consumption, but it gives no reliable measure of the average price difference that is actually experienced.

IV. COMPARATIVE PRICES OF CANADIAN SPRING AND AMERICAN WINTER WHEATS

Comparisons between prices of Canadian spring and American winter wheats are more difficult and unreliable than those between the two spring wheats. This is partly because each of these is exposed to market influences from which the other stands detached. Moreover, in the case of spring wheats in the two countries, the crop years may be said to run concurrently, beginning September 1; but in the case of the winter wheats, the crop year begins July 1. It is necessary to use the prices for the course of the actual crop year in each country. But things may happen to the prices of either wheat during the months of July and August, when the crop years overlap, that result in bias when comparisons are made for the respective crop years. Furthermore, since the wheats are of different varieties, it is not practicable to contrast grades closely on the basis of milling values, as in the case of the two spring wheats. Comparisons of No. 2 Hard Winter and No. 2 Soft Red Winter wheats with No. 3 Manitoba Northern are therefore much less satisfactory than one between No. 3 Manitoba Northern and No. 1 Dark Northern Spring. Nevertheless, it is of interest to see where the comparisons lead.

We have first compared weighted average prices of cash sales of No. 2 Hard Winter wheat at Kansas City with a weighted average of the high and low cash prices of No. 3 Manitoba Northern at Winnipeg. The weighted average prices at Kansas City are those computed by the United States Department of Agriculture. The Winnipeg prices are the same as those employed in Table 5 above. Table 6 (p. 310) contains the average monthly prices, with margins, for the three crop years, together with the averages for each year. The overlapping of the crop years is directly indicated.

The volume of carload sales of hard winter wheat at Kansas City is relatively less than that of spring wheat in Winnipeg, and not as representative; nevertheless, since No. 2 wheat is used instead of No. 1, probably no great error is committed by assuming that the course of sales roughly represents the way in which the No. 2 wheat of the crop was sold. Of the hard winter wheat inspected, the percentages grading No. 2 or better, in the three years under review, were 57.6, 75.7, and 74.2 per cent, respectively.[1]

For the crop years 1923–24 and 1925–26, the Kansas City prices stood substantially above those of Winnipeg in practically all

[1] *Agriculture Yearbook, 1924*, p. 576, and *1925*, p. 759; also, "Receipts of Wheat for June 1926," Bureau of Agricultural Economics of U.S. Department of Agriculture.

of the concurrent months. The margin between the weighted American price for July–June and the weighted Canadian price for September–August was 12 cents in 1923–24 and 27 cents in 1925–26. The year 1924–25 presents a totally different picture. In seven of the ten concurrent months, the Winnipeg prices stood above those of Kansas City, and the average margin of the year was 21 cents in favor of Winnipeg. This result was due to the cumulative action of two factors: a short Canadian crop with high price and a large hard winter-wheat crop with heavy marketing at low prices during July–September.

The comparison of crop-year averages when the crop years are not identical is by no means satisfactory, because each crop-year average price covers two months that are not covered by the price compared with it, and in these months each price is subject to influences that do not operate on the other. But using twelve concurrent months, whether July–June or September–August, involves the other difficulty of having two months in which prices of old-crop wheat of one country are compared with prices of new-crop wheat in the other. The comparison of unweighted averages for the ten concurrent months avoids these difficulties but involves others, in that the period is incomplete and in particular excludes two months in which American winter-wheat marketings are usually heavy and Canadian spring-wheat marketings are light. Thus the average margins for ten concurrent months are 16, −5, and 23 cents, respectively, as compared with the crop-year margins shown as 12, −21, and 27 cents, respectively. The lower margins in 1923–24 and 1924–25, on the latter basis, reflect the influence of prices during July and August, included in the winter-wheat crop year; these were markedly lower than prices in the corresponding months one year later, which were included in the corresponding spring-wheat crop year. The higher margin in 1925–26, on the other hand, is not easily explained. The results indicate that while price comparisons of American winter and Canadian spring wheat can be made for brief periods, averages covering several months or a year are not highly significant.

We have next made a comparison of weighted average prices of cash sales of No. 2 Red Winter (soft) wheat at Chicago

TABLE 6.—COMPARISON BETWEEN WEIGHTED AVERAGE CASH SALES PRICES OF NO. 2 HARD WINTER AT KANSAS CITY AND AVERAGE OF HIGH AND LOW CASH PRICES (WEIGHTED BY INSPECTIONS) OF NO. 3 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; monthly averages of daily prices)

Month	1923–24			1924–25			1925–26		
	Kansas City	Winnipeg	Margin	Kansas City	Winnipeg	Margin	Kansas City	Winnipeg	Margin
July	96	...	...	120	...	...	154	...	...
Aug.	101	...	...	119	...	...	164	...	...
Sept.	109	96	13	120	141	−21	158	131	27
Oct.	112	91	21	137	151	−14	158	120	38
Nov.	109	90	19	143	153	−10	163	136	27
Dec.	109	86	23	162	158	4	172	149	23
Jan.	113	89	24	182	185	− 3	178	148	30
Feb.	111	93	18	181	188	− 7	171	145	26
Mar.	109	91	18	171	167	4	161	137	24
Apr.	104	92	12	151	146	5	159	147	12
May	106	98	8	163	174	−11	155	144	11
June	108	107	1	160	161	− 1	153	144	9
July	...	123	...	...	153	...	...	149	...
Aug.	...	137	...	...	154	...	...	135	...
Average	105	93	12[a]	135	156	−21[a]	163	136	27[a]

* Kansas City prices from *Agriculture Yearbook, 1925*, p. 766, and *Crops and Markets;* Winnipeg prices as in Table 5.
[a] These margins are between the annual averages for Kansas City for the months July–June, and for Winnipeg for the months September–August.

with a weighted average of high and low cash prices of No. 3 Manitoba Northern at Winnipeg. The Chicago prices are those computed by the United States Department of Agriculture. The Winnipeg prices are those employed in Tables 5 and 6 above. Table 7 contains the average monthly prices, with margins, for the three crop years, together with the averages for each year. The overlapping of the crop years is directly indicated.

TABLE 7.—COMPARISON BETWEEN WEIGHTED AVERAGE CASH SALES PRICES OF NO. 2 RED WINTER AT CHICAGO AND AVERAGE OF HIGH AND LOW CASH PRICES (WEIGHTED BY INSPECTIONS) OF NO. 3 MANITOBA NORTHERN AT WINNIPEG*

(Cents per bushel; monthly averages of daily prices)

Month	1923–24			1924–25			1925–26		
	Chicago	Winnipeg	Margin	Chicago	Winnipeg	Margin	Chicago	Winnipeg	Margin
July	100	...	...	129	...	...	159	...	...
Aug.	100	...	...	131	...	...	168	...	...
Sept.	105	96	9	131	141	–10	167	131	36
Oct.	111	91	20	153	151	2	163	120	43
Nov.	106	90	16	155	153	2	170	136	34
Dec.	109	86	23	180	158	22	180	149	31
Jan.	113	89	24	195	185	10	188	148	40
Feb.	113	93	20	200	188	12	183	145	38
Mar.	109	91	18	191	167	24	171	137	34
Apr.	106	92	14	166	146	20	168	147	21
May	107	98	9	189	174	15	165	144	21
June	115	107	8	187	161	26	148	144	4
July	...	123	...	...	153	...	...	149	...
Aug.	...	137	...	...	154	...	...	135	...
Average	102	93	9[a]	158	156	2[a]	164	136	28[a]

* Chicago prices from *Agriculture Yearbook, 1925*, p. 765, and *Crops and Markets;* Winnipeg prices as in Tables 5 and 6.
[a] These margins are between the annual averages for Chicago for the months July–June, and for Winnipeg for the months September–August.

High-grade soft winter wheat often commands a premium on account of needs of manufacturers of crackers and cakes, but such premiums are applicable only to a small portion of the crop. No. 2 in an ordinary year stands above the average quality of the crop and a figure applicable to No. 2 would be too high for the average. Of the soft red winter wheat inspected, the percentages grading No. 2 or better, in the three years under review, were 59.2, 54.5, and 71.2 per cent, respectively.[1]

For the crop year 1923–24, the average Chicago price was only 9 cents above that of Winnipeg (despite the high margins indicated during seven of the ten concurrent months) as a result of large sales at low prices in July–September 1923. For the crop year 1924–25, the average Chicago price stood only 2 cents over that of Winnipeg, owing to the short crop and high price of Canadian wheat and heavy marketings of American wheat at low prices in July–September 1924; in September, the average Chicago price stood 10 cents under the average Winnipeg price. For 1925–26, on the other hand, the average Chicago price stood 28 cents above that of Winnipeg, as a result of the almost continuous prevalence of high prices in Chicago, for reasons already mentioned.

The average margins for ten concurrent months are 16, 12, and 30 cents, respectively, as compared with crop-year margins of 9, 2, and 28 cents, respectively. In every case, but especially in the first two years, the margins shown for concurrent months are higher than for the crop years, primarily because prices were lower in July and August, which fell in the winter-wheat crop year, than in the same months a year later, which were included in the corresponding spring-wheat crop year.

Although these price comparisons are much less satisfactory than those between

[1] See preceding footnote.

American and Canadian spring wheats, it is significant that in 1923–24 and 1924–25 the margins shown between American and Canadian prices are much lower when one compares Canadian spring and American winter wheats. This strongly suggests that as long as the American export surplus consists largely of winter wheat, the effect of the tariff in restricting imports of Canadian wheat has its principal influence on American prices of spring wheat, and a much smaller, indirect influence on prices of American winter wheats. On the other hand, in 1925–26 the margins were fairly similar; and this suggests that in a year of short American crop, particularly when the shortage comes in winter wheats, the protective action of the tariff applies all around and in much the same degree to winter wheats and spring wheats.

V. TENTATIVE CROP-PRICE COMPARISONS

In the two foregoing sections we have made price comparisons, on several bases, between leading grades of important varieties of wheat in the two countries, endeavoring to compare wheats that are inherently comparable. In certain respects these are the really significant comparisons. But, one may ask, can one draw from these comparisons any direct inferences as to the relative prices of American and Canadian crops as a whole? Unfortunately one must answer, No.

An inherent difficulty in the comparisons we have made lies in the divergent and varying qualities of the wheats for which prices were compared. The greater difficulty in drawing from these comparisons inferences as to the crops as a whole lies in the fact that the wheats selected are not representative of the entire crops in either country, and that their relative importance and relative price position vary from year to year and within a season. If all the Canadian hard spring wheat graded No. 3 or the average were equal to that, and if all the American hard spring wheat graded No. 1, the comparisons might apply to the spring-wheat crops. But the average quality of American spring wheat is nowhere near No. 1. There is always a relatively large amount of spring wheat graded under No. 1 (also inclined to be weedy, tough, and smutty) and that spring-wheat crop is above the average which contains over 50 per cent of No. 1 Dark Northern. If it were not for the special grade, Hard Spring, and the Fancy Montana wheats, our average spring-wheat crop would make a sorry showing. Any estimate of the average price of No. 1 must obviously be considerably too high for the crop as a whole. We have no good measure of the relations of prices of American hard spring wheats below No. 1 with those of Canadian hard spring wheats below No. 3.

Similarly, if all Canadian hard spring wheat graded No. 3 Manitoba Northern, or the average were equal to that grade, and soft red winter wheat and hard winter wheat respectively graded No. 2, or the averages were equal to that grade, one might apply the results of the price comparisons to the crops. In most years, however, No. 3 Manitoba Northern is probably below the average in Canada while No. 2 grades are above the average in American soft red winter and hard red winter wheats. Exceptions occur, as in the present season, when the Canadian crop is below par and our hard winter crop above par. If Blackhull wheat continues to expand in the hard winter-wheat belt, however, the average milling quality of hard winter wheat may be expected to decline substantially. The considerations pertinent in the case of hard winter wheat apply with still greater force to soft winter wheat, the milling quality of which is usually lower than that of hard winter wheat. Our soft winter-wheat crop has no such outstanding varieties as the Turkey Red and Kanred of the hard winter-wheat belt. Therefore, the occurrence of an occasional crop of unusually high quality is rare. In any case, we have no way of making comparisons between the prices of the Canadian spring wheats below No. 3 and of American winter wheats below No. 2.

Recognizing the indeterminate bias, and without any implication that the figures obtained by using prices of these important

grades would represent the actual average margin between the prices of the crops in the two countries, let us see where such a calculation would lead. For each year we may multiply the weighted average price of the stated grade and variety by the number of bushels that represents the approximate volume of each wheat marketed. To secure figures for wheat marketed, we must deduct from the estimated crop an allowance for seed, feed, and waste. For the present purpose rough approximations will suffice. We have assumed a seed allowance of 25 million bushels of hard spring wheat, 32 million of hard red winter, and 21 million of soft red winter. We have assumed that feed and waste amount to 5 per cent of the crops of hard spring and hard red winter, and 10 per cent of the crop of soft red winter.

Table 8 shows the official estimates of these crops for the past three crop years, and our rough calculation, on the bases described, of the volume marketed. Using the average prices per bushel at terminals for leading grades (see Tables 5, 6, and 7), one secures a rough approximation to the terminal value of these crops, subject to the reservations already made. From the final row of figures in Table 8 one secures the following weighted average price per bushel, in each year, for the three American crops combined, for comparison with the weighted average price of No. 3 Manitoba Northern in Winnipeg, in cents per bushel:

	1923–24	1924–25	1925–26
United States	107.6	148.3	164.0
Canada	93.2	155.8	135.9
Difference	14.4	−7.5	28.1

These differences are probably more heavily in favor of the United States than truly weighted prices of American and Canadian crops as a whole, since the grades used for American crops are above, and for Canadian crops probably below, the average, in quality and price, of the crops of the two countries.

We do not wish to lay stress upon this type of computation, nor to make far-reaching deductions from it. The table impressively brings out the indubitable fact that with a short American crop (as in 1925–26) American prices are substantially higher than Canadian; while with a short Canadian crop and a large American crop (as in 1924–25) American prices may average lower than Canadian, in spite of the tariff. It is important to observe that with this type of weighting the average terminal price of representative types of wheat in the United States for the crop year 1924–25 appears several cents lower than that in Canada. While the prices of American hard spring wheat and of soft red winter wheat were higher than the prices of Canadian hard spring wheat, this influence was more than overbalanced by the low price and large volume of hard winter wheat. In 1923–24, again because of lower prices for winter

TABLE 8.—ROUGH CALCULATION OF TERMINAL VALUES OF MARKETED CROPS OF HARD SPRING, HARD RED WINTER, AND SOFT RED WINTER WHEATS IN THE UNITED STATES

	Hard spring			Hard red winter			Soft red winter		
	1923–24	1924–25	1925–26	1923–24	1924–25	1925–26	1923–24	1924–25	1925–26
Estimated crop[a] *(million bu.)*	122	195	157	221	316	177	260	217	181
Seed *(million bu.)*	25	25	25	32	32	32	21	21	21
Feed and waste *(million bu.)*	6	10	8	11	16	9	26	22	18
Marketed crop *(million bu.)*	91	160	124	178	268	136	213	174	142
Price per bu.[b] *(cents)*	126	160	165	105	135	163	102	158	164
Value *(million dollars)*	114.7	256.0	204.6	186.9	361.8	221.7	217.3	274.9	232.9

[a] Figures furnished by U.S. Department of Agriculture.
[b] Weighted average prices of No. 1 Dark Northern at Minneapolis, No. 2 Hard Winter at Kansas City, and No. 2 Red Winter at Chicago, as given in Tables 5–7 above.

wheats than for American spring, the price margin in favor of the American wheats was much smaller than for American spring wheat. In 1925–26, on the other hand, when the American crop was short and the Canadian crop was large, the margin between the weighted averages for the crops was large.

VI. SUMMARY

In Table 9 we have brought together the results of the various comparisons that we have made, in averages for the three crop years. Since the data leave much to be desired, we consider it impossible to reach more than a few conclusions, and some of these must be regarded as tentative.

TABLE 9.—SUMMARY OF PRICE COMPARISONS AND MARGINS

(Cents per bushel)

Comparison	1923–24			1924–25			1925–26		
	United States	Canada	Margin	United States	Canada	Margin	United States	Canada	Margin
Comparable spring wheats, unweighted (Table 2)...	132.7	107.0	25.7	187.6	170.5	17.1	173.7	149.7	24.0
Comparable spring wheats, unweighted (Table 3)...	133.5	107.0	26.5	190.0	170.5	19.5	178.4	149.7	28.7
Comparable spring wheats, unweighted (Table 4)...	125.3	99.4	25.9	172.8	161.3	11.5	166.0	140.5	25.5
Comparable spring wheats, weighted (Table 5).....	126.0	93.0	33.0	160.0	156.0	4.0	165.0	136.0	29.0
American hard winter, Canadian spring (Table 6).	105.0	93.0	12.0	135.0	156.0	–21.0	163.0	136.0	27.0
American soft winter, Canadian spring (Table 7).	102.0	93.0	9.0	158.0	156.0	2.0	164.0	136.0	28.0
Rough average of crops (page 313).....	107.6	93.2	14.4	148.3	155.8	– 7.5	164.0	135.9	28.1
Farm prices (Table 1).....	92.4	66.8	25.6	127.8	122.2	5.6	145.9	111.6	34.3

The most significant and satisfactory price comparisons that can be drawn are those between spring wheats of comparable qualities in the leading markets in the two countries—Minneapolis and Winnipeg. Under the present tariff on wheat, in the ordinary crop year when we have little spring wheat for export and Canada has a great deal (and even if we have winter wheats for export), the price margin in favor of the American spring wheat averages about 26 cents a bushel. In particular periods of the year the margin is considerably higher or lower, chiefly because of seasonal variations in marketings and prices in each country. If one takes account of the volume marketed at prices prevailing in different parts of the year, the difference between weighted average prices in ordinary years tends to be somewhat higher, because of wide margins in months when Canadian wheat moves in largest volume. The tariff is undoubtedly a major factor in maintaining such margins. In a year of short Canadian crop, however, the margin tends to be reduced, and quite substantially if the American crops of spring and winter wheats are large and good. In such circumstances, the tariff has only a moderate influence. In any year, because of quality differences, the margin is likely to be smaller between the American and Canadian spring-wheat crops as a whole than between the prices of comparable grades, because Canadian spring wheat averages distinctly higher in grade and quality.

Comparisons between terminal prices of American winter wheats and Canadian spring wheats are much less satisfactorily made, chiefly because the wheats are less readily comparable and the crop years are

different. The evidence indicates, however, that in an ordinary year terminal prices of American hard winter and soft red winter wheats stand above those of Canadian hard spring wheat, but that the weighted margins are smaller than between prices of comparable spring wheats. Under certain circumstances, indeed, the price of Canadian hard spring wheat may stand above that of American hard winter wheat; of this the crop year 1924–25 afforded an illustration. In a year of short American crop, prices of typical American wheats may be expected to stand above the price of Canadian wheat to the extent of some 25–30 cents; of this the crop year 1925–26 afforded an illustration. As in the case of spring wheats, the margins vary greatly within a year, because of seasonal variations in marketings and prices in each country.

Even in the exceptional years of short American crops and large Canadian crops, the margin between terminal prices of wheats of comparable grades does not average as much as the duty of 42 cents a bushel. On certain days or in certain weeks the margin may approach or even exceed this figure, but such high margins are not characteristic even in exceptional years.

Broadly considered, the annual average margin between American and Canadian wheat prices increases and decreases directly with the size of the Canadian crop and inversely with the size of the American crop. The dimensions of the crops in both countries exert an influence upon the price relationship. Hard spring wheat represents so small a proportion of the American crop that a large total crop usually means an excess of winter wheats (mostly of mediocre grades); the depressing effect on American prices and price margins is well illustrated in the year 1924–25. The effect of a short American crop is not so much to increase the advantage in the price of spring wheat, as to extend it to the winter wheats. When the Canadian crop is heavy, this lowers the premium position of high-protein wheat on the Liverpool market, but that does not react much upon American spring-wheat prices because we export so little of these wheats. When the Canadian crop is short, this increases the premium on high-protein wheat in Liverpool, but that does not reflect much on us beneficially, because we are practically on a domestic basis for high-protein wheats.

No satisfactory measure of the relative values per bushel of the entire wheat crops of the two countries can be calculated. Even if one excludes Canadian winter wheats and American durum and Pacific wheats, the available data are inadequate for such comparisons. A rough calculation made from the weighted terminal prices of No. 1 Dark Northern Spring at Minneapolis, No. 2 Hard Winter at Kansas City, No. 2 Red Winter at Chicago, and No. 3 Manitoba Northern at Winnipeg, points to the conclusion that the American crops of hard spring, hard winter, and soft red winter wheats brought, in 1923–24, some 14 cents a bushel more than Canadian hard spring; in 1924–25, some 7 cents a bushel less than Canadian hard spring; and in 1925–26, some 28 cents a bushel more than Canadian hard spring. If one could take into account the fact that the average quality and value of the entire crop of American wheats is farther below that of the grades we have used in our price comparisons, than is true in the case of Canadian wheats, the margins would presumably be reduced.

The margins between farm prices of wheat in the two countries, as shown by the available data of annual averages, are higher than those shown by crop comparisons based on terminal prices. This is probably chiefly because the weighted farm price in the United States includes high farm prices in deficiency regions, while the Canadian figure is almost wholly based on prices in surplus regions. But comparisons between national average farm prices in the two countries are inherently unsatisfactory, and are rendered still more unreliable by lack of comparability of the two series.

Altogether there is no question that, with a substantial tariff duty on wheat imported into the United States for domestic consumption, wheat prices tend to stand higher in the United States than in Canada. The margins are usually quite substantial between spring wheats of comparable milling quality, but rather less between the Ameri-

can spring- and Canadian spring-wheat crops as a whole. The margins are smaller between American winter and Canadian spring wheats of roughly comparable grades, and still smaller between American winter- and Canadian spring-wheat crops as a whole. The margins are highest in years of short American crops and large Canadian crops, as in 1925–26; when conditions are reversed, as in 1924–25, American wheats may average lower in price than Canadian, but this will rarely hold for comparable spring wheats of the two countries. More definite generalizations are difficult to make in view of changing conditions from year to year and within each season.

The foregoing analysis is broadly in harmony with trade impressions, but affords a somewhat clearer view of the price relationships in question than has heretofore been available. Despite its admitted shortcomings, it throws light upon the protective influence of the tariff and the possibilities of raising domestic wheat prices by artificial measures, behind the tariff wall. It shows that the tariff is never effective in raising the price of American wheat as a whole by the full extent of the duty, except for comparatively short periods; but it suggests that it exerts an influence on American wheat prices, especially of spring wheat, even in years of large American crops and small Canadian crops, when the United States has a substantial export surplus.

This study is chiefly the work of Alonzo E. Taylor with the aid of Elizabeth M. Brand, and with some assistance from Joseph S. Davis

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