

## **Table of Contents**

|         |   |    |
|---------|---|----|
| 1.      | Introduction.....   | 8  |
| 2.      | The International Prices of the Agricultural Products and its Effect on the Domestic Markets..... | 10 |
| 2.1     | Price Transmission.....   | 10 |
| 2.2     | Distributions of the Damages and Benefits.....  | 12 |
| 2.2.1   | At Country Level.....   | 12 |
| 2.2.2   | At Household Level.....   | 12 |
| 2.3     | Empirical Analysis of the International Cereal Prices.....  | 13 |
| 2.4     | The Chilean International Trade Policy.....   | 14 |
| 2.4.1   | The Chilean Trade Agreements and its Relation with the Domestic Agriculture Sector.....           | 15 |
| 3.      | The World Wheat Market.....   | 16 |
| 3.1     | The Main Producers.....   | 17 |
| 3.2     | The Main Exporter Countries.....  | 18 |
| 3.3     | The Main Importer Countries.....  | 19 |
| 3.4     | The Chilean Wheat Market.....   | 20 |
| 3.4.1   | The Chilean Agricultural Structure and Situation.....   | 22 |
| 3.4.2   | The Chilean Wheat Price Band Mechanism.....   | 23 |
| 3.4.2.1 | The Relevant Markets.....   | 23 |
| 3.4.2.2 | The FOB Price Estimations.....  | 24 |
| 3.4.2.3 | Band to Import Costs.....   | 24 |
| 3.4.2.4 | Specific Rights and Tariff Reductions.....  | 25 |
| 3.4.2.5 | The Reference Markets and the Band Operation.....   | 26 |
| 3.5     | The Argentinean Wheat Market.....   | 27 |
| 3.5.1   | The Argentinean Agricultural Structure and Situation.....   | 28 |
| 3.6     | The United States Wheat Market.....   | 30 |
| 3.6.1   | The United States Agricultural Structure and Situation.....                                       | 32 |
| 4.      | Theoretical and Methodological Background.....  | 35 |
| 4.1     | The Co-Integration Analysis.....  | 36 |
| 4.1.1   | Autoregressive Process.....   | 36 |
| 4.2.2   | The Specification of the Model.....   | 39 |
| 4.2.3   | Augmented Dickey Fuller Test for Unit Root.....   | 41 |

|         |   |    |
|---------|---|----|
| 4.2.4   | The Cointegration Concepts.....                           | 42 |
| 4.2.4.1 | The Cointegration Test.....                               | 44 |
| 4.2.4.2 | The Causality Test.....                                   | 45 |
| 5.      | Data Analysis.....  | 47 |
| 5.1     | Basis for the Data Analysis.....                          | 47 |
| 5.2     | The Models.....   | 49 |
| 5.2.1   | The General Models.....                                   | 49 |
| 5.2.2   | The Weighted Models.....                                  | 55 |
| 6.      | Results and Discussion.....                               | 61 |
| 6.1     | Discussion on the Weighted Models.....                    | 61 |
| 6.1.1   | Discussion on the Loading Parameters.....                 | 62 |
| 6.2.2   | Discussion on the ECT Parameters.....                     | 64 |
| 6.2.3   | Discussion on the Dummy Variables.....                    | 65 |
| 6.2     | General Shortcomings and Alternatives for the Models..... | 66 |
| 7.      | Conclusions.....  | 69 |
| 8.      | Bibliografic References.....                              | 71 |
| 9.      | Appendix.....   | 78 |

## **List of Tables**

|  |    |
|--|----|
| Table 1: World wheat supply and demand.....  | 17 |
| Table 2: World wheat producers, on average terms, among the seasons 2002-2004... ..  | 18 |
| Table 3: The Chilean wheat imports registered for 2007.....  | 20 |
| Table 4: Average interment cost for wheat in 2007.....   | 20 |
| Table 5: Comparative analysis of industrial quality for imported wheats.....   | 21 |
| Table 6: Domestic wheat prices behaviour with respect to the Chilean productive regions.....                                     | 22 |
| Table 7: The price band estimation.....  | 24 |
| Table 8: Argentinean wheat production and its sales situation until September 2008. ....   | 28 |
| Table 9: Benefits received by the USA farmers from the “Law-1990” .....  | 34 |
| Table 10: Description of the time series variables of the research.....  | 47 |
| Table 11: Results from the Augmented Dickey-Fuller test for each variable.....   | 49 |
| Table 12: Johansen cointegration test results.....   | 49 |
| Table 13: Results of the Granger and Instant Causality tests.....  | 53 |
| Table 14: Residual analysis.....   | 54 |
| Table 15: Results from the Augmented Dickey-Fuller test for each variable.....   | 55 |
| Table 16: Johansen cointegration test results.....   | 56 |
| Table 17: Results of the Granger and Instant causality tests.....  | 59 |
| Table 18: Residual analysis.....   | 60 |
| Table 19: Regression statistics related to the correlation index for DOM_CH with respect to WGHT_PRICE, HRW_USA and PAN_ARG..... | 63 |

## **List of Figures**

|  |    |
|--|----|
| Figure 1: World wheat importers.....   | 19 |
| Figure 2: Regional areas in Chile.....   | 21 |
| Figure 3: The Argentinean production and its area evolution.....   | 27 |
| Figure 4: The cereal production zones in Argentina.....  | 29 |
| Figure 5: FOB prices behaviour for USA wheat varieties among 1991 and 2007.....                          | 31 |
| Figure 6: The cereal production zones in the United States.....  | 32 |
| Figure 7: Co-movement of wheat prices for PAN_ARG, HRW_USA and<br>DOM_CH.....                            | 50 |
| Figure 8a: Results of the stability test for break points (Chow test) for the model with<br>D_BAND.....  | 51 |
| Figure 8b: Results of the stability test for break points (Chow test) for the model with<br>D_MECH.....  | 51 |
| Figure 9: Relationships on the ECT for Argentinean and USA coefficients.....                             | 55 |
| Figure 10: Co-movement of wheat prices for DOM_CH and WGHT_PRICE prices...                               | 56 |
| Figure 11a: Results of the stability test for break points (Chow test) for the model with<br>D_BAND..... | 57 |
| Figure 11b: Results of the stability test for break points (Chow test) for the model with<br>D_MECH..... | 57 |

## **List of Appendix**

|  |    |
|--|----|
| 9.1. Data for the Analysis   |    |
| 9.1.1. Descriptive Statistics of the Time Series.....                            | 78 |
| 9.1.2. Augmented Dickey Fuller Tests for the variables.....                      | 78 |
| 9.1.3. Co-integration test for the proposed models using the Johansen approach.. | 78 |
| 9.1.4. Granger Causality and Instant Causality tests.....                        | 79 |
| 9.1.5. Residuals Analysis for the Estimated Models.....                          | 79 |
| 9.2. Productive Aspects of the Chilean Wheat Sector .....                        | 80 |
| 9.2.1. White Wheat Production.....   | 80 |
| 9.2.2. Durum Wheat Production.....   | 80 |

## **List of Abbreviations**

|         |   |
|---------|---|
| CEPAL   | Economic Commission for Latin America and the Caribbean |
| COTRISA | Chilean Office for Wheat Commercialization              |
| FAO     | Food and Agriculture Organization of the United Nations |
| FTA     | Free Trade Agreement                                    |
| IICA    | Inter-American Institute for Cooperation on Agriculture |
| IMF     | International Monetary Fund                             |
| MINAGRI | Chilean Ministry of Agriculture                         |
| MECON   | Argentinean Office for Agricultural Markets             |
| MFN     | Most Favoured Nation Tariff                             |
| ODEPA   | Chilean Office for Agricultural Policies and Studies    |
| OECD    | Organisation for Economic Co-Operation and Development  |
| SNA     | Chilean Agriculture Association                         |
| USDA    | United States Department of Agriculture                 |