Effects of the Duties on Canadian Hard Red Spring Wheat

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Abstract

Since the United States imposed antidumping and countervailing duties totaling 14.16 percent on imports of Canadian hard red spring (HRS) wheat, Canadian exports to the United States have nearly stopped. This study examines the changes in U.S. wheat imports from Canada. An econometric model is developed and estimated to determine the effects of the decline in HRS wheat imports on U.S. farm price and producer revenue. The substantial decline in HRS wheat imports from Canada from the 1997/98 - 2001/02 levels to the current levels is found to have increased the spring wheat price received by farmers by about $0.15 per bushel. With the average yearly HRS wheat production totaling 481 million bushels, this price increase means an increase in annual income of $74 million. The increase in price also leads to an increase in production, and domestic sales replace imports. This increase in production leads to an additional increase in revenue of $27 million per year. The total increase in revenue for the U.S. HRS wheat industry is about $101 million per year. Some of the decline in Canadian HRS wheat exports to the United States could be due to a weakening U.S. dollar and below average Canadian production, but most is likely due to the U.S. imposition of antidumping and countervailing duties.

Keywords: wheat, imports, Canada, farm price, countervailing duties, antidumping duties

Highlights

The U.S. Commerce Department determined that imports of durum and hard red spring (HRS) wheat from Canada were being unfairly subsidized, with a net subsidy rate of 5.29 percent, and sold at less than fair value, with dumping margins of 8.26 percent and 8.87 percent for durum and HRS wheat, respectively. The U.S. International Trade Commission then determined that the U.S. HRS wheat industry is materially injured by imports of Canadian HRS wheat, but that the durum industry is not materially injured, or threatened with material injury, by imports of durum wheat. Therefore, antidumping and countervailing duties totaling 14.16 percent were issued for imports of HRS wheat, but no duties were imposed on durum wheat.

Since these duties were imposed in October 2003, Canadian HRS wheat exports to the United States have nearly stopped. From January 1997 through July 2002, monthly HRS wheat exports from Canada to the United States averaged 113 thousand metric tons. Canadian HRS wheat exports to the United States declined to 6.8 thousand metric tons per month from November 2002 to August 2003 because of a poor Canadian crop. Imports from Canada dropped more substantially when the duties were imposed. From October 2003 to November 2004, U.S. HRS wheat imports from Canada averaged only 656 metric tons per month, which is a 97.5 percent reduction in imports compared to the 2002/03 crop year and a more than 99 percent reduction compared to the level of imports from the previous five crops years. This dramatic drop in HRS wheat imports from Canada seems to indicate that the duties have been highly successful in restricting imports.

The high sensitivity of U.S. HRS wheat users to price indicates that they would shift from Canadian to U.S. wheat if Canadian price increases. Canada is more likely to shift exports to overseas markets rather than absorb the duties and export to the United States at lower prices. While imports of HRS wheat from Canada have nearly stopped, imports of other classes of wheat have increased. U.S. durum imports from Canada are now returning to the levels of previous years after decreasing in 2003. Imports of other non-durum wheat, including white winter wheat, Canadian western red winter, and soft red winter wheat, have also increased.

To calculate changes in U.S. farm revenue resulting from the antidumping and countervailing duties, a price model is developed, based on supply and demand conditions of HRS wheat, and is estimated with time series data. The price flexibility coefficient estimated from the price model is used to calculate changes in farm price and revenue that have resulted due to the drop in imports.

HRS and hard red winter (HRW) wheat supply are found to be the most significant variables affecting HRS wheat farm price. A 1 percent increase (decrease) in HRS wheat supply is found to cause a 0.67 percent decrease (increase) in HRS wheat farm price, while a 1 percent increase (decrease) in HRW wheat supply is found to cause a 0.48 percent decrease (increase). The level of wheat stocks held by the Commodity Credit Corporation, the Food Security Wheat Reserve, and the Farmer-Owned Reserve has a positive effect on price, and the stock-to-use ratio for the rest of the world has a negative effect on U.S. price, although the effects of these factors are only marginally significant.

The substantial decline in HRS wheat imports from Canada from the 1997/98 - 2001/02 levels to the current levels since the duties were imposed has led to a 5.1 percent increase in U.S. HRS wheat farm price, according to the results of our model. With an average farm price of $3.02 per bushel during 1997 to 2001 crop years, a 5.1 percent increase in price is equal to a $0.15 per bushel price increase. Because of a rather large standard error in the model, though, the 90 percent confidence interval for the price increase ranges from about $0.05 to $0.26 per bushel.

With an average yearly HRS wheat production of 480.6 million bushels, this price increase results in an estimated annual income increase of $74.2 million. This is revenue gained strictly due to the price effect. The 90 percent confidence interval for the price effect ranges from $21.7 million to $126.8 million. The increase in price also leads to an increase in domestic production, and domestic sales replace imports. This increase in production causes an additional increase in revenue of $27.3 million per year, with a 90 percent confidence interval ranging from $7.7 million to $48.3 million per year. The total increase in revenue for the U.S. HRS wheat industry is estimated to be $101.5 million per year, with a 90 percent confidence interval ranging from $29.3 million to $175.0 million per year.

This increase in revenue is attributable to a reduction in HRS wheat imports from Canada. Some of the decline in Canadian HRS wheat exports to the United States could be due to a weakening U.S. dollar and below average Canadian production. However, the sudden, dramatic drop in HRS wheat imports, as imports of other classes of wheat increased, suggest that the antidumping and countervailing duties are the main contributing factor to the decline in U.S. HRS wheat imports.

Effects of the Duties on Canadian Hard Red Spring Wheat

Jeremy W. Mattson, Won W. Koo, and Jungho Baek[*]

INTRODUCTION

Since the implementation of the Canada - United States Free Trade Agreement (CUSTA) in 1989, a number of trade disputes have arisen between the two countries, especially with respect to wheat. Canadian wheat exports to the United States increased substantially in the early 1990s. A recent investigation by the U.S. Trade Representative (USTR) and the U.S. International Trade Commission (USITC) revealed that the Canadian Wheat Board (CWB) has used special monopoly rights and privileges which disadvantage U.S. farmers and are unfair to trade. As a result of this investigation, the U.S. Department of Commerce examined the possibility of imposing antidumping or countervailing duties on Canadian wheat. They determined that certain durum wheat and hard red spring (HRS) wheat imports were sold at less than fair value and were unfairly subsidized (International Trade Administration Fact Sheet, August 2003). The subsequent investigation by the USITC concluded that U.S. industry is materially injured by imports from Canada of HRS wheat, but that U.S. industry is not materially injured or threatened with material injury by imports of durum wheat. Therefore, antidumping and countervailing duties were applied to imports of Canadian HRS wheat but not to durum wheat. The antidumping and countervailing duties were set at 8.87 percent and 5.29 percent, respectively.

The objective of this study is to examine the effects of these duties on the U.S.- Canada wheat trade and on U.S. price and producer income. Analyzing data from the U.S. Department of Agriculture's Foreign Agricultural Service (FAS), the next section describes the changes in U.S. imports of wheat from Canada under CUSTA. The following section discusses the results from the USITC investigation on durum and HRS wheat imports from Canada. Changes in U.S. wheat imports since the imposition of the duties are discussed in the fourth section of the paper. Effects of the change in imports on U.S. price and producer revenue are presented in the fifth section of the paper, and a summary and conclusions are provided in the final section.

U.S. WHEAT IMPORTS FROM CANADA UNDER CUSTA

Wheat imports from Canada increased dramatically after CUSTA was implemented in 1989 (Figure 1). In 1989/90, non-durum and durum wheat imports from Canada totaled 160 thousand and 221 thousand metric tons, respectively. Some of the non-durum imports from Canada consist of winter wheat, but most non-durum imports are HRS wheat. Non-durum wheat imports rose substantially to 2.1 million metric tons in 1993/94, and durum wheat imports reached 582 thousand metric tons. After a dispute in 1994 and a negotiated settlement that restricted Canadian exports, imports from Canada declined, but then increased again after 1996.

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Figure 1. U.S. Imports of Non-durum and Durum Wheat from Canada
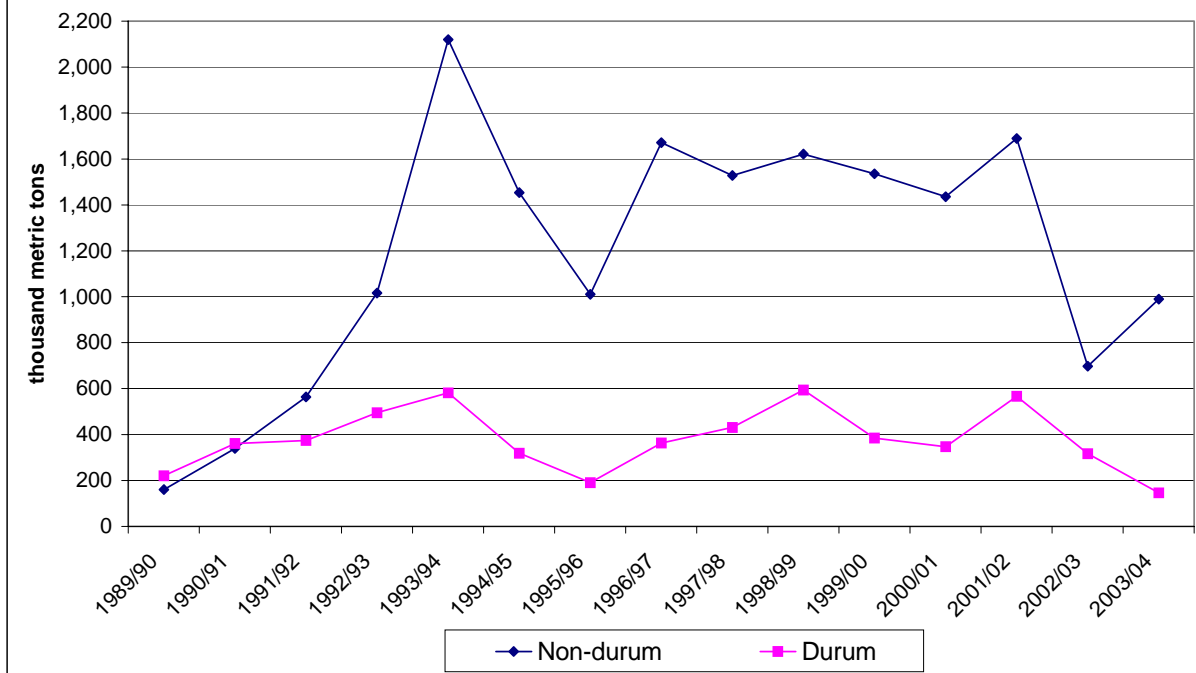
During the six years from 1996/97 to 2001/02, non-durum wheat imports from Canada were fairly stable, ranging from 1.4 million to 1.7 million metric tons per year. Meanwhile, durum imports increased to 594 thousand metric tons in 1998/99, decreased the next two years, and then increased to 567 thousand metric tons in 2001/02. Non-durum wheat imports from Canada were strong throughout 2001 and the first nine months of 2002. Beginning in October 2002, Canadian exports to the United States dropped due to a poor Canadian crop. The reduction in Canadian non-durum wheat exports to the United States continued in 2003, with the exception of large quantities shipped to the United States in August and September of 2003. Durum wheat imports from Canada remained strong throughout 2002 but declined substantially in 2003. Canadian non-durum and durum wheat exports to the United States dropped to 697 thousand and 316 thousand metric tons, respectively, in 2002/03. Durum wheat imports from Canada during calender year 2003 equaled only 40 thousand metric tons. This drop is likely due to drought and production decreases in Canada. During most years under CUSTA, Canadian exports of non-durum and durum wheat to the United States range from 1.5 to 1.7 million and 350 to 590 thousand metric tons, respectively.

When compared to the volume of U.S. domestic production, imports of durum wheat are more substantial than imports of HRS wheat (Figure 2). In most years, imports of durum wheat have equaled 20 to 40 percent of U.S. production. HRS wheat imports from Canada were equal to about 12 percent of U.S. HRS wheat production in the late 1990s and early 2000s. HRS and hard red winter (HRW) wheat can be used as substitutes, and when comparing HRS wheat imports from Canada to total U.S. hard wheat production, the quantity of imports appears less

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substantial. Hard wheat imports from Canada have equaled about 4 percent of U.S. HRS and HRW wheat production in recent years.

Most of the non-durum wheat import from Canada is classified as HRS wheat, but some is classified as white winter, HRW, or soft white spring, and some is unclassified (Table 1). Imports of unclassified wheat vary from year to year and could include feed wheat or soft red winter wheat (which is not classified under the 10-digit harmonized tariff schedule (HTS)), or possibly unidentified HRS wheat. This unclassified wheat is simply denoted as "other" wheat. Large quantities of "other" wheat were shipped to the United States in 1993/94 and 2003/04. The "other" wheat in 1993/94 is likely feed wheat, while the "other" wheat in 2003/04 could be soft red winter wheat.

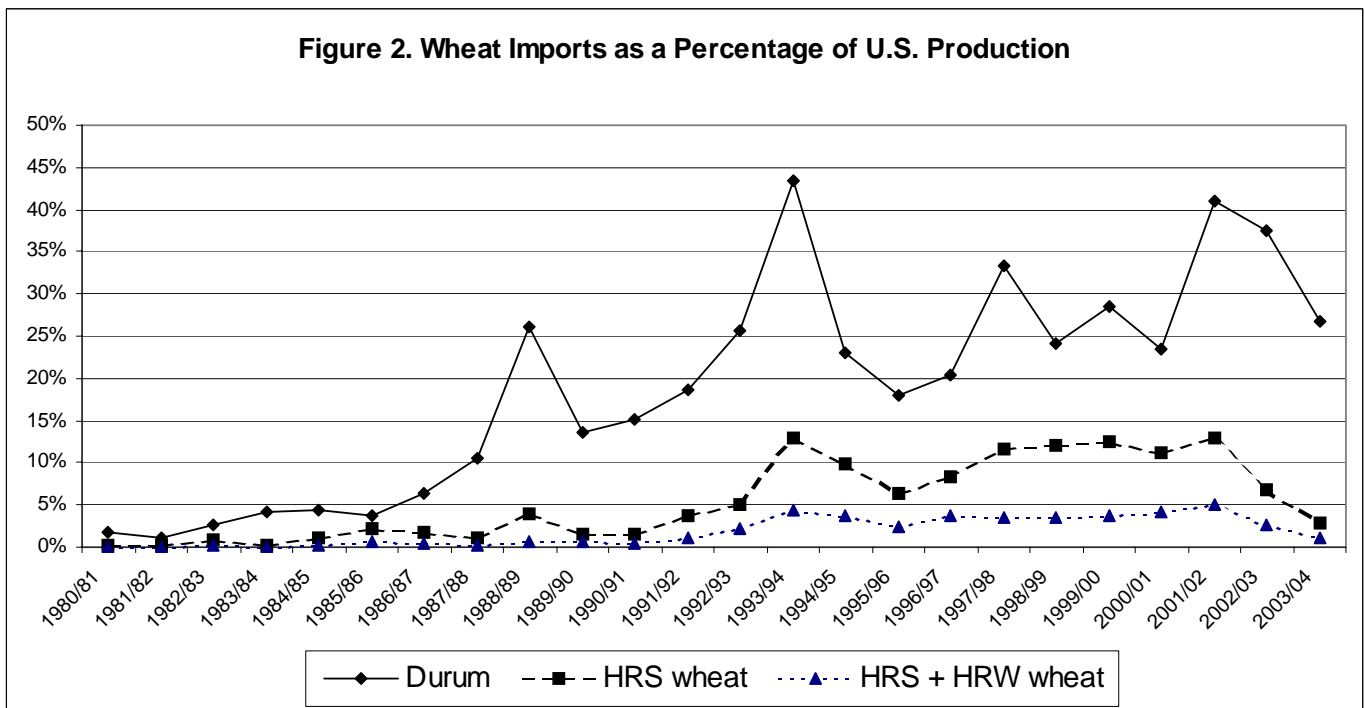Figure 2. Wheat Imports as a Percentage of U.S. Production

Table 1. Marketing Year Canadian Wheat Exports to the United States, by Class[1]

	Durum	Hard Red Spring	White Winter	CWR Winter	Soft White Spring	Seed	Other	*Total*
	--metric tons--							
1991/92	369,139	275,689	90,511	478	178	10,015	191,561	*937,571*
1992/93	494,053	350,357	170,042	14,059	37,876	3,431	440,885	*1,510,702*
1993/94	570,975	878,671	117,328	96,753	52,030	43,127	942,516	*2,701,399*
1994/95	310,841	617,156	182,109	73,923	177,403	23,217	387,112	*1,771,760*
1995/96	186,291	557,615	276,960	2,621	120,754	25,571	31,253	*1,201,065*
1996/97	358,167	1,159,176	289,455	3,776	32,509	21,690	169,308	*2,034,080*
1997/98	426,263	1,284,298	118,889	13,320	8,936	17,392	89,634	*1,958,732*
1998/99	593,038	1,237,293	167,784	21,251	14,468	4,552	176,759	*2,215,145*
1999/00	383,470	1,361,589	66,490	2,397	1,868	3,020	101,116	*1,919,951*
2000/01	345,887	1,316,085	37,760	1,102	1,008	2,359	78,919	*1,783,120*
2001/02	565,495	1,436,345	130,576	21,406	657	3,111	98,407	*2,255,997*
2002/03	315,831	323,956	166,797	6,649	497	4,555	195,850	*1,014,135*
2003/04	172,521	33,125	190,753	10,038	3,476	3,239	749,733	*1,162,885*

[1]Marketing year is July-June
Source: FAS/USDA

USITC INVESTIGATION

Following receipt of a petition filed by the North Dakota Wheat Commission, the Durum Growers Trade Action Committee, and the U.S. Durum Growers Association, the U.S. Commerce Department determined that imports of durum and HRS wheat from Canada were being unfairly subsidized, with a net subsidy rate of 5.29 percent, and sold at less than fair value, with dumping margins of 8.26 percent and 8.87 percent for durum and HRS wheat, respectively. The USITC then determined that the U.S. HRS wheat industry is materially injured by imports of Canadian HRS wheat, but that the durum industry is not materially injured, or threatened with material injury, by imports of durum wheat. Therefore, antidumping and countervailing duties were issued for imports of HRS wheat but not durum wheat.

In making their determination of material injury, the USITC considered the volume of imports, their effect on domestic prices, and their impact on domestic producers. They found that, unlike durum wheat imports, HRS wheat imports were significantly undersold. The USITC collected pricing data for HRS and durum wheat. They found that weighted-average delivered prices for Canadian No. 1 and 2 HRS wheat were lower than comparable U.S.-grown HRS wheat in 28 of 40 monthly comparisons from June 2000 to August 2002. They also made company-specific and place-specific comparisons which show Canadian underselling in a majority of months, albeit by a slim majority.

The USITC concluded that not only was Canada underselling HRS wheat, but that imports had a significant price depressing effect on domestic HRS wheat. They demonstrated this by showing that monthly prices received by farmers were among the lowest in 2001/02 when import volumes were the highest, and that with the filing of the petition in September 2002, HRS wheat prices rose dramatically as imports fell. Two of the USITC commissioners dissented, concluding that the impact of Canadian imports is not significant. They argued that the evidence of underselling was mixed and that pricing data do not show price depression or suppression.

The USITC could not find evidence of underselling by Canadian durum exporters, nor could they find significant price depression or suppression caused by imports of durum wheat. Their investigation found that demand for durum wheat is not price sensitive and that purchasers generally rank U.S. durum as inferior to Canadian durum in product consistency and dockage. Therefore, U.S. purchasers value the quality of Canadian durum and, unlike purchasers of spring wheat, their demand for Canadian wheat will not change significantly with changes in price.

As a result of the USITC investigation, an antidumping duty of 8.87 percent and a countervailing duty of 5.29 percent were imposed on Canadian HRS wheat.

CHANGES IN TRADE SINCE THE IMPOSITION OF DUTIES

Orders for antidumping and countervailing duties on Canadian HRS wheat were made by the USITC on October 23, 2003. Since these duties were imposed, Canadian HRS wheat exports to the United States have nearly stopped (Table 2). From January 1997 through July 2002, monthly HRS wheat exports from Canada to the United States averaged 113 thousand metric tons. Canadian HRS wheat exports to the United States started declining in August 2002 because of a poor Canadian crop. From November 2002 to August 2003, HRS wheat exports to the United States averaged just 6.8 thousand metric tons per month. Canadian HRS wheat exports to the United States jumped a little in September 2003 to 20 thousand metric tons, possibly in anticipation of the coming duties. From October 2003 to November 2004, U.S. HRS wheat imports from Canada averaged only 656 metric tons per month, which is a 97.5 percent reduction in imports compared to the 2002/03 crop year and a 99.4 percent reduction compared to the level of imports from 1997 to July 2002. This dramatic drop in HRS wheat imports from Canada seems to indicate that the duties have been highly successful in restricting imports.

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Table 2. Monthly Canadian Wheat Exports to the United States, by Class

	Hard Red Spring	Durum	White Winter	CWR Winter	Soft White Spring	Other
	--------------------------metric tons--------------------------					
Jan-01	81,439	34,621	1,887	0	0	5,201
Feb-01	105,336	12,914	1,457	0	347	15,448
Mar-01	114,421	27,742	4,019	100	119	14,888
Apr-01	109,675	22,937	5,342	111	22	1,672
May-01	109,300	38,252	3,748	230	110	1,684
Jun-01	102,716	34,055	6,132	53	90	1,572
Jul-01	144,077	45,461	4,839	67	46	5,793
Aug-01	70,060	43,257	19,430	191	0	30,188
Sep-01	91,560	43,131	15,968	4,295	39	17,727
Oct-01	106,414	41,704	17,742	12,797	0	5,697
Nov-01	198,615	47,339	16,702	1,782	58	1,642
Dec-01	173,419	44,007	4,674	1,365	0	1,882
Jan-02	104,942	50,165	10,321	909	131	1,141
Feb-02	137,293	38,572	13,719	0	294	1,172
Mar-02	151,823	36,961	8,202	0	0	5,845
Apr-02	97,495	51,048	7,875	0	0	5,484
May-02	77,823	48,132	5,341	0	0	8,272
Jun-02	82,824	75,719	5,765	0	89	13,564
Jul-02	116,926	67,581	8,312	150	0	15,614
Aug-02	47,004	51,550	19,700	0	0	23,434
Sep-02	69,054	54,615	44,235	4,928	0	22,669
Oct-02	31,396	38,165	6,478	30	103	12,574
Nov-02	7,742	50,220	812	0	0	13,614
Dec-02	10,323	30,663	1,111	0	0	1,506
Jan-03	1,592	10,676	19,767	0	50	9,789
Feb-03	2,814	10,429	20,130	0	102	10,838
Mar-03	11,389	568	17,755	0	144	25,728
Apr-03	19,411	476	16,360	636	45	25,656
May-03	5,061	531	10,022	674	0	18,072
Jun-03	1,245	358	2,116	231	54	16,357
Jul-03	3,218	205	1,280	0	27	19,872
Aug-03	5,347	158	29,523	89	499	151,006
Sep-03	20,264	3	23,884	776	1,648	248,493
Oct-03	206	395	34,243	1,045	279	61,256
Nov-03	618	3,055	11,696	2,109	164	22,397
Dec-03	218	12,408	8,685	1,791	170	25,442
Jan-04	391	9,229	16,053	187	33	32,183
Feb-04	358	16,623	11,685	1,505	72	35,918
Mar-04	488	26,208	18,973	1,126	361	49,231
Apr-04	593	41,275	12,051	694	109	33,052
May-04	588	35,695	15,174	270	70	39,736
Jun-04	835	27,268	7,505	446	44	31,145
Jul-04	707	42,429	7,567	1,012	136	32,034
Aug-04	132	51,279	9,719	870	38	75,896
Sep-04	2,661	30,254	32,623	5,340	37	83,038
Oct-04	608	26,936	22,311	1,845	62	49,219
Nov-04	784	28,098	15,629	2,344	86	30,108

Source: FAS/USDA

The large decline in HRS wheat trade can be explained by examining both the demand side and the supply side. As the USITC concluded in its investigation, U.S. importers of HRS wheat are highly sensitive to price. The high sensitivity to price indicates that U.S. HRS wheat users would shift from Canadian to U.S. wheat if Canadian price increases. Canada, therefore, would have to lower its wheat price and absorb most of the duties if they wanted to continue exporting to the United States. Under this circumstance, Canada is more likely to shift exports to overseas markets rather than export to the United States at lower prices. Transportation costs from the Canadian wheat producing regions to the United States are lower than those to overseas export markets, providing an incentive to export to the United States. The 14.16 percent tariff, however, negates the transportation cost advantage and provides incentive to export to overseas markets instead of the United States. A report from the FAS (February 2004) notes that the U.S. antidumping and countervailing duties make the United States an uneconomical market for Canadian HRS wheat.

While imports of HRS wheat from Canada have nearly stopped, imports of other classes of wheat have increased. Unlike HRS wheat, imports of these classes of wheat are not hindered by duties. U.S. durum imports from Canada are now returning to the levels of previous years after decreasing in 2003. Imports of other non-durum wheat, including white winter wheat, Canadian western red winter, and soft red winter wheat, have also increased.

Increased Imports of Other Wheat

The 10-digit Harmonized Tariff Schedule of the United States (HTSUS) subheadings identify wheat imports by class. Wheat imports are classified into durum, HRS, white winter, Canadian western red winter, and soft white spring wheat; and separate subheadings exist for wheat seed. Any wheat imports that do not fall into these categories are classified as "other" wheat. The "other" tariff schedule number is listed under all HTSUS headings and is suppose to be used when goods fall outside of the specific headings and/or descriptions. "Other" wheat that the United States could import from Canada may include soft red winter wheat or feed wheat that is not classified.

In previous years, "other" wheat would account for about 5 percent of U.S. wheat imports from Canada, while HRS and durum wheat made up most of the imports (Tables 1 and 2). This situation changed dramatically in 2003 when the United States imposed antidumping and countervailing duties on HRS wheat. Canadian exports to the United States spiked in August and September of 2003, and most of those exports during this period were classified as "other" wheat (Table 2). Since then, imports of "other" wheat continue to account for a large portion of total imports, while imports classified as HRS wheat are almost nonexistent. During the first few months of 2004, close to half of total imports from Canada were "other" wheat, while only one half of one percent were classified as HRS. Imports of white winter wheat increased in 2003 and 2004 due to an increase in production of winter wheat in Ontario.

There are a few possible explanations for the substantial increase in imports of "other" wheat. One explanation for wheat classified as "other" is that brokers do not adequately check for the specific description and use the "other" classification, but this does not explain the large increase

in other wheat imports. A second explanation for classifying wheat as "other" is that it is a way to evade antidumping and countervailing duties. The "other" tariff schedule number is sometimes used by exporters of a number of different commodities to hide or evade duties. The countervailing and antidumping duties do not cover imports of wheat that enter under the subheading 1001.90.20.96 (the HTSUS subheading for "other" wheat) that are not classifiable as HRS wheat. If Canada is trying to evade duties by not identifying its wheat as being HRS, it may be selling this wheat in the United States at a discount. The trade data show that imports of wheat classified as "other" have a lower unit value than do imports of HRS wheat. The unit value of "other" wheat imports was 21 percent lower than the unit value of HRS wheat imports in 2003, and this price difference was even wider in early 2004. The price differences make it unlikely that Canada is evading duties by selling it as "other" wheat.

Alternatively, Canada could be exporting an increased quantity of wheat that does not fall under any other classification. The increase in imports of "other" wheat could be explained by the record 2003 wheat crop in Ontario. Ontario produces white winter and soft red winter wheat, and since there is no specific HTSUS number for soft red winter wheat, it could be classified as "other" wheat. Data from Statistics Canada indicate that Ontario's winter wheat production increased from 1.1 million metric tons per year in 2001 and 2002 to 2.06 million metric tons in 2003 (FAS, January 2004). About 60 percent of Ontario's winter wheat is red wheat, and 40 percent is white wheat. An FAS report (January 2004) states 1.2-1.3 million metric tons of Ontario's 2003 crop were available for export. The report cites data from Statistics Canada indicating that Ontario exported 536 thousand metric tons to the United States from August to October 2003, which is an increase from the 351 thousand metric tons exported to the United States during the entire 2002/03 crop year. Table 2 shows that U.S. imports of white winter wheat have increased since August 2003. However, there is no separate HTSUS number for soft red winter wheat to show how much of this wheat class the United States has imported from Canada. The large increase in imports of "other" wheat since August 2003 could be explained by an increase in soft red winter wheat imports from Ontario. The FAS report indicates that demand for Ontario winter wheat has increased among eastern U.S. mills because of quality problems in eastern U.S. growing regions. Furthermore, the Economic Research Service's (ERS) Wheat Yearbook (2004), published by the U.S. Department of Agriculture, indicates that U.S. imports of soft red winter increased substantially during the 2002 and 2003 crop years. The U.S. soft red winter crop has also been smaller the last two years.

Since the Ontario wheat is soft wheat, it is not a close substitute for HRS wheat, and the increase in U.S. imports of soft wheat is not likely to be influenced by the duties on HRS wheat. Even when the increase in other non-durum wheat imports is considered, however, total non-durum imports from Canada are still down by about 60 percent since the duties were imposed, compared to previous years. The U.S. dollar has declined in value relative to the Canadian dollar over the last year, which also contributes to a decrease in U.S. imports from the country. However, the sudden, dramatic drop in HRS wheat imports, as imports of other classes of wheat increased, suggest that the duties are the main contributing factor to the decline in U.S. HRS wheat imports.

PREVIOUS STUDIES

The North Dakota Wheat Commission announced in December 2004 that the tariffs on Canadian wheat resulted in a $0.20 per bushel increase in North Dakota spring wheat prices (Zent 2004). This finding is consistent with the results from a study by Koo and Mattson (2002). Koo and Mattson found that a 1 percent change in imports from Canada causes a 0.086 percent change in the spring wheat price. Since the level of HRS wheat imports has dropped by about 99 percent, these results indicate that the decline in imports has caused the HRS wheat price to increased by 8.5 percent, about $0.25 per bushel when compared to the 1997/98-2001/02 average farm price. One problem with this study is that, due to data limitations, it included imports of all non-durum wheat from Canada in the model rather than imports of just HRS wheat. It can be assumed that most non-durum wheat imports from Canada are HRS wheat, but in some years there could a higher quantity of feed wheat imports or imports of other types of non-durum wheat, such as white wheat, as noted in the previous tables. These data limitations could influence the results in the 2002 study by Koo and Mattson.

A few studies were conducted in the mid-1990s, when the USITC investigated the impact of U.S. imports of Canadian wheat, wheat flour, and semolina on the U.S. farm program. These papers estimated the effect of imports on U.S. price. The results of the studies varied widely and were bounded by Alston et al. (1994) on the low end and the USDA on the high end. The USDA study, as described by Babula et al. (1996) and Alston et al. (1994), suggested that imposing a quota by which imports are restricted to half of the average levels over the 1987/88 to 1991/92 period would increase the average market price by 12 cents per bushel per year in 1993/94 and 1994/95 and by an average of 9 cents per bushel over the 1991/92 to 1994/95 period.

The study by Alston et al. (1994), which was conducted on behalf of the CWB, imposed on its model a restriction of Canadian exports to the United States equal to 50 percent of the 1993/94 level. Their results suggested that such a decrease in exports from Canada to the United States would increase the annual U.S. market price by 0.5 cents per bushel. Alston et al. noted that the USDA simulated restricting total imports to 22.4 percent of the base in 1993/94, rather than 50 percent. The authors simulated a reduction in imports to 22.4 percent of the base; the results of this simulation led to a 0.8 cent per bushel increase in the wheat price, which is still substantially different than that estimated by the USDA. The USITC staff suggested that annual declines in prices due to imports from Canada grew from 1.34 cents per bushel in 1989/90 to 4.41 cents per bushel in 1993/94 (Babula et al.1996).

In each of these studies, though, the simulated reduction in imports is less than the actual reduction of imports that has occurred. In reality, the level of imports since the duties were imposed is equal to less than one percent of the 1993/94 level of imports. Furthermore, the price changes in these studies is for the average price of all U.S. wheat or all U.S. milling wheat and is not specific to HRS wheat.

EFFECTS OF REDUCTION IN IMPORTS ON PRICE AND REVENUE

Reductions in the price of HRS wheat and revenue for HRS wheat producers due to imports from Canada can be explained in Figure 3. This figure shows the demand and supply of wheat in the United States. S_1 is the supply of wheat in the United States before Canada exports to the United States. At this supply level, the equilibrium market price is P_1, and the quantity supplied by U.S. producers is Q_1^{US}. When Canada exports to the United States, supply shifts out to S_2. The increase in supply causes price to decrease to P_2, and consumption increases to Q^d. When price decreases to P_2, the quantity supplied by U.S. producers will decrease to Q_2^{US}. Domestic consumption (Q^d) is now made up of domestic supply (Q_2^{US}) and imports from Canada ($Q^d -Q_2^{US}$). The effect on U.S. farm revenue is due to both a decrease in wheat price (price effect) and an increase in imports displacing domestic sales (substitution effect). Prior to imports from Canada, total revenue for U.S. producers equals market price (P_1) times the quantity produced (Q_1^{US}). After supply shifts to S_2, total revenue for U.S. producers equals the reduced market price (P_2) times quantity produced (Q_2^{US}). The reduction in revenue, represented by the shaded area in Figure 3, is divided into three parts: area P_1 a b P_2, area b c $Q_1^{US} Q_2^{US}$, and area a e c b. The first component is a reduction in income due to the decreased price (price effect), the second component represents a reduction in revenue due to an increase in imports substituting for domestically produced wheat (substitution effect), and the third component is a reduction in revenue due to both price and income effects.
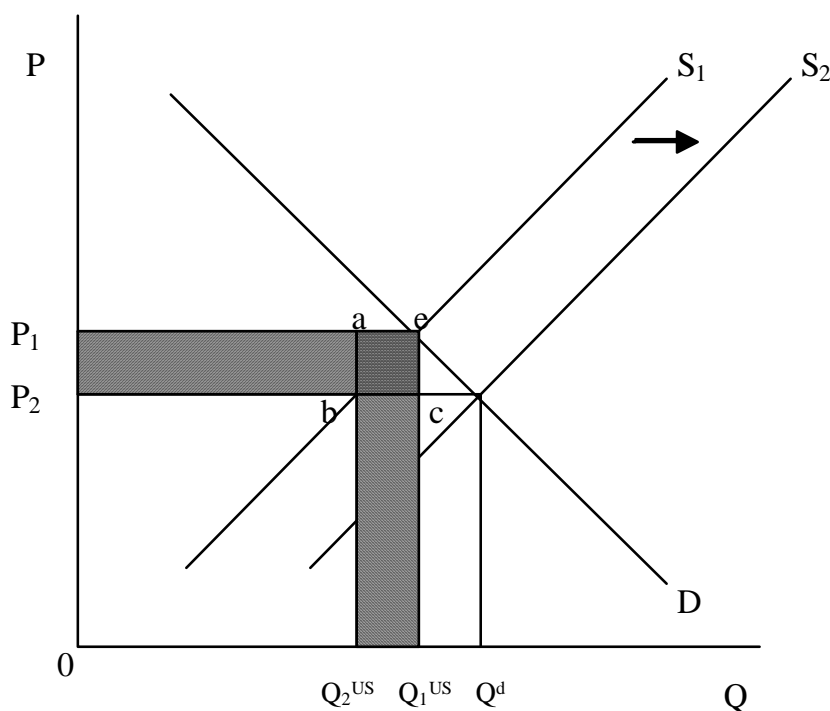

Figure 3. Effect of Supply Shift on Price and Revenue

Analysis from Koo and Mattson (2002) indicated that Canadian exports to the United States have not had a significant effect on U.S. exports to offshore markets; therefore, we did not consider third-market effects in this study.

Since the antidumping and countervailing duties were imposed on Canadian wheat, Canadian HRS wheat exports to the United States nearly stopped and supply shifted back to near S_1 in Figure 3, causing U.S. price to increase. This study estimates the effects of the near stoppage of HRS wheat imports from Canada on U.S. HRS wheat price and changes in total farm revenue in the United States in an average year, using the 5-year average of 1997/98 to 2001/02. The 2002/03 crop year is not a good year for comparison because the poor Canadian crop limited exports to the United States.

To calculate changes in U.S. farm revenue resulting from the antidumping and countervailing duties on Canadian HRS wheat, a price model is developed, based on supply and demand conditions of HRS wheat, and is estimated with time series data. The price flexibility coefficient estimated from the price model is used to calculate changes in farm revenue.

Farm Price Model

Based on basic microeconomic theory, equilibrium price is determined by demand (D) and supply (S). The quantity demanded must equal the quantity supplied at the equilibrium price:

$$D(p) = S(p) . \tag{1}$$

If supply is less than demand at a given price, then the price will increase. Conversely, if supply is greater than demand at a given price, then the price will decrease. With demand for wheat relatively stable, changes in the price of wheat can be estimated by changes in stocks:

$$P_t = f(SK_t) , \tag{2}$$

where P_t is the price of wheat in time period t and SK_t is wheat stocks in period t. SK_t is defined as

$$SK_t = TS_t - TU_t , \tag{3}$$

where TS_t is total supply and TU_t is total use in period t. More specifically, TS consists of beginning stocks (BS), production (PROD), and imports (M); and TU consists of exports (X) and domestic consumption (DC):

$$TS_t = BS_t + PROD_t + M_t , \tag{4}$$

$$TU_t = DC_t + X_t \, . \tag{5}$$

SK_t is commonly referred to as the ending stocks. Studies such as Westcott and Hoffman (1999) have used the stocks-to-use ratio to represent market conditions in explaining price movements. This ratio is defined as the ending stocks divided by total use. Our study separates TS from TU to estimate the effect of these different components on price. TS is expected to have a negative effect on price, while TU should positively affect price. Equation 2 can be re-written as follows:

$$P_t = f(TS_t, TU_t) \, . \tag{6}$$

This model is developed specifically for HRS wheat. Since HRW wheat is a close substitute for HRS wheat, the supply of HRW wheat is expected to negatively affect the HRS wheat price. Therefore, HRW wheat supply is included in the model.

Westcott and Hoffman (1999) also note that government programs and world market conditions shift the pricing relationship. Government programs must be considered because they have affected the level of stocks, especially in the mid-1980s when there was a large buildup of stocks. Many of these stocks were held by the Commodity Credit Corporation (CCC), the Food Security Wheat Reserve (FSWR), or the Farmer-Owned Reserve (FOR). The level of stocks in these programs is expected to have a positive effect on price because stocks held by the government have generally not been available to the marketplace.

Since U.S. wheat prices are affected by world market conditions, the stocks-to-use ratio for the rest of the world is added to the model. An increase in the supply or decrease in the use of wheat in the rest of the world (ROW) is expected to have a negative effect on U.S. prices, and the opposite is also true. The wheat price equation is re-written as follows:

$$P_t^s = f(TS_t^s, TS_t^w, TU_t^s, ROWSU_t, CCC_t) \, , \tag{7}$$

where ROWSU is the stocks-to-use ratio in the rest of the world; CCC includes stocks in the CCC, FSWR, and FOR; and superscripts s and w represent spring wheat and winter wheat.

Like the model estimated by Westcott and Hoffman, our model is estimated using a double-log form. The final equation to be estimated is as follows:

$$Ln(P_t^s) = \alpha_0 + \alpha_1 Ln(TS_t^s) + \alpha_2 Ln(TS_t^w) + \alpha_3 Ln(TU_t^s) + \alpha_4 Ln(ROWSU_t) + \alpha_5 Ln(CCC_t) + \varepsilon_t \, . \tag{8}$$

An autoregresive process of order 1, AR(1), is used to correct for serial correlation. One lag was chosen based on the Akaike information criterion (AIC).

Farm Revenue Model

In Figure 3, when imports from Canada stop, supply shifts back from S_2 to S_1, price increases from P_2 to P_1, quantity supplied by U.S. producers increases from Q_2^{US} to Q_1^{US}, and total farm revenue increases from $P_2*Q_2^{US}$ to $P_1*Q_1^{US}$. P_2 and Q_2^{US} are the given levels of U.S. HRS wheat price and production that occurred before imports from Canada dropped. P_1 and Q_1^{US} are the estimated levels of U.S. HRS wheat price and production that result when imports decline to the extent that they did after the duties were imposed, with all other factors remaining the same. P_1-P_2 is the price increase caused by the drop in imports, and Q_1^{US}-Q_2^{US} is the resulting U.S. production increase. From Equation 8, α_1 is the price flexibility coefficient that describes the effect of a change in HRS wheat supply on price, and an own-price supply elasticity (e^s) estimates the change in domestic production caused by the change in price.

The total change in farm revenue (ΔTR) is divided into three effects - the price effect, the substitution effect, and the dual effect:

$$\Delta TR = \Delta TR^p + \Delta TR^s + \Delta TR^d , \tag{9}$$

where superscripts p, s, and d represent price, substitution, and dual effects, respectively. The three components of the change in total revenue are calculated as follows:

$$\Delta TR^p = (P_1\text{-}P_2)*Q_2^{US} = [(\alpha_1* \ \%\Delta TS^s)*P_2]*Q_2^{US} \tag{10}$$

$$\Delta TR^s = (Q_1^{US}\text{-}Q_2^{US})*P_2 = [e^s*(\alpha_1* \ \%\Delta TS^s)*Q_2^{US}]*P_2 \tag{11}$$

$$\Delta TR^d = (P_1\text{-}P_2)*(Q_1^{US}\text{-}Q_2^{US}) = [(\alpha_1* \ \%\Delta TS^s)*P_2 \ ]*[e^s*(\alpha_1* \ \%\Delta TS^s)*Q_2^{US}] . \tag{12}$$

EMPIRICAL RESULTS

The price used is the HRS wheat farm price. Annual data from crop years 1980/81 to 2003/04 are used. The HRS wheat farm price, HRS and HRW supply, HRS use, and CCC, FSWR, and FOR stocks were obtained from the ERS's Wheat Yearbook. The ROW stocks-to-use ratio was calculated using data from the FAS's Production, Supply and Distribution (PS&D) Database. The government-held stocks and ROW stock-to-use variables include all wheat because data specific to HRS wheat were not available.

Changes in Price

The results of the estimation of Equation 8 are shown in Table 3. The signs are all as expected. The supply of HRS and HRW wheat have significant negative effects on HRS wheat farm price. The level of wheat stocks in CCC, FSWR, and FOR has a positive effect on price, and the stock-

to-use ratio for the ROW has a negative effect on U.S. price, although the effects of these two variables are only marginally significant. HRS wheat use is found to positively affect farm price, but this result is not statistically significant. HRS and HRW wheat supply are found to be the most significant variables affecting HRS wheat farm price. The estimated coefficients are price flexibility coefficients. A 1 percent increase (decrease) in HRS wheat supply is found to cause a 0.67 percent decrease (increase) in HRS wheat farm price, while a 1 percent increase (decrease) in HRW wheat supply is found to cause a 0.48 percent decrease (increase).

From 1997/98 to 2001/02, imports from Canada in a given year averaged 7.7 percent of HRS wheat supply for that year (which consists of imports, production, and beginning stocks). A near stoppage of imports in a given year would result in a 7.7 percent reduction in supply for that year. According to the results in Table 3, this reduction in supply would result in a 5.1 percent increase in U.S. HRS wheat farm price. With an average farm price of $3.02 per bushel during these five years, a 5.1 percent increase in price is equal to a $0.15 per bushel price increase. Because of a rather large standard error, though, the 90 percent confidence interval for the price increase ranges from about $0.05 to $0.26 per bushel.

Table 3. Results of Hard Red Spring Wheat Farm Price Estimation

Explanatory variable	Coefficient
HRS wheat supply (TS^s)	-0.6705
	(-2.46)**
HRW wheat supply (TS^w)	-0.4838
	(-2.94)**
HRS wheat use (TU^s)	0.0721
	(0.34)
Rest of world stocks-to-use (ROWSU)	-0.2925
	(-1.61)
Stocks in CCC, FSWR, and FOR (CCC)	0.0891
	(1.73)*
Constant	1.4205
	(6.47)**
R^2	0.75

Note: t-values in parentheses. * denotes significance at the 10% level, ** denotes significance at the 5 % level.

The total tariff on Canadian HRS wheat is 14.16 percent, and results show it had led to an increase in U.S. price of 5.1 percent. This suggests that Canada is absorbing some of the cost of the duties when exporting to the United States. Canada must decrease the price of exports to the United States, bearing a large percentage of the cost of duties, because of the high sensitivity of U.S. hard wheat users to price. As a result, Canada is now shipping most exports overseas instead of to the United States. The increase in U.S. price resulting from the duties is moderated somewhat because of the substitutability of HRS wheat with HRW wheat. As shown in Figure 2, Canadian HRS wheat exports to the United States have been equal to about 12 percent of U.S. HRS wheat production but just 4 percent of total HRS and HRW wheat production. There is a high degree of substitutability between HRS and HRW wheat, and as mixing technologies have improved, there may also be increased substitutability with other wheats. Despite this substitutability, imports from Canada have a significant impact on U.S. price.

Wheat stocks in the rest of the world could also have a moderating effect on U.S. price. If Canadian wheat that would have been exported to the United States is diverted to other parts of the world, wheat stocks overseas increase. This situation could negatively affect overseas demand for U.S. wheat, causing a decline in U.S. price. Results from our model, however, do not show that the wheat stocks-to-use ratio in the rest of the world has a very significant effect on U.S. HRS wheat farm price.

Figure 4 shows the actual U.S. HRS wheat farm price from July 1997 through October 2004. The average farm price from October 2003 to October 2004 was $3.70, which is a $0.68 increase above the 1997/98-2001/02 average of $3.02. Our results show that part of this increase is due to the drop in imports from Canada, but a large part is also due to other factors. Prices rose during the latter half of 2002 because small crops in the United States and Canada led to a reduction in supplies. Ending stocks since 2002 have remained below average. Furthermore, U.S. HRS and HRW wheat exports both increased significantly during the 2003 marketing year, and domestic consumption of hard wheats has remained strong. The level of U.S. wheat exports in 2003/04 was the highest it has been since 1995/96. These factors have all contributed to the recent increase in prices.

Changes in Farm Revenue

Estimated mean revenue changes due to the reduction in Canadian wheat exports to the United States and a 90 percent confidence interval are presented in Table 4. With average yearly HRS wheat production of 480.6 million bushels, a 15.4 cent per bushel price increase results in an increase in annual income of $74.2 million. This is income gained strictly due to the price effect. The 90 percent confidence interval for the price effect ranges from $21.7 million to $126.8 million.
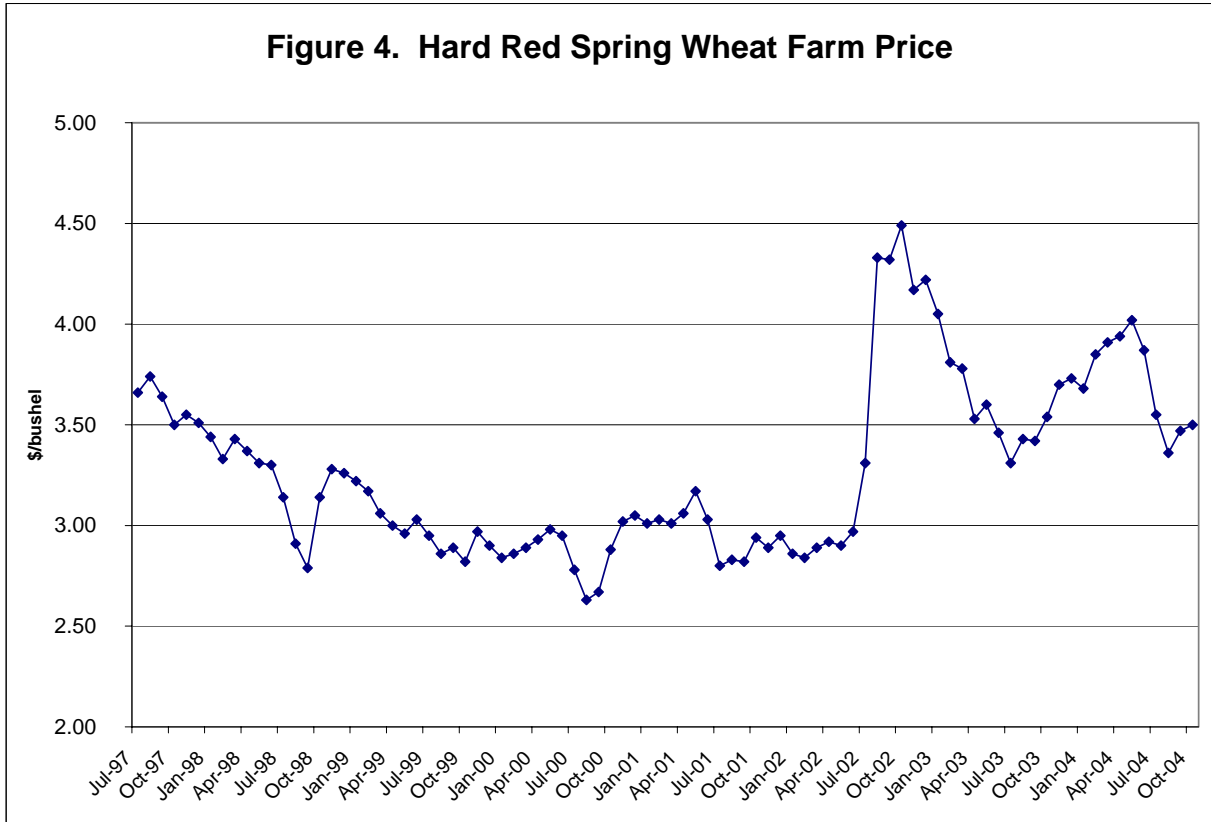
Figure 4. Hard Red Spring Wheat Farm Price

Table 4. Estimated Annual Effects of Reduced Hard Red Spring Wheat Imports on Price and Revenue

	90 % lower limit	Mean	90% upper limit
1997/98-2001/02 Average annual imports (million bushels)		48.76	
Annual imports since duties (million bushels)		0.286	
1997/98-2001/02 Average farm price ($/bushel)		3.02	
Price increase from reduced imports ($/bushel)	0.045	0.154	0.264
1997/98-2001/02 Average production (million bushels)		480.6	
Production increase from reduced imports (million bushels)	2.5	8.6	14.7
Price effect (million $)	21.7	74.2	126.8
Substitution effect (million $)	7.6	26.0	44.4
Dual effect (million $)	0.1	1.3	3.9
Total effect (million $)	29.3	101.5	175.0

The increase in price also leads to an increase in production, and domestic sales replace imports. As Figure 3 shows, a higher price results in an increase in production. To estimate the changes in production, we use information on U.S. supply elasticities for HRS wheat. Koo et al. (1999) estimate an own-price supply elasticity of 0.3 for spring wheat, while results from a model developed by Koo and Mattson (2002) indicate an elasticity of 0.4. An elasticity of 0.35 is assumed for this study. The 5.1 percent increase in price is found to cause an increase in HRS wheat production of 1.8 percent, or about 8.6 million bushels per year. This increase in production leads to an additional increase in revenue, from the substitution and dual effects, of $27.3 million per year. The 90 percent confidence interval for these effects ranges from $7.7 million to $48.3 million per year.

The total increase in revenue for the U.S. HRS wheat industry is estimated to be $101.5 million per year, with a 90 percent confidence interval ranging from $29.3 million to $175.0 million per year. This increase in revenue is attributable to a reduction in HRS wheat imports from Canada. Some of this drop in Canadian HRS wheat exports to the United States could be due to a declining U.S. dollar and lower than normal Canadian production. However, a substantial part is due to the duties.

CONCLUSIONS

Detailed analysis of U.S.-Canada wheat trade since the U.S. duties on imports of Canadian HRS wheat suggests that these duties have been highly successful in reducing Canadian wheat exports to the United States. U.S. imports of Canadian wheat classified as HRS wheat have declined significantly, nearly stopping, since duties were imposed by the U.S. government in October 2003. At the same time, Canadian exports of wheat classified as "other" wheat have increased noticeably. A substantial increase in production of wheat in Ontario in 2003, and a corresponding increase in Ontario wheat exports to the United States, indicates that much of the other wheat imported from Canada could be soft red winter wheat.

An HRS wheat farm price model is developed and estimated to determine the effects of the drop in imports on prices received by farmers. Results show that HRS wheat supply is an important determining factor for HRS wheat farm price, as expected, and that HRW wheat supply also has a significant effect since it is a close substitute. Wheat supplies in the rest of the world could also have some effect, but this factor is not found to be significant. The substantial decline in HRS wheat imports from Canada from the 1997/98 - 2001/02 levels to the current levels since the duties were imposed has led to a $0.15 per bushel increase in the spring wheat price received by farmers, according to the results of our model. With an average yearly HRS wheat production of 480.6 million bushels, this price increase results in an annual income increase of $74.2 million. This is revenue gained strictly due to the price effect. The increase in price also leads to an increase in production, and domestic sales replace imports. This increase in production leads to an additional increase in revenue of $27.3 million per year. The total increase in revenue for the U.S. HRS wheat industry is $101.5 million per year.

Some of the decline in Canadian HRS wheat exports to the United States could be due to a

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weakening U.S. dollar and below average Canadian production. However, the sudden, dramatic drop in HRS wheat imports, as imports of other classes of wheat increased, suggest that the antidumping and countervailing duties are the main contributing factor to the decline in U.S. HRS wheat imports.

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