Supply Response for Durum Wheat in Canada

By

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Introduction

Canada is the top producer and exporter of durum wheat globally, with durum accounting for roughly 20% of prairie wheat acreage each year. Canada Western Amber Durum (CWAD) is a type of wheat that is rich in protein and gluten and is mainly used to make semolina flour for pasta and couscous production. The Canadian Wheat Board (CWB) had complete monopoly control over the buying and selling of durum wheat grown for human consumption or export in Western Canada, until August 1, 2012. However, the elimination of the CWB's monopoly/monopsony powers in 2012 was due to domestic and international political pressure, and state trading enterprises (STEs) such as the CWB, have faced heightened scrutiny from WTO members. The benefit of the CWB's single desk was a topic of debate within Canada, as some agricultural organizations on the prairies desired the ability to sell their wheat independently. The purpose of the research presented in this paper is to examine the impact of the CWB's monopoly on Canadian durum sales on the supply response for durum among Canadian producers (Carter & Ferguson, 2020).

The CWB was created by the Parliament of Canada on July 5, 1935, as a mandatory producer marketing system for wheat and barley in Alberta, Saskatchewan, Manitoba, and a small portion of British Columbia. Farmers in regions under the CWB's jurisdiction were prohibited by law from selling their wheat and barley through any other channels than the CWB. Although frequently referred to as a monopoly, it was a monopsony because it was the only wheat and barley buyer. It was a marketing agency that worked on behalf of Western Canadian farmers and passed all of its operating profits back to farmers. Under the CWB system, farm and grain industry decision-making was typically influenced by non-market incentives, resulting in production and marketing inefficiencies (Carter & Ferguson, 2020).

The present study builds on the of the literature evaluating the ex post economic impact of the removal of STE powers. Carter and Ferguson (2019) found that malt barley production became more concentrated around malt plants after the end of the Canadian single-desk. In another paper, Carter and Ferguson (2019) showed that the elimination of the CWB's single desk had a notable effect on the overall durum wheat production in Western Canada, causing a shift in the distribution of durum wheat acres from marginal growing areas to drier regions, resulting in an increase in specialization that arguably improved the efficiency of resource allocation. Further assessments of the policy change have also examined its impact on trade opportunities. According to Bekkerman, Schweizer, & Smith (2014), the absence of the CWB's single-desk marketing authority may offer Western Canadian farmers new marketing opportunities for grains.

Significant additions to the previous work include: a longer data set, with an additional six years of post-CWB data; Carter and Ferguson paper (2020) titled "State Trading Deregulation and Prairie Durum Wheat Production," which only had four years of post-CWB data, from 2012 to 2016, Improved moisture data, which considers not only spring rainfall but also winter precipitation; and a novel method of accounting for the end of the CWB monopoly, with an indicator variable implemented over three years.

The paper is organized into six sections, starting with a discussion of durum marketing on the prairies before and after deregulation. After that, the theoretical model underpinning the empirical analysis is introduced, followed by an overview of the data sources used. The fourth section of the paper describes the empirical approach and procedure carried out for the research. The next-to-last section of the paper presents and discusses results, with the final section stating conclusions, and providing suggestions for future work.

Durum Marketing on The Prairie Before and After Deregulation

Durum wheat (Triticum durum) is a variety of wheat that is primarily used for making food products like pasta, couscous, and bulgur. Canada is the world's largest producer and exporter of durum wheat, with durum accounting for approximately 20% of Prairie wheat acreage in a typical year. The primary class of durum grown in Canada is Canada Western Amber Durum (CWAD), which is rich in gluten and protein and is predominantly used for making semolina flour, the main ingredient in pasta and couscous production. (Carter & Ferguson, 2020).

The Canadian Prairies' arid regions are ideal for growing durum wheat, with production primarily concentrated in southern Saskatchewan and southern Alberta, as illustrated in Figures 1. Due to the frequent occurrence of diseases like Fusarium head blight in Manitoba, there is very little durum production in that region (Sask, 2019). Durum production also takes place in the wetter areas of the Prairies, although the crop quality tends to be lower.

Figure 1: Map of the wheat and durum wheat producing area in Canada (Sask, 2019)

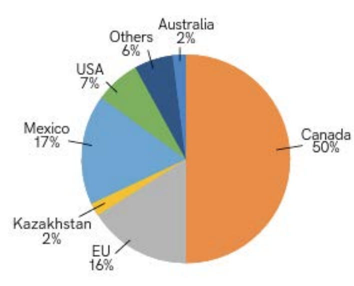

Figure 2: Top Exporters of Durum Wheat for 2015/16(July/June)
(Total world exports of 8.7 million tonnes) (Sask, 2019)

The Canadian Wheat Board (CWB) was created by the Canadian Parliament on July 5, 1935, as a marketing organization for wheat and designated barley in Western Canada. The Canadian Wheat Board (CWB) had exclusive authority to sell wheat, durum, and barley produced by farmers in Western Canada for both export to global markets and for human consumption within the domestic market (Schmitz, Furtan, Brooks, & Gray, 1997). Although often referred to as a monopoly, it was a monopsony as it was the only buyer of wheat and barley. The CWB acted as a marketing agency on behalf of Western Canadian farmers and returned all profits from its operation back to the farmers (Carter & Ferguson, 2020).

Under the CWB, producers could choose the types and amounts of wheat to plant, but they could not market their wheat until the CWB announced the quantity and quality of wheat that they were willing to purchase. Throughout the year, the CWB would call for deliveries, requiring farmers to store their wheat until the CWB was able to sell it. During the crop year, the CWB would issue delivery calls, requesting specific types and quantities of wheat from the producers. One of the main features of the CWB's single-desk system was "price pooling," where all producers were paid the average price received by the CWB in the durum pool for a given crop. (Carter & Ferguson, 2020).

In the crop years of 2008-2009 and 2009-2010, the limitations and complexity of the CWB's single-desk system became apparent as it was unable to accept all the durum wheat offered by producers. This resulted in producers having to either store their durum or sell it in the feed market at lower prices to generate some income. On August 1, 2012, the Marketing Freedom for Grain Farmers Act (also known as Bill C-18) was enacted, which ended the CWB's monopoly on marketing wheat and barley for farmers (Carter & Ferguson, 2020).

Material and Methods

Theory

The literature on supply response has undergone significant empirical and theoretical changes, leading to the development of two main frameworks. The first is the Nerlovian partial adjustment model, which allows for the analysis of both the speed and level of adjustment from actual to desired output. The second is the supply function approach, which is based on a profit-maximizing framework and requires the simultaneous estimation of input demand and output supply equations, as well as detailed input prices. The main focus is on the acreage supply function. The present study employs an econometric approach that aligns with the partial adjustment framework (Haile & Kalkuhl, 2013). There have been various applications of the Nerlovian model, including modifications to the original framework. Models of crop supply response can be formulated in terms of yield, area, or output response. For example, the desired planting area for a particular crop in a given period depends on expected output prices and other external factors(Braulke, 1982).

To accurately estimate the agricultural supply function, it is necessary to take into account the dynamic nature of supply response and incorporate the adjustments made over time. The Nerlovian model, which is a dynamic model, incorporates these adjustments through time and factors affecting the speed and magnitude of the adjustment are taken into account. According to Gujarati (1995), a model is considered dynamic if the time path of the dependent variable is explained by its past values. The Nerlovian model is autoregressive because it includes lagged values of the dependent variable (output) among its explanatory variables (Leaver, 2004). Nerlove's (1958) adaptive expectations model assumes that past prices determine expectations about future price levels, with more recent prices having a greater influence. In this model, sellers adjust their price expectations based on past forecasting errors, with changes in expected price being proportional to the deviation between actual and expected prices in the previous period. Producers are assumed to adjust output slowly to the desired level due to factors such as habit persistence, costs of adjustment, technological constraints, institutional rigidities, and overall caution (Henneberry & Tweeten, 1991).

The topic of acreage response to prices is of significant interest. a simplified version of the Nerlovian model may be helpful in understanding how to approach this topic:

$$A^* = \alpha + \beta P_t \quad (1)$$

$A_t - A_{t-1} = (1 - \gamma)\ (A_t - A^*_{t-1})$ (2)

$A* = \alpha + \beta Pt$ (*1*) refers to the desired acreage where:

A*: The desired acreage.

α: The intercept term of the equation, representing the minimum amount of land required for production, even if the price of the output is zero.

β: The slope of the equation, representing the responsiveness of the desired acreage to changes in the price of the output.

P_t: The price of the output.

The equation $A* = \alpha + \beta Pt$

(*1*) suggests that the desired acreage (A*) is a function of the price of the output (P_t). As the price of the output increases, the desired acreage will also increase, ceteris paribus. The intercept term (α) represents the fixed amount of land required for production, regardless of the price of the output. The slope (β) represents the extent to which changes in the price of the output affect the desired acreage. Equation $At - At_{-1} = (1 - \gamma)\ (At - A^*_{t-1})$

(*2*) models the actual acreage and suggests that the change in the acreage supplied (A_t - A_{t-1}) in a given time period is equal to a fraction of the difference between the current desired acreage (At) and the expected desired acreage based on past periods (A_t-1). The term "gamma" (γ) in the equation represents the weight or importance assigned to past expectations in determining the current acreage supplied. Through substitution and simplifications, we can derive the following specification:

$$A_t = (1-\gamma)\ \alpha + (1-\gamma)\ \beta\ P_t + \gamma A_{t-1} \quad (3)$$

where A_t is the acreage (or land size), P_t is the grower price per pound. The $At = (1-\gamma)\ \alpha + (1-\gamma)\ \beta\ Pt + \gamma At_{-1}$ (3) incorporates the behavior of producers that adjust their acreage when they realize that the desired acreage differs from the acreage realized in the previous year. The adjustment coefficient (1-γ) represents the speed at which the actual acreage changes to reach the desired acreage (Henneberry & Tweeten, 1991).

Data

The principal data source for seeded acreage is the Field Crop Reporting Series, released annually by Statistics Canada. These data are intended to provide accurate and timely estimates of seeding intentions, seeded, and harvested areas, production, yield, and farm stocks of the principal field crops in Canada at the provincial level. The focus of the paper is on seeded area because it is believed that acreage planted yields a better indication of the farmers' intention as the farmer has control over this variable (i.e., as opposed to production, which depends upon a host of other factors). Statistics Canada provides data on seeded area for each Small Area Data Region that corresponds to a Census Agricultural Region (CAR). The data also provide the total seeded area in acres for the provinces of Alberta, Saskatchewan, and Manitoba for the period between 1991 and 2022.

Precipitation data were collected for each province for the nine months leading up to durum harvesting, which typically occurs around the end of August in most Canadian Agricultural Regions (CARs) but may extend into October in certain areas. To assess the overall moisture level available to the crop at planting, the total precipitation between January and September was considered, as producers tend to increase their durum acreage in drier years (thus expecting an inverse relationship). Daily weather information was obtained from Environment Canada, with data specifically gathered from the Sakatoon, Edmonton, and Winnipeg stations located in the middle and southern regions of the provinces. Total precipitation was then calculated over the nine-month period for each year studied.

The annual prices for durum and wheat excluding durum are used as additional controls. The price data in Canadian dollars per tonne is derived from annual reports of CWB for the period 1991-2012. The annual reports of CWB are available in the publication part of the Government of Canada website. CWB published these reports from 1995, but the report for 1995 includes the price data from 1991 to 1995. The statements of operations and distributions of earnings to producers are provided in the reports. The final prices, rates per tonne, after deducting the CWB operating cost in Canadian dollars paid to producers by CWB, are our price data for 1991 to 2012. These prices are derived and manually added to our data. Price data in Canadian dollars per tonne for the remaining years from 2013 to 2022 are derived from the economic dashboard of the Alberta provincial official website. The data were collected monthly at the provincial level, and the annual averages for each province were calculated. Prices for wheat excluding durum are also included, since it is a closely related substitute product, and changes in its price can influence the supply response of durum wheat. To create a panel data set, the seeded area data were merged with price and weather data, covering a 32-year period across three provinces.

An indicator variable was included to capture the effect of the removal of the CWB monopoly on Canadian durum wheat sales. The value of that variable takes a value of zero prior to 2012. Then, it takes a value between zero and one during the "transitional" years from 2012 until 2015. Finally, it takes a value of one after the period of transition away from the CWB. CWB receives a value of 0.5 for three years from 2012 to 2015 because it continued until 2015. rom 2012 to 2015, the Canadian Wheat Board (CWB) went through significant changes after the Canadian government removed its monopoly on the marketing of Western Canadian wheat and barley. Prior to these changes, farmers were required to sell their grain to the CWB, which handled the marketing and sale of the grain to buyers around the world. However, in 2011, the government passed a law that ended the CWB's single desk selling authority. This allowed farmers to sell their grain to any buyer they chose, leading to a more open and competitive grain market. As a result, the role of the CWB shifted significantly during this period, and it had to adapt to the new reality of competing with other companies in the marketplace. In 2015, the CWB was officially privatized and continues to operate as a private company focused on grain marketing and handling (Zhang, J., Meilke, K. D., & Swinnen, J, 2020).

A Wooldridge test was conducted as one of the specification tests for the present panel data, which found no evidence of autocorrelation in the model. The test statistic for the Wooldridge test is $F(1, 2) = 5.514$, and the associated p-value is 0.1434. Since the p-value is greater than the significance level of 0.05, the null hypothesis cannot be rejected. Therefore, there is no evidence of first-order autocorrelation present in the model. This suggests that the assumption of no autocorrelation in the errors is reasonable and that the panel data model is a good fit for the data.

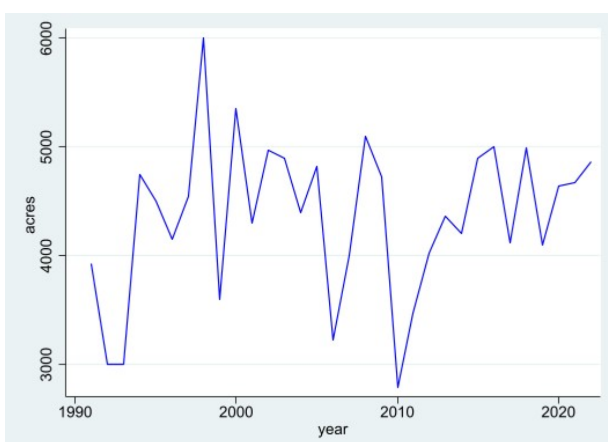

Figure 3: The variation in acres of durum wheat over time in Saskatchewan

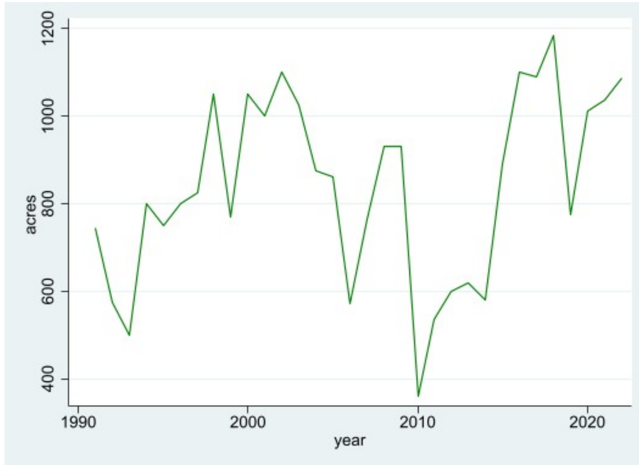

Figure 4: The variation in acres of durum wheat over time in Alberta

In Saskatchewan and Alberta, as shown in Figure 3 and Figure 4 and, the lowest acreage of durum was in 2010. During the 2008-2010 crop years, the Canadian Wheat Board's (CWB) single-desk system faced criticism due to its restrictive nature. Due to the CWB's inability to accept all of the durum wheat produced by farmers in 2010, there were concerns that the organization would incur a deficit in the 2009-2010 durum pool. As a result, the CWB ceased accepting producer deliveries, leaving farmers with two options - to store their durum or sell it to the lower-priced feed market to generate cash flow. These issues may have led to a decrease in seeded acreage in 2010.

Procedure

Table 1: Variable Description for Derived panel Poisson regression and Descriptive Statistics

Variable	Description	Number of observations	Mean	Std.dev	Min	Max
A_{it}	Acres seeded to durum wheat in province i in year t, in thousands	96	1750.637	1929.828	0	6000
$A_{i,t-1}$	Lagged one period acreage of durum wheat (in thousands of acres)	-	-	-	-	-
M_{it}	Total of precipitation in province i and in year t in mm for 9 months before harvesting of durum wheat representing moisture in soil	96	355.6073	113.2782	115.5	692.3
P_{Dit}	Durum price in province i and in year t (C$ /tonne)	96	264.902	96.89295	125	588.45
P_{owit}	Wheat excluding durum price in province and in year t (C$ /tonne)	93	213.6671	56.28684	128.58	402.19
CWB_t	CWB dummy which gets a value of 0 before 2012, 0.5 for transition years (2013,2014,2015), and 1 after 2012	96	.265625	0.4164583	0	1
δ_{it}	fixed effects account for ssignificant portion of the geographic variation explains durum wheat acreage, such as long-term climate averages and soil characteristic	-	-	-	-	-

Based on $A_t = (1-\gamma)\,\alpha + (1-\gamma)\,\beta\, P_t + \gamma A_{t-1}$ (3 of the simplified Nerlove model in the theory section above, durum acreage response is a function of prices, lagged acreage, and other control variables including weather variables. In research on agricultural supply response, previous studies have used acreage, yield, or production as indicators for desired output supply. However, this paper specifically focuses on seeded area as it is believed to be a more accurate reflection of the farmer's intention, as farmers have control over this variable, unlike production which can be influenced by a variety of factors such as weather and other agronomic conditions during the growing season. By using planted acreage as a dependent variable, this can help to reduce endogeneity bias in estimating supply elasticity (Haile & Kalkuhl, 2013). Lagged acreage within the partial adjustment framework detailed above is included to capture soil conditions or land constraints.

The inclusion of crop price in models of supply response is self-explanator, but prices of substitute crops are also frequently included for the same reasons that prices of close substitutes are included in demand models. For supply response, as the expected relative price of a substitute crop becomes more favourable, farmers may choose to plant the substitute crop instead. These factors are incorporated into the simplified Nerlove model to capture the complex decision-making process that farmers face when deciding which crops to plant. In this case, given rotational considerations in the Canadian prairie provinces upon which this research focuses, the price of alternate wheat types were included as the closest substitute for durum acreage.

Total precipitation for the nine months prior to the normal seeding date of April 15th is included as an explanatory variable for durum acreage in each province. Producer decisions consider the total moisture available to the crop at planting since durum acres being higher in years that are drier (so the relationship is expected to be inverse). Prices for wheat excluding durum are also included, since it is a closely related substitute product, and changes in its price can influence the supply response of durum wheat. Table 1, provides Variable Description for Derived panel Poisson regression with panel fixed effects and descriptive statistics for the data. The model for durum acreage is :

$$A_{it}= \beta_0 + \beta_1 A_{it-1} + \beta_2 P_{Dit} + \beta_3 P_{OWit} + \beta_4 CWB_t + \beta_5 M_{it} + \delta_{it} + e_t \quad (4)$$

The statistical model used in the empirical analysis is a panel Poisson regression with panel fixed effects. This modeling approach is suitable for accommodating observations with zero production, which may occur in areas with marginal durum production. The inclusion of panel fixed effects in the model helps control for unobserved heterogeneity across regions (Carter & Ferguson, 2020). The panel-specific fixed effect captures unobserved heterogeneity that is constant over time within each panel; by including these fixed effects the model controls for unobserved heterogeneity and avoids bias in the estimation of the coefficients of the time-varying covariates. The CWB variable is an indicator that equals zero before 2012, a value between zero and one during the transitional years after its monopoly was removed but while it was still marketing grain, and a value of zero after it ceased operations in 2015.

The Hausman test, as one of the specification tests, is used to determine whether a fixed effects (FE) or random effects (RE) model is more appropriate for the panel data analysis. The test compares the coefficients obtained from the FE and RE models and tests whether the difference in coefficients is systematic. The null hypothesis (H_0) is that the difference in coefficients is not systematic, meaning that either model can be used. The alternative hypothesis (H_a) is that the difference is systematic, indicating that one model is preferred over the other. The output of the test shows the coefficients for the FE and RE models, as well as the difference between the two sets of coefficients and their standard errors (Hausman, 1978). The chi-squared test statistic is calculated using the difference in coefficients and their covariance matrix, and is compared to a critical value from the chi-squared distribution with degrees of freedom equal to the number of coefficients being compared (Hausman & Taylor, 1981). The results suggest that there is little difference between the coefficients estimated by the FE and RE models. Therefore, it may not matter which model is used in this case. However, it is recommended to use fixed effects (FE) models. Since there are three provinces considered in the paper and using random effects (RE) models may not be appropriate as the province-specific effects cannot be estimated precisely with a limited number of clusters. FE models, on the other hand, can control for time-invariant unobserved heterogeneity and can provide unbiased estimates for the within-province variation.

The Modified Wald test for groupwise heteroskedasticity is a statistical test used to determine if there is significant heteroscedasticity in a fixed effect regression model. Test results implied heteroscedasticity in the fixed effect regression model; to address this the model was run using a clustered standard errors approach to yield heteroskedasticity-consistent standard errors (Wooldridge, 2010).

Given the dynamic nature of agricultural supply response, the panel dataset may contain nonstationary variable series (Haile & Kalkuhl, 2013). The Levin-Lin-Chu (LLC) test, a popular panel unit root test commonly used in applied research, is based on the principle of pooling the test statistics across individual units in the panel to increase the power of the test, is a panel unit root test used to determine whether a time series variable is stationary or non-stationary (Levin, Lin, & Chu, 2002). The LLC test is suitable for testing the presence of unit roots in panel data as it accounts for the presence of cross-sectional dependence among the individual units in the panel. It has been shown to have good size and power properties in finite samples, and it is robust to a wide range of specifications and types of cross-sectional dependence. The LLC test also accounts for cross-sectional dependence in panel data and is robust to the presence of serial correlation and heteroscedasticity (Maddala & Wu, 1999). The p-values for the LLC test (Table 2) are less than 0.05 indicating that the panel data are stationary.

Table 2:Panel Unit Root Test Results, P-values

Variable	H_0: Unit Root P-value
Acres	0.023
Price of Durum Wheat	0.043
Price of Wheat Excluding Durum	0.026
Precipitation	0.0027

The short-run supply elasticity is the response of supply to a price change that occurs within a year. In contrast, the long-run supply elasticity measures the supply response to a price change that occurs after enough time has passed for the market to fully adjust. For instance, if the short-run supply elasticity is 0.10 and the long-run supply elasticity is 1, a one-time price increase of 10 percent would result in a 1 percent output increase in the short run and a 10 percent output increase in the long run.(Henneberry & Tweeten, 1991).

$$e_{sr} = \frac{\%\Delta Q}{\%\Delta p} = \beta \cdot \frac{\bar{P}}{\bar{Q}} \quad (5)$$

According to Henneberry and Tweeten (1991), the long-run supply elasticity can be calculated by dividing the short-run supply elasticity by the adjustment coefficient (1-w). The adjustment coefficient indicates the rate of adjustment of actual output to desired output, and a larger coefficient of the lagged dependent variable (w) implies a lower adjustment coefficient (1-w). As a result, it takes a longer time for output to reach its long-run equilibrium value following a price change. Conversely, a lower coefficient of the lagged dependent variable leads to a faster adjustment of output to its long-run equilibrium value, which in turn means that the short-run elasticity is closer to the long-run value (Henneberry & Tweeten, 1991).

Results:

Table 3: The impact on total durum wheat acreage

	Annual panel, 1991—2022 **Durum seeded acreage, thousands: durum_acres$_{it}$**
$A_{i, t-1}$	0.0000118** (0.00000389)
P_{Dit}	0.00131*** (0.0000447)
P_{owit}	-0.00220*** (0.0000949)
M_{it}	-0.000157*** (0.0000287)
CWB	0.131*** (0.00794)

Observations	93
Year fixed effects	YES
Province fixed effects	YES
Number of provinces	3
Wald chi-square statistic	1464.71

Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001

The regression coefficient for CWB in **Error! Reference source not found.** suggests that the removal of the CWB monopoly resulted in a 13.1% increase in the seeded acreage of durum wheat. This finding is consistent with the results of Carter and Ferguson (2020), who found a similar increase of around 14% in durum wheat acreage after the removal of CWB. In addition, Carter and Ferguson (2019) observed that the deregulation of the CWB also resulted in an expansion of malt barley production in regions with higher average July temperatures. The Wald chi-square statistic of 1464.71 in this Poisson regression analysis indicates that the model is statistically significant since the p-value of the chi-square test is zero which is less than 0.05.

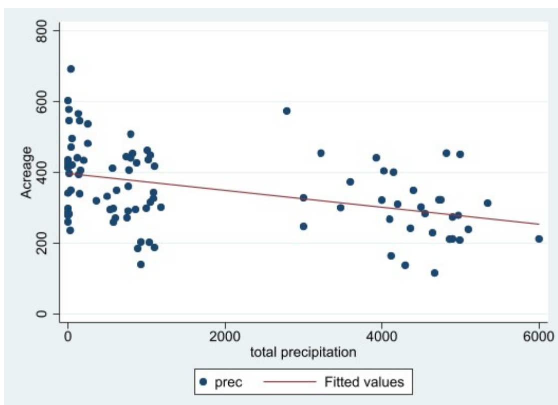

Figure 5: Scatter plot of durum wheat Acreage vs. precipitation

Total precipitation, representing total moisture, had a negative and statistically significant effect on the acres of durum seeded. Figure 5, Shows this negative relationship. Since durum is typically grown in arid areas, this negative relationship between total moisture and durum acreage was expected.

Durum prices had a positive and significant effect on durum seeded area, while other wheat prices had a negative and significant effect. These findings are consistent with expectations of a positive own-price elasticity and negative cross-price elasticity. Specifically, a 1% increase in durum price is associated with a 0.131% increase in acreage, while a 1% increase in other wheat prices is associated with a 0.22% decrease in acreage.

The effect of lagged acreage is also significant and positive, as expected based on the Nerlovian model. Carter and Ferguson (2020) did not include the effect of lagged acreage in their model, although this is an important variable in the Nerlovian model since it captures the target level of acreage that farmers aim to plant each year.

Overall, the findings suggest that the removal of the CWB monopoly had a significant positive impact on durum wheat acreage, while other factors such as durum and other wheat prices, precipitation, and lagged acreage also played important roles in predicting the total acreage of durum wheat.

The short-run elasticity of the supply response of durum wheat acreage to its own price is calculated as 0.176. To calculate this, the coefficient of the product's price in the regression of durum wheat acreage on its lagged acreage and price of other wheat should be multiplied by the mean of durum wheat prices divided by the mean of its acreage. The long-run elasticity is calculated as 0.2, derived by dividing the short elasticity of durum by one minus the coefficient of lagged acreage. Therefore, a one percent increase in durum wheat prices in the short run leads to a 17% increase in seeded acreage for that product, while in the long run it leads to a 20% increase in seeded acreage. As expected, short-run elasticities are generally smaller than long-run elasticities for all seven commodities. Research conducted by Bond (1985) on Sub-Saharan African countries indicates that the long-term price elasticities are greater than those of the short-term, and that they are of a substantial magnitude. (Magrini, Balié, & Morales-Opazo, 2018). Additionally, the short elasticity of the supply response of durum wheat acreage to its own price before the removal of CWB, from 1991 to 2012, is 0.201, and after the removal of CWB, it is 0.131. The sensitivity of farmers to durum prices also decreased by about 7% after the removal of CWB. This difference is more significant in the long run, as before the removal of CWB, the elasticity was about 0.23, while after it was about 0.065. The difference in elasticity in the long run before and after the removal of CWB is about 17%.

Conclusion

The Canadian Wheat Board (CWB), previously a government agency, had a significant role in the global wheat trade. However, the CWB was deregulated due to various factors such as demands from domestic farmers and pressure from the World Trade Organization. The elimination of the CWB's statutory marketing authority created an opportunity in which it was possible to examine the effects of the change on the production of Western Canadian durum wheat. This study suggests that the deregulation of the CWB single-desk resulted in an increase in durum acreage, particularly in drier areas. Overall, Canada's comparative advantage in producing high-quality durum with consistent traits contributed to the expansion of durum acreage.

Suggestions for future work

one suggestion is to conduct comparative studies with other durum wheat producing countries to determine the impact of the removal of a single-desk system on durum wheat production. While this study focused on Canada, other countries may have experienced similar changes in their durum wheat production after deregulation. Comparing these experiences could help to identify commonalities and differences in the response to deregulation, providing insights into the factors that shape production responses.

It is also important to consider the impact on other stakeholders such as processors or consumers. While this study focused on the impact on producers, there may be other groups that were affected by the removal of the CWB monopoly. Understanding these impacts could help to identify potential winners and losers from deregulation and inform policy decisions aimed at managing these impacts.

Another suggestion for future research is to examine the heterogeneous impact of the elimination of the CWB monopoly on different types of durum wheat producers in Western Canada. While this study examined the overall impact of deregulation, there may be important differences in the response of different types of producers. For example, larger producers may have had different responses to deregulation than smaller producers. Understanding these differences could provide insights into the factors that shape production responses and inform policy decisions aimed at managing these impacts.

Finally, it is important to analyze potential spillover effects on other crops or sectors in the agricultural industry. Deregulation of durum wheat production may have had impacts on other crops or sectors, as farmers adjust their production decisions in response to changes in the market.

Understanding these spillover effects could provide insights into the broader impacts of deregulation on the agricultural industry.

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