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THE POLITICAL ECONOMY OF AGRICULTURE AND FOOD POLICIES IN ARGENTINA DURING THE XXI CENTURY: AN EMPIRICAL ESTIMATION OF THE ELECTORAL RESPONSE AT THE NATIONAL, PROVINCIAL, AND LOCAL LEVEL, AND ITS CONCEPTUAL RELATIONSHIP WITH LOBBYING, ADVOCACY, AND DEMONSTRATIONS

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Policy Studies

by
Matias Gabriel Nardi
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Accepted by:
Carlos E. Carpio, Committee Chair
Todd D. Davis
Stephen L. Sperry
William A. Ward
ABSTRACT

The political economy of Argentina in the XX and early XXI century has been characterized by the difficulty of establishing a sustainable path of balanced and integrated development due to the social, economic, and political conflict between rural and urban, agriculture and industry, high class versus low class, Radical or Justicialist party supporters which generated stop and go cycles. This Dissertation analyzes the political economy of agriculture and food policies in Argentina during the first decade of the XXI century through a conceptual framework that takes into account politics, policies, economics and social responses through voting, lobbying, advocacy and demonstrations in order to shed light on the nature of this conflict.

This study employs economic voting and political referendum empirical models to estimate the effect of agricultural and food policies enacted in Argentina between 2002 and 2010 in the electoral results for the incumbent party, Partido Justicialista-Frente para la Victoria, in the elections of 2001, 2003, 2005, 2007, and 2009. The electoral response is estimated using aggregate-level data at the department level through Ordinary Least Square and Seemingly Unrelated Regression estimation techniques and controlling for wealth, education, age, and sex.

This research found an overall effect between agricultural revenue taxed away by the national government and the difference in voting for the PJ-FpV during the last four election periods across four different social cleavages: urban-rural, center-periphery, agriculture-industry, and class. This research also found an effect between layers of
government, nation versus province and nation versus department, but no effect for the different branches of government (executive and legislative) was found.

Given that the rural farming population does not have a voting density comparable to that of the urban wage earning population in Argentina, farming organizations will have to affect policymaking via other social responses, lobbying or interest group access and advocacy coalitions. However, if these two other ways to produce a change in the policy process fail, they will have to resort to social demonstrations with the risks that social response entails.
DEDICATION

I learned from my father that all valuable things in life require hard work, sacrifices, and determination. I learned from my mother that patience is the cornerstone of all things that come to fruition. Therefore, this Dissertation is dedicated to my father, Julio Armando Nardi, and my mother, Lidia Dora Rodriguez.
ACKNOWLEDGMENTS

The topic for this thesis was the outcome of many trips to Argentina with my Advisor, Dr. Todd D. Davis, and the International Agribusiness Seminar courses of 2008, 2009 and 2010. I wish to express a sincere acknowledgement to Dr. Davis for his ability to inspire me to conduct research in an interdisciplinary and original way. His support and advice throughout Graduate School at Clemson University was a fundamental part of my education formation. I would like to thank Dr. Carlos E. Carpio, Stephen E. Sperry, and Dr. William A. Ward for their comments and suggestions when reviewing the manuscript, checking the models, challenging the assumptions, and questioning the validity of the results and conclusions.

There have been many important people that shaped my education while at Clemson University during both my Master of Science and PhD degrees. Professors Michael D. Hammig, Hoke S. Hill, Gary J. Wells, and Larry Bauer at the Department of Applied Economics and Statistics, were outstanding in teaching the fields of Agricultural Policy, Contemporary Public Policy, Globalization, Agricultural Prices, and Regression Models. Professors Scott L. Baier, Daniel K. Benjamin, Michael M. Maloney, Brad T. Thompson, and Patrick L. Warren at the Department of Economics provided solid foundations in the fields of Macroeconomics, Microeconomics, Financial Economics, Political Philosophy, and Political Economy. Professors Robert Becker, Bruce W. Ransom, and Holley H. Ulbrich, at the Strom Thurmond Institute guided me in the fields
Fellow classmates Casey J. Frid, Lori A. Dickes, Mark Mellott, and Marco Berger at the Policy Studies program were excellent peers to lean on for guidance, debates, and support. Going through the core and field courses, the preliminary and concentration examinations, and completing the Dissertation would not have been possible without them being there every week to talk, share meals, activities, and most of all, to band as a group of colleagues.

At Barre Hall and at Strom Thurmond Institute I was helped and supported by an incredible staff. I really appreciate the kindness and generosity received from Lynn Fowler, Cary Gaines, and Ellen Reneke at Barre Hall, and from Carolyn Benson and Diann Groomes at Strom Thurmond Institute. Without them, I would not have been able to complete all the forms and follow all the procedures in time as required by the respective departments and the Graduate School.

The research of this Dissertation would not have been possible without the help and support over many years of visits and meetings in Argentina with experts within the government sector. I appreciate the support received from Sandra Minvielle of the Direcccion Nacional de Estadisticas Electorales at the Ministerio del Interior and from Marcelo R. Ruiz from the Camara Nacional Electoral for their guidance on electoral law and electoral statistics. I appreciate the help from Consolacion Otaño, Ruben Ciani, Blanca Alonso, Norma Doban and Claudio Fonda from the Ministerio de Agricultura, Ganaderia y Pesca not only for providing agricultural statistics but also for explaining the
agricultural policies enacted in Argentina during the last two decades. I appreciate the support from the Equipo Especial from the Instituto Nacional de Estadisticas y Censos for building and preparing census statistics for Argentina and explaining the properties and limitations of the data. Also, I want to thank the support from Analia Vasallo at the Administracion Federal de Ingresos Publicos for guiding me through the fiscal revenue statistics of Argentina.

Interviews and meetings with experts across the private sector and the non-profit or non-government sector were fundamental as well for the development of the present research. I appreciate the time and help from the following experts: Carlos G. Haeberle and Santiago Sanchez (Aceitera General Deheza), Patricia Bergero y Rogelio Ponton (Bolsa de Comercio de Rosario), Carlos Guillermo Garcia (Bunge Argentina), Miguel Achaval and Roberto Eizmendi (Cactus Argentina), Patricio Allegri (Cargill Argentina), Noel Alonso Murray (Directorio Legislativo), Carlos Morad y Luis Moreyra (Direccion de Referencia Legislativa del Congreso de la Nación), Jorge Parizzia (Dow AgroSciences Argentina), Francisco Biener (Grupo Pancho), Ramiro Ruiz (Grupo SEMA), Eduardo Azzi y Marta Alvarez Molindi (JBS), Diego Feldman y Rodrigo Weisburd (John Deere Argentina), Jorge Rodriguez (Mercado de Hacienda de Liniers), Pablo Vaquero (Monsanto Argentina), Hernan Rodriguez Arias (Schutter Argentina), Gustavo Ferrero (Ser Beef), Ernesto Ambrosetti (Sociedad Rural Argentina), Pablo Ferres y Norma Giavarini (Terminal 6), and Hugo Vizca (Zeni Cereales).

I appreciate the motivation that my parents, Julio and Dora, my siblings, Maria Andrea, Alejandro, Fernando and Juan Pablo gave me to come to study to Clemson
University in the fall of 2003 to pursue a Master of Science in Agricultural and Applied Economics. Over the years, their visits, phone calls, and e-mails were a constant flow of support to continue my studies through Graduate School. Friends in Argentina have always encouraged me to pursue my studies in the United States. I appreciate the encouragement from all of them but especially from Agustin Cetrangolo and Tamara von Bernard. There are many others who have been with me during this great period of my life at Clemson, South Carolina. To all my fellow classmates, my friends, and my teachers, a special thanks.

Finally, I would like to thank my wife Maria Mercedes Rossi for her kindness and faith for without it I would not have been able to come this far as to complete and defend a Dissertation. During this endeavor, our first son, Mateo Nardi Rossi, was born. Thanks to him, I had the extra motivation to see this Dissertation completed.
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LIST OF ACRONYMS

AFIP ........................................................... Administración Federal de Ingresos Públicos
ANSES .................................................. Administración Nacional de la Seguridad Social
ARS ................................................................. Argentine Peso
BCRA ............................................................... Banco Central de la República Argentina
CIF ............................................................... Cost, Insurance, and Freight Price
ARS ................................................................. Argentine Peso
BCRA ............................................................... Banco Central de la República Argentina
CIF ............................................................... Cost, Insurance, and Freight Price
CNE ............................................................. Cámara Nacional Electoral del Ministerio del Poder Judicial
CONINAGRO ............................................ Confederación Intercooperativa Agropecuaria
CPI ................................................................. Consumer Price Index
CRA ............................................................. Confederaciones Rurales Argentina
CWE ............................................................. Carcass Weight Equivalent
DET ............................................................ Differential Export Tariff
DINE ............................................................ Dirección Nacional Electoral del Ministerio del Interior
EPH ............................................................. Encuesta Permanente de Hogares
ET ................................................................. Export Tariff
FAA ............................................................. Federación Agraria Argentina
FAS ............................................................. Free Alongside Shipment Price
FOB ............................................................. Free on Board Price
FpV .............................................................. Partido Frente para la Victoria
GCS ............................................................. Global Coordinate System
GDP ............................................................. Gross Domestic Product
GIS ............................................................. Geographic Information Systems
GMO ........................................................................................................... Genetically Modified Organism
GWR .......................................................... Geographically Weighted Regression Model
INCOTERM ........................................................ International Commercial Terms
IGN .......................................................... Instituto Geográfico Nacional
IMF ........................................................................................................ International Monetary Fund
INDEC ........................................................ Instituto Nacional de Estadísticas y Censos
INTA ........................................................ Instituto Nacional de Tecnología Agropecuaria
IT ............................................................................................................ Import Tariff
MAGyP ........................................................ Ministerio de Agricultura, Ganadería y Pesca
MAUP .......................................................... Modifiable Areal Unit Problem
MECON ........................................................ Ministerio de Economía y Finanzas Públicas
MIDP ................................................................................................ Misaligned Data Problem
NER ...................................................................................................... Nominal Exchange Rate
OLS .......................................................... Ordinary Least Square Model
ONCCA ........................................................... Organismo Nacional para el Control Comercial Agropecuario
PJ ................................................................. Partido Justicialista
PJ-FpV ........................................................ Alianza Partidos Justicialista-Frente para la Victoria
RER ................................................................................................ Real Exchange Rate
SENASA ................................................... Servicio Nacional de Sanidad y Calidad Agroalimentaria
SRA ................................................................. Sociedad Rural Argentina
SUR ........................................................................................ Seemingly Unrelated Regression
UCR ................................................................. Partido Unión Cívica Radical
USD.......................................................... United States Dollar
USDA.......................................................... United States Department of Agriculture
UTM.......................................................... Universal Transpose Mercator
WB.......................................................... World Bank
CHAPTER ONE
BACKGROUND AND INTRODUCTION

This chapter presents a background of the political economy of Argentina during the last decade. The background starts by describing the economic, social and political situation since 2002 and the new model of economic development implemented in Argentina after the Convertibility. Then the agricultural and food policies set by the Executive in order to reduce the domestic prices for agricultural commodities and food through export trade restrictions and subsidies are presented and discussed in relation to this new model.

This chapter continues with an introduction to the political economy of agricultural and food policy in the developing world and the conceptual framework usually employed when researching the relationship between politics and economics through policies. Given the lack of a clear understanding in the causality direction of policies between politics and economics, this Dissertation suggests a new framework that claims that indeed there is causality of politics towards policies and from policies towards economics and vice versa. However, this new framework claims that it is a circular causality relationship instead a two-way causality. Politics cause policies, but policies cause politics by affecting the socioeconomic process which in turn affects the political processes through a series of responses. These responses may take the form of direct voting, indirect voting, lobbying or interest group access, advocacy coalition, and demonstrations. After presenting the new framework, the problem statement and the
purpose of the Dissertation follow. The research questions of the Dissertation and the significance of this study are presented next. Finally, the outline of the Dissertation closes this background and introductory chapter.

**Economic, Social and Political Situation Since 2002**

Argentina suffered an economic, social and political collapse in December of 2001 and January of 2002. The gross domestic product (GDP) fell 4.4% in 2001 and 10.4% in 2002 (Figure 1.1) reducing the GDP to a level of 235 billion Argentine pesos (in 1993 constant ARS), the lowest level in over a decade (Figure 1.2). Unemployment, poverty and indigence reached historical highest levels. Unemployment peaked in 2001 and 2002 to 19% and 21% of the active economic population (Figure 1.3). Poverty peaked in 2002 and 2003 to 52% and 49% of the total urban population (Figure 1.4) while indigence peaked in the same years to 24% and 22% of the total urban population respectively (Figure 1.4). In the political arena, there were five presidents in 13 days. President Fernando de la Rua, elected on December 10, 1999, was forced to resign on December 21, 2001, amid the collapse of the country. Interim President Ramon Puerta called for an election within Congress and governors of the 23 provinces and the autonomous district. Given Argentina’s presidential line of succession, Ramon Puerta was the interim president as he was the president pro tempore of the Senate at that time, because the vice president, Carlos Alvarez, had resigned on October 6, 2000. Adolfo Rodriguez Saa, governor of San Luis, was elected president on December 23, 2001 but forced to resign on December 30, 2001. The new interim President, Eduardo Oscar
Camaño, Speaker of the House, called for a new election and Eduardo Duhalde was elected President on January 2, 2002. President Duhalde finished the original term of De la Rua in May 25, 2003. Nestor C. Kirchner became President from May 25, 2003 until December 10, 2007 in open elections, which he won by default with only 22.2% of the vote in the first round when former President Carlos Menem (24.4%) withdrew from the race. Cristina Fernandez de Kirchner succeeded her husband as President from December 10, 2007 until December 10, 2011, after winning the election with 45.3% of the vote, and a 22% lead over her nearest rival, thus avoiding the need for a runoff election. Finally, Cristina Fernandez de Kirchner won the reelection on October 23, 2011 with a record high support of 54% of the vote.

The Duhalde, Kirchner, and Fernandez de Kirchner administrations implemented a series of economic policies in order to promote economic activity, boost fiscal revenue and foreign exchange accumulation, increase employment and reduce poverty and indigence in Argentina (Narodowski and Panigo 2010). These series of economic policies follow Musgrave (1939 and 1959) and Keynes (1936) who argued about the government or the State key role in the economy. During periods of recessions and depressions, the government had the capacity: to use revenues from the budget, to use future revenue from the budget through the issuance of debt, to change the terms of trade, or to issue money, in order to increase the production of goods and services and to increase employment. This was especially useful when households and firms did not have the capacity to increase their income or expand their debt. Musgrave (1959) furthermore claimed that the
budget can conceptually be broken into three functions: stabilization function, allocative function, and transfer or redistributive function.

The series of economic policies implemented in Argentina since 2002 can be traced to Musgrave’s arguments about the role of the State in the economy, as they can be grouped in three distinct areas: to stabilize the economy in order to foster the supply of goods and services by the manufacturing and service sectors, to increase the total aggregate demand through a full employment economy, and to transfer or redistribute income to low income or disadvantage groups (Narodowski and Panigo 2010). These economic policies were supported by the following pillars: a competitive real exchange rate; a reduction of the foreign national debt; growth in fiscal revenue for both growth in fiscal expenditures and fiscal surplus; growth in exports for both current account surplus and foreign exchange accumulation; and increasing the purchasing power of the employed wage earners in the formal and informal labor markets, unemployed, children, and retired people collecting pensions and social security (Narodowski and Panigo 2010).

The Pillars of the Development Model

Public Emergency Law (Law 25,561) instituted a devaluation of the ARS against the USD in January 2002 under the Duhalde administration (Figure 1.5). After having the ARS pegged to United States dollar (USD) in a fixed exchange rate of 1 ARS equal to 1 USD since April 1993, a period called the Convertibility, the currency went from a fixed exchange rate regime to a managed floating exchange rate regime. The devaluation of the currency made Argentine exports more competitive in the world markets as many production and marketing costs were set in ARS, such as wages, energy, and taxes; while
most of the agricultural and manufactured goods sold were priced in USD. The devaluation also made imports more expensive, giving domestic industries the opportunity to be able to compete against foreign companies.

The first pillar of the model, the competitive real exchange rate, generated higher profitability for sectors of the economy that produce tradable goods and services given that the prices of the outputs generated were higher than the inputs used for transformation. In turn, this provided the growth incentive in economic activity and employment (Figures 1.2 and 1.3).
Figure 1.1: Real GDP growth change in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.2: Real GDP in Argentina between 1993 and 2009 in constant 1993 ARS.

Source: MECON, 2011.

Figure 1.3: Share of urban unemployment in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.4: Share of population below the poverty and indigence line in Argentina between 1993 and 2009.

Source: MECON, 2011.
Payments on the national public foreign debt came to halt in early 2002 when the largest sovereign default in history was declared by President Rodriguez Saa (MECON 2011). At that time the Central Bank of the Argentine Republic (BCRA) had its foreign currency reserves almost depleted and the Treasury was not able to issue more debt or to collect any more revenue to service the debt. The debt was restructured in 2005 by President Kirchner with an offer of 35 cents on the dollar and 76% of the bondholders agreed to a debt exchange in 2005 (MECON 2011) (Figure 1.6). Also, in January 2006 all the debt outstanding to the International Monetary Fund (IMF), 9.538 USD billion, was paid in full from reserves available at the BCRA. Despite the fact that the restructuring was supposed to be final, President Fernandez de Kirchner reopened the restructuring of the debt and more bondholders agreed to the debt exchange bringing the total to 93% (MECON 2011) (Figure 1.6). However, the 7% remaining has sued Argentina and because of the lack of payment to these bondholders, Argentina is currently the only member of the G-20 that is unable to raise capital in the international financial markets (MECON 2011).

The second pillar of the model, the reduction of the public foreign national debt has provided the government of Argentina with lower pressure on the fiscal account and on the foreign exchange reserves as it has to disburse a lower share of fiscal revenue in order to service the debt due to the debt restructuring. The foreign debt was reduced from 160% of the GDP in 2002 to 40% of the GDP in 2009 (Figure 1.6). However, since this restructuring was not 100% successful, the government has been only able to issue debt domestically and has been able to obtain foreign exchange only from exports or from
foreign direct investment. Therefore, the capital and financial account has had deficits in 5 out of the last 8 years (Figure 1.7), given that financial payments by the national government, out of the Central Bank, are higher than foreign direct investment from the private financial sector (MECON 2011).

The combination of higher economic activity, the strong reduction of debt service payments together with a stronger tax collection and the imposition of export tariffs allowed the national government to increase the fiscal revenue as a percentage of GDP, from an average of 18% in the nineties to a record high 30% in 2009 (AFIP 2011) (Figure 1.8). The increase in fiscal revenue was across all sources, taxes (value added tax and income tax), social security, and most importantly from custom tariffs (import and export tariffs). Custom tariffs, from being the least important before 2002, had the highest growth between 2002 and 2009, accounting to 13.1% of total fiscal revenue and 3.30% of the GDP on average respectively for the period (AFIP 2011). Given the devaluation of the ARS, collection from import tariffs was substantially reduced while collection from export tariffs became the most important source within custom tariffs (AFIP 2011). The third pillar of the model, the growth in fiscal revenue, permitted both a growth in fiscal expenditures and to attain fiscal surpluses after 2002. Between 1993 and 2002, in 9 out of the 10 years the national government had a fiscal deficit, while between 2003 and 2009, in 6 out of the 7 years the national government had a surplus (AFIP 2011) (Figure 1.9).
Figure 1.5: Nominal and real exchange rates between the ARS and the USD between January 1993 and December 2009. 

Source: USDA, 2011.

Figure 1.6: Foreign debt and foreign debt as a share of GDP in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.7: Capital and financial account surpluses and deficits in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.8: Fiscal revenue by source (taxes, social security and customs tariffs) in Argentina between 1993 and 2009.

Source: AFIP, 2011.
The higher exports and lower imports of goods provided the basis for a positive current account and to have current account surpluses after 2002 (MECON 2011) (Figure 1.10). Between 1993 and 2002, every year the current account had deficits that ranged between -5% and -1% of GDP (Figure 1.10). However, after the devaluation of the ARS in 2002, every year the current account had surpluses that ranged between 9% and 3% of the GDP (Figure 1.9). The devaluation of the ARS against the USD was further helped by a sharp change in the terms of trade. The terms of trade averaged 103% for the period 1993-2002 but 130% for the period 2003-2009 in constant 1993 prices, due to the increase of Argentina’s primary commodities exports prices for soybeans, corn, wheat, sunflower, oil, and copper (IMF 2011 and WB 2011). Interestingly, services and rents, the other components of the current account besides merchandises, have had deficits throughout the years analyzed, and were not positively affected by the devaluation (MECON, 2011). Current account surpluses, the fourth pillar of the model, provided the accumulation of foreign exchange reserves by the BCRA, from a low 9 billion USD in 2002 to 46 billion USD in 2009 (MECON 2011). The lack of foreign exchange reserves was a recurrent crisis in Argentina and a usual weakness in securing loans to roll over maturing foreign debt.
Figure 1.9: Fiscal account surplus or deficit in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.10: Current account surplus or deficit in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.11: Real monthly minimum wage and minimum social security payments in Argentina between 1993 and 2009.

Source: MECON, 2011.

Figure 1.12: Real monthly poverty and indigence line in Argentina between 1993 and 2009.

Source: MECON, 2011.
The fifth pillar of the model was to increase the purchasing power of the employed wage earners (formal and informal labor markets), unemployed, children, and retired people collecting pensions and social security ((Panigo and Neffa 2009 and Narodowski and Panigo 2010). The monthly minimum wage and child allowances for formal workers and the minimum social security payments were increased nominally every year after 2002; however, only after 2004 these payments increased in real terms (MECON 2011) (Figure 1.11). These increases in real terms contrast with no increases performed between 1994 and 2001 (MECON 2011) (Figure 1.11). Wages benefited in real terms from favorable collective bargaining agreements between the unions and the companies in a time when millions of workers returned to formal and informal employment. The social security administration instituted in 2005 the Pension Inclusion Program to grant social security to almost two million people that had not paid social security contributions given that they were unemployed or working in the informal labor market during the 1990’s. The national government also developed other programs to increase the purchasing capacity of the disadvantaged and low income population through cash income transfers: the Heads of Household Program, the Family Plan, and the Universal Child Allowance, among the most important ones (Panigo and Neffa 2009 and Narodowski and Panigo 2010).

The wage, pension, and social policies implemented by the national government in order to increase the purchasing capacity of the wage earners, the unemployed, and retired people were successful as long as income increased in real terms and not just in nominal terms. An increase in the consumer price index (CPI), the most common
measure of inflation for consumers, would decrease the purchasing capacity of households and thus decrease real income for wage earners, threatening the overall social well-being by not only pushing more households into poverty and indigence but also increasing inequality among the high income and low income. The poverty line and indigence line for a household of four people barely increased in real terms according to official estimates after 2002 (Figure 1.12).

An Unwanted Effect: Inflation

The national government implemented several policies in order to support the real income and the social well-being of the population as previously described. However, inflation, or the general increase in the price level of goods and services, increased greatly due to diverse causes after 2002. The first cause was the devaluation of the ARS against the USD in order to achieve a competitive real exchange rate, which made tradable goods and services more expensive in ARS and increased the supply of ARS domestically given that the BCRA has to issue ARS for every USD of exports at the official exchange rate. This was especially important in 2002 when the peso devalued from 1 to 3.45 ARS per USD and the CPI went from 100 to 137 between January and December, respectively (MECON 2011) (Figure 1.5 and Figure 1.13). Despite the fact that the ARS revalued against the USD in 2003 and maintained a nominal exchange rate of 3 ARS per USD until September of 2008 (Figure 1.5) the CPI kept increasing year after year (Figure 1.13) being 215 in that month for the overall level, 244 for food and beverages and 182 for transportation and communication (Figure 1.13) (MECON 2011).
The second cause was that the BCRA benchmark interest rates have been negative in real terms since 2002, thus increasing the aggregate supply of ARS domestically besides the exchange rate effect mentioned earlier. Households and firms, therefore, did not have an incentive to save in ARS given that the real interest rate was negative and given that the real exchange rate was appreciating over time as well. Both the exchange rate policy and monetary policy provided the incentives to consume instead of saving and fostered the demand for goods and services.

The third cause is that the increase in fiscal revenue gave the national government the means to increase fiscal expenditures and increase aggregate demand faster than aggregate supply. As it was described earlier, several different policies were implemented to increase the real income of wage earners, the unemployed, and the retired, which together with the growth in economic activity and employment generated an increase in the demand for goods and services beyond the production capacity of the economy. This demand-pull inflation explanation (Gordon 1988) is in line with the increasing share of government revenue and expenditures as a share of the GDP since 2003, in which the national government took a key role in expanding the economic activity of the country (Narodosky and Panigo 2010).

The fourth cause is the increase of commodities prices that Argentina exports, which are tradable goods, and have an important participation in the CPI. Food and beverages has the highest share in the CPI, being 32% on average for all households (INDEC, 2011) (Figure 1.14). The increase in the price of soft commodities (agricultural), hard commodities (metals), and energy commodities in the worldwide
markets increased the value of exports and foreign exchange reserves in the BCRA, but pushed up the domestic prices for basic goods and the CPI. This cost-push inflation explanation (Gordon 1988) is in line with the increase in the CPI in 2008 given the record world prices for soybeans, corn, wheat, cotton, oil, natural gas, copper and other commodities (IMF 2011 and WB 2011).

Finally, the fifth cause is related to the collective bargaining agreements between workers and companies, in which workers demand higher wages in order to keep their purchasing power from eroding in an environment of inflation and the companies pass the higher cost to consumers as higher prices, and then the cycle begins again and turns into an inflationary spiral. Gordon (1988) argues that built-in inflation is induced by adaptive expectations by society and is in line with the price increases since 2002 in which different sectors of society expected the recurrent set of economic and social policies mentioned above.

Inflation has been persistent and in the double digits annually since the devaluation, despite the fact that the national government has replaced the experts in charge of the CPI estimations at the Instituto Nacional de Estadísticas y Censos (INDEC) and not reviewing the official accounts by the IMF guidelines as instituted by the G-20. The national government intervened in the economic sectors that had key role in the CPI such as food, transportation, and the provision of public services (Panigo and Neffa 2009 and Narodowski and Panigo 2010). Companies that provided public services (water, sewage, electricity, natural gas, garbage collection, etc.) had their rates transformed from USD into ARS during the devaluation in early 2002. Other companies that had been
privatized during the nineties were renationalized by the government. Subsidies were provided for most of the urban transportation modes (subway, rail, and bus) while the national airline was renationalized. Given that the agricultural sector is comprised of hundreds of thousands of farmers and thousands of agribusinesses, and not by large companies as in the transportation or utilities sectors, the political economy and the policies are expected to be more complex. Therefore, the next section describes in detail the agricultural and food policies set in place in Argentina in relation with the economic, social and political situation since 2002.
Figure 1.13: Monthly consumer price index in Argentina from January 1993 until December 2009.

Source: INDEC, 2011.

Figure 1.14: Weight of different household expenditures in the Argentine consumer price index.

Source: INDEC, 2011.
As described in the previous section, the national government put in place a series of economic and social policies in order to stabilize the economy by fostering the supply of goods and services by the manufacturing and service sectors, to increase the total aggregate demand through a full employment economy, and to transfer or redistribute income to low income or disadvantage groups (Narodowski and Panigo 2010). These policies achieved many of the stated goals but generated inflation eroding the purchasing capacity of the wage earners, unemployed, and retired people, thus affecting the overall social well-being by failing to reduce poverty, indigence, and inequality further. Given that the national government most important priority was to make the manufacturing sector profitable, it was necessary to keep the real income of wage earners up with the cost of living. Otherwise, inflation was going to reduce the nominal value of wages and generate conflict between the unions and companies and in turn reduce economic activity and employment. It became a priority to the national government to reduce the profitability of the agricultural sector, given that the adoption of the competitive real exchange rate policy through the devaluation of the ARS made all economic sectors more profitable (Narodowski and Panigo 2010).

According to Narodowski and Panigo (2010), the goal of these export and domestic agricultural and food policies were to redistribute income from the highly productive and profitable agricultural economic sector to the low productive and low profitable manufacturing economic sector. This was strategic given that the agricultural...
and food sector is characterized as a sector with low employment capacity in rural areas and that that produces goods that have a high weight in the CPI, while the manufacturing sector is characterized as a sector that has a high capacity of generating employment in urban areas and that produces value added goods that do not impact the CPI.

The interventions of the national government on the farming sector over agricultural revenues involved many different agricultural policies during a period of time that spans from January 2002 to the present time. The export agricultural policies set by the national government were in the form of export tariffs, export bans, and export quotas on different agricultural commodities. The domestic agricultural policies set by the national government were diverse and included price agreements in the form of price ceilings below the market price for several food items, increase of the slaughter weight limit for live cattle, and subsidies (compensation payments) to feedlot producers of cattle, poultry industry, dairy industry, wheat millers, corn millers, oilseed crushers, among other industries. In the following sections the export tariffs, export quotas and bans, and the subsidies through compensation payments are explained to understand their economic and political effect in Argentina in the recent years.

*Export Tariffs*

An export tariff is the opposite of an import tariff. The agricultural commodity being exported is levied a tariff when leaving the country at Customs. This levy or tax is based on the free on board (FOB) price which is the price of the commodity at the vessel at the terminal elevator ready to be shipped abroad. The free alongside ship (FAS) price is the price at the terminal elevator resulting from the FOB price less the loading and
storage costs and the export tariff imposed by the Customs agent. Since farmers in Argentina sell their agricultural commodities at the terminal elevator, they receive the FAS price and bear the export tariff themselves as the levy is passed through by the exporters and the crushing or milling industries.

The economic effect from imposing tariffs on trade will depend on the elasticity of supply and demand and will differ for suppliers, demanders, and the government imposing the barrier of trade on the good (Houck 1986). In the case of an export tariff, in the short term, when factors of production are fixed and supply is inelastic, the losers are producers of agricultural commodities in the domestic country because they receive a lower price and output falls; and consumers of food in foreign countries because the world price for that commodity increases (Piermartini 2004). The winners are the domestic consumers of food as lower domestic prices provide them with a positive purchasing power effect; and the foreign producers of agricultural commodities as higher world prices provide a higher revenue (Piermartini 2004). The government in the domestic country obtains fiscal revenue that may benefit specific sectors of population through social programs or welfare payments. On the other hand, governments in foreign countries may have to increase subsidies to compensate consumers for higher food prices. The same purchasing power and tax effects would happen if the country imposing the export tariff is a country that has a large share of the world market for that commodity as changes in domestic prices would affect domestic output and therefore a significant share of the world output (Piermartini 2004).
The effects of export tariffs differ in the long term, when factors of production are not fixed and can freely move to more profitable economic activities and supply becomes elastic. In this case the losers are not only the producers but other economic agents in the value chain in the domestic country while consumers in foreign countries can choose from other substitute sources. The consumers in the domestic market still enjoy the lower price of food but most probably the output from producers is lower and companies along the value chain have captured that rent. Furthermore, producers in foreign countries may have increased output to compensate for the fall in the competitor’s export share. The government in the domestic country keeps collecting the export tariff revenue but there is a foregone export revenue loss and consequent opportunity cost in foreign exchange earnings. The costs for foreign governments are reduced as the missing production from the country with the export tariff has been replaced by its competitors in the world markets. The same purchasing power and tax effects would occur if the country imposing the export tariff is a country that has a small share of the world market for that commodity as changes in domestic prices would affect domestic output but not a significant share of the world output (Piermartini 2004).

The impact of an export tax on primary commodities in an economy is complex to estimate as there are income distribution effects: between consumers and producers of the taxed commodities, on other sectors of the economy, and across factors of production (Piermartini 2004). The impact will also depend on the elasticity of supply and demand, the time period considered, and the world market share for the country imposing the quota. Gainers and losers can be found within the domestic country and in the foreign
countries. Finally, the income distribution effects between consumers and producers in the domestic country are difficult to estimate. This results from both a purchasing power effect from lower food prices and a tax effect from welfare payment transfers through social programs.

Export tariffs in the agricultural sector in Argentina had both fiscal and monetary implications. On the fiscal side, as it was mentioned above it increased tax revenue for the national government. However, the income redistribution was not equitable given that the marginal effect was heavier on small-scale farmers, and that food was subsided for all consumers, not just the ones below the poverty or indigence lines. On the monetary side, it affected the exchange rate for products considered to be sensitive in two ways. Export tariffs reduced the food price for urban consumers while import tariffs increased the price for industrial products (machinery or fertilizers). Therefore, there was a real exchange rate that was \([\text{RER} = (1-\text{ET}) \times \text{FOB} \times \text{NER}]\) for agricultural commodities and a real exchange rate that was \([\text{RER} = (1+\text{IT}) \times \text{CIF} \times \text{NER}]\) for manufactured products.

This tariff wedge between agricultural and industrial prices would promote the substitution of imports by increasing the profitability of the manufacturing sector in two ways. First, profitability of the manufacturing sector was boosted by increasing the price of its output through import tariffs on industrial products. Second, profitability of the manufacturing sector was augmented by reducing the cost of the wage earners by increasing their real salaries through the reduction of sensitive items in the CPI thanks to export tariffs on agricultural products.
This price wedge between agriculture and industry by means of trade policies such as export and import tariffs could also have been achieved through a grain or meat board, in which the national government is a de facto monopsony and determines the domestic prices for agricultural goods. Furthermore, this price wedge may be obtained through a multiple exchange rate in which agricultural goods receive a lower exchange rate than manufactured goods. These two policies were implemented in Argentina during the first and second administrations of Peron (1946-1955) and the administrations of Lanusse, Campora, Lastiri, and Peron (1971-1976), respectively.

The export tariffs in Argentina affected all farmers regardless of farm size and farm distance to the terminal elevators, because the tariff is levied on the FOB price which is the one used to determine the FAS price. In the case of the export tariffs for soybeans, the national government increased them over time. The export tariff rate went from 3.5% in January 2002 to 13.5% in March 2002, to 23.5% in April 2002, to 27.5% in January 2007, to 35% in November 2007 and finally to a variable and progressive rate in March 2008 (Figure 1.15, 1.16 and 1.17). In this last case, the tariff average rate increased with increases in the FOB price as it was variable and progressive. For the soybean prices of March through July of 2008 the rate was 45% (Figure 1.16). Furthermore, the marginal tariff rate was 99%, i.e. for every 1 USD of FOB price increase the government obtained 99 cents of that increase and therefore the FAS price that farmers received reached a plateau of USD 550 per metric ton (Figure 1.16). Export tariffs for the soybean complex in Argentina also have the particularities that are higher for soybeans than for the soybean byproducts. This differential export tariff, or DET,
favors the crushing of the soybeans into soybean oil and meal, and the further processing of oil into biodiesel (Figure 1.15).

The increases in export tariffs during 2002 were implemented following the devaluation of the ARS against the USD (Resolutions 11/2002 and 35/2002). The increases in export tariffs during 2007 and early 2008 were implemented due to the increase in the international prices of commodities (Resolutions 10/2007, 365/2007 and 125/2008). The increases in export tariffs were set by the Minister of Economics, under power granted by Public Emergency Law (Law 25561) that transferred functions from the Legislative to the Executive.

Resolution 125 from March 10, 2008 set off the largest and longest conflict Argentina has seen between the Executive and the farmers. The farmers were organized in their four organizations: Sociedad Rural Argentina (SRA), Confederaciones Rurales Argentinas (CRA), Federacion Agraria Argentina (FAA), and Confederacion Inter-Cooperativa Agropecuaria (CONINAGRO) through an agricultural liaison committee (Mesa de Enlace Agropecuaria). After thousands of demonstrations all over the country, on July 17, the Senate did not ratify Resolution 125 after being approved by the House on July 5. On July 18, through a Presidential Decree, the Executive struck down Resolution 125/2008. Therefore, the export tariffs were set at the level prior to March 10, this is 35% of the FOB (Resolution 180/2008) (Figures 1.15, 1.16 and 1.17).

The Executive not only applied export tariffs to the soybean complex but to other agricultural commodities as well. These agricultural commodities included major grains (wheat, corn, sorghum, sunflower, and peanuts), byproducts (wheat flour, corn meal,
sunflower oil, sunflower meal, peanut oil, and peanut meal), livestock and meats. However, the export tariff rates differed from those of the soybean complex.

The price difference between the FOB and FAS price increased significantly after the imposition of the export tariffs (Figure 1.18). During the nineties and up to 2001, export tariff rates for most grains were 3.5% or lower, and the price difference between the FOB and the FAS prices, or fobbing, was on average per year around 10 and 20 USD per metric ton (MAGyP 2011) (Figure 1.18). Between 2002, the price difference started to grow because of the increase in the export tariff rates and was on average around 30 and 40 USD per metric ton and per year (MAGyP 2011) (Figure 1.18). However, starting in late 2007 and especially in 2008 and 2009, the price difference increased significantly because of both record high prices for agricultural commodities in the world markets and because of a progressive export tariff rate that increased with an increase in prices during the harvest months of 2008 as mentioned above (Figures 1.16 and 1.18). During this last time period, the yearly price difference on average was 50 USD per metric ton for sorghum, 60 USD per metric ton for corn, 100 USD per metric ton for wheat, and 150 USD per metric ton for soybeans and sunflower (MAGyP 2011) (Figure 1.18).
Figure 1.15: Export tariffs in Argentina for the soybean complex between 1993 and 2009.

Figure 1.16: FOB-FAS wedge effect from exports tariffs applied on soybeans in Argentina since 2002.

Figure 1.17: Soybean CIF, FOB, and FAS prices between January 1993 and December 2009.

Figure 1.18: FOB-FAS price difference for major grains in Argentina between 1993 and 2009.

Source: INDEC, 2011.
Export Quotas and Export Bans

An export quota is the opposite of an import quota. In an export quota, the government places a limit on the quantity of the particular agricultural commodity that can be exported into a country or set of countries in a given period of time (Houck 1986). In an export ban, the government shuts the export market down for a given commodity and all the quantity produced must be sold domestically. Export quotas and export bans have similar economic effects as export tariffs, benefitting domestic consumers and foreign producers at the expense of foreign consumers and domestic producers (Houck 1986). However, in these particular cases, the government does not collect revenue as it does not levy a tariff rate on the exported commodities (Houck 1986). Furthermore, the government foregoes collecting foreign exchange through the Central Bank. Starting in 2006 the national government began the restriction of exports of agricultural commodities with beef, but was later expanded to dairy, cereals and oilseeds. A brief description of each commodity is outlined below.

In January 2006 the Executive began to implement export quotas on the beef sector (Resolution 31/2006). In March 2006 the export market was shut down for 180 days for the beef sector (Resolution 114/2006) as well as for the cattle sector (Resolution 210/2006). In May 2006 the export quota for beef was set at 40% of the previous year exports (Resolution 397/2006) and in August the quantities to be exported by meat packing plant for the year 2006 were set following the same guidelines (Resolution 1327/2006). In September 2006 the export quota was increased to 50% of the previous year exports (Resolution 760/2006) and in October the quantities by meat packing plant
were defined. During 2007 and 2008 the export quota remained at 50% of the exports of 2005. In May 2008 the ROE Red (Exporters’ Operators Registry for Beef) was created for the meat packing plants and the export quota was set by an agreement between the government and the meat packing plant, according to the market conditions (Resolution 6/2008). Export bans and export quotas on beef were put in place despite the fact that beef exports already had export tariffs in place.

In February 2007 the Executive started the physical intervention in the dairy sector when it created the dairy sector price stabilization program for the domestic market (Resolution 61/2007). This program did not achieve its stated goals and in May 2008 the ROE White (Exporters’ Operators Registry for Dairy) was created for the dairy plants in which the export quota was set by an agreement between the government and the dairy industry, according to market conditions (Resolution 3/2008). Again, export quotas for the dairy sector were put in place despite the fact that dairy exports already had export tariffs in place.

The Executive started the physical intervention of the grain sector when it shut down the export registry for corn in November 2006 (Resolution 775/2006) and for wheat in February 2007 (Resolution 61/2007). The export market for corn was opened in May 2007 and set a 3 million metric ton quota while the export market for wheat was opened in November 2007 without setting a specific quota (Resolutions 147 and 342 respectively). In November 2007, the soybean export market was also closed for a week as the export registry did not allow any exporter to register any foreign bound transactions (Resolutions 333 and 341 respectively). In May 2008 the ROE Green
(Exporters’ Operators Registry for Grains) was created for corn and wheat in line with the ones for beef and dairy in order to provide quotas for the exporters (Resolution 543/2008).

The markets for beef cattle, dairy cattle, corn and wheat became opaque, as the price transmission between the export markets (FOB) and the domestic markets (FAS) were not only affected by the export tariffs but by the export quotas and bans set in place by the agency administering the ROE, which it was called ONCCA (Organismo Nacional para el Control Comercial Agropecuario) through arbitrary resolutions. Dairy plants, meat packing plants, wheat and corn processors and exporters were not competing against each other for their input sources, but they were vying for registration permits in order to be able to export. If the market for agricultural products was competitive (many buyers and sellers, low entry and exit barriers, perfect information, homogeneous products, and profit maximization) then the FAS price should reflect the FOB price less the fobbing costs. However, deep discounts in the FAS prices followed the implementation of the export quotas and the MAGyP started to estimate an official FAS price daily to reflect the exporters’ ability to pay a full FAS price. Given that domestic prices did not abate, despite the fact of export tariffs, export quotas and export bans, the national government began to subsidize different agribusinesses in order to further reduce the price of food as described in the next section.

Subsidies and Compensation Payments

In January 2007 the Executive began to subsidize different agribusiness companies through compensation payments in order to further reduce the cost for food to
consumers. The compensation payments framework was set in place for wheat, corn, sunflower, and soybeans commodities that were purchased in the domestic market (Resolution 9/2007). The compensation payment was a sum that was equal to the difference between the official FAS price (Resolution 42/2007) and the domestic set price (Resolution 12/2007) for wheat (440 and 370 ARS per metric ton respectively), sunflower (614 and 524 ARS per metric ton respectively), corn (419 and 293 ARS per metric ton respectively), and soybeans (607 and 462 ARS per metric ton respectively). The official FAS price was estimated and published periodically while the domestic mandated price was revised only in March 2009 to reflect higher prices for these grains (Resolution 83/2009). The quantities to be subsidized were set as the monthly average between January 2005 and November 2006 for the domestic sector plus a vegetative growth in consumption (Resolution 9/2007).

In January 2007 the Executive developed the subsidy mechanisms not only for the agribusinesses that were important users of cereals and oilseeds, covering dairy farmers (Resolution 745/2007), poultry (Resolution 746/2007), grain-fed cattle (Resolution 1378/2007), and swine (Resolution 1379/2007) but also for wheat farmers, that were severely affected by the decrease in domestic prices from the export tariffs and the export quota and ban restrictions (Resolution 378/2007). Interestingly, in the case of wheat the national government was creating new regulations in order to help those farmers affected by previous regulations. A brief description of these subsidy mechanisms are outlined below.
The dairy farmers were granted a non-refundable subsidy of ARS 0.05 per liter produced after estimating feed conversion rates and milk production efficiency parameters for the dairy herd (Resolution 475). These payments were segmented in March 2008 progressively by quantity of milk produced by farmer: up to 5,000 liters per day it was 0.07 ARS per liter, between 5,000 and 10,000 liters per day it was 0.03 ARS per liter, above 10,000 liters per day it was 0.01 ARS per liter (Resolution 48/2008). These payments were increased regularly with the increase of the price for the grains and in August 2009 were set at ARS 0.20 per liter produced at the base level of 3,000 liters per day (Resolution 513/2009).

The compensation payment for poultry producers was determined monthly by estimating the quantity of the grain used to raise the animal and the price subsidy. The quantity of grain was estimated through a feed conversion rate of 1.81 Kg of corn and 0.81 Kg of soy per Kg of dressed meat and a slaughter conversion rate per animal of 2.20 Kg of dressed meat (Resolution 746/2007). The price subsidy was the difference between the official FAS for corn and soybeans and the mandated prices for the domestic market (Resolution 19/2007). The quantity of grain times the price subsidy resulted in the compensation payment for each poultry producer.

Grain-fed cattle from feedlots were given a compensation payment similar to the one given to poultry but the feed conversion rates was of 6 Kg of corn per animal and per day for all animals while animals heavier than 300 Kg per head were given an extra feed conversion rate of 3.6 Kg of corn per Kg above the threshold (Resolution 1378/2007). The quantity of animals was estimated as the average quantity of animals in the feedlot.
between December 2005 and November 2006 (Resolution 1378/2007). The feed conversion rates were modified in October 2007 as soybeans were included in the feeding rations (Resolution 4668/2007). The price subsidy was the difference between the official FAS for corn and soybeans and the mandated prices for the domestic market (Resolution 19/2007). The quantity of grain times the price subsidy resulted in the compensation payment for each feedlot producer.

Swine producers had compensation payments similar to those for poultry and feedlots (Resolution 1379/2007). However, feeding conversion rates were established according to three types of pork producers: breeding and rearing producers that sell feeder pigs to finishers and sell culled sows and boars for slaughter; finisher producers that sell finished pigs for slaughter; and full cycle producers that sell all the different categories (Resolution 1379/2007). The price subsidy was the difference between the official FAS for corn and soybeans and the mandated prices for the domestic market (Resolution 19/2007). The quantity of grain times the price subsidy resulted in the compensation payment for each swine producer.

After January 2007 the subsidy mechanisms were progressively increased for other types of agribusinesses that included corn millers in April 2007 (Resolution 328/2007), oilseed crushers in April 2007 (Resolution 344/2007), the dairy industry in July 2007 (Resolution 1984/2007), wheat millers in July 2007 (Resolution 1887/2007), and high quality wheat millers in March 2009 (2242/2009).

As described earlier, the increase in export tariffs through Resolution 125/2008 had a higher impact in small-scale farmers and farmers farther from the exporting ports.
Special subsidy mechanisms were created after Resolution 125/2008 was implemented by the Executive catering for these farmers in order to reduce the level of protests and to divide the farmers’ cohesion against the national government. The first subsidy returned the export tariffs to small-scale farmers through non-refundable payments (Resolution 21/2008). The second subsidy granted a non-refundable payment to farmers 500 kilometers away from terminal elevators and ports (Resolution 22/2008). Again, new regulation from the Executive was created to diminish the effects of previous regulations.

In 2009 a new subsidy mechanism was developed to support the male calves from dairy farmers through a non-refundable payment (Resolution 2240/2009). Finally, in March 2010 a subsidy was created to grant a non-refundable payment to small-scale wheat and corn farmers (Resolution 106/2010).

The interventions from the Executive in the agricultural and food sector were clearly directed towards taxing the revenue from the farming sector and granting part of this revenue to agribusinesses through compensation payments. After the negative effect of export tariffs, export quotas and export bans on small scale farms, the Executive developed subsidies for this group of farmers. However, the amount of revenue taxed from the agricultural sector was several times higher than the amount of subsidies granted to agribusinesses and small-scale producers. Just to have an idea of the magnitude, export tariff revenue from agricultural commodities for 2007 was ARS 15 billion while subsidies between 2007 and 2010 were 10 billion (AFIP 2011 and ONCCA 2011).

The implementation of these policies was plagued by problems related to registering the agribusinesses and producers, certifying the monthly declared quantities,
disbursing the payments, and charges of corruption. The agency in charge of the
compensation payments, ONCCA, was created in August 2005 (Decree 1067/2005) but
was dissolved in February 2011 after strong pressure from the farming organizations
(Decree 192/2011). The functions of the ONCCA were transferred to a new agency
within the MAGyP. The next section briefly shows the dynamic of the agricultural sector
in Argentina during this period and the impact that these policies had on output, prices
and revenue.

Impact on the Agricultural Sector

The most important agricultural activities by farmers in Argentina regarding row-
crop production are soybeans, corn, wheat, sunflower, sorghum and cotton; while the
most important livestock operations are grass-fed cattle followed by dairy and sheep
(INDEC 2002). Poultry, swine and grain-fed cattle operations are vertically integrated
and do not resemble the organizational structure as the farms described above. There are
approximately 200,000 row-crop and livestock farmers in Argentina distributed in the
Pampas Region (Buenos Aires, La Pampa, Cordoba, Santa Fe, Entre Rios, and San Luis
provinces), the Northwest Region (Jujuy, Salta, Catamarca, La Rioja and Santiago del
Estero provinces) and the Northeast Region (Misiones, Corrientes, Formosa and Chaco
provinces) (INDEC 2002).

The output of the agricultural sector in Argentina has been different for the grain
subsector than for the livestock subsector in the last two decades. The grain subsector
increased planted area from 19.2 million hectares in 1992/93 to 30.5 million hectares in
2009/10 (Figure 1.19). This 58.8% increase over a 15-year period was driven mostly by
increased soybean planting. Soybean planted area almost quadrupled from 5.3 to 18.5 million hectares whereas the planted area for other oilseeds and cereals decreased slightly from 13.9 to 12.9 million hectares over this period (MAGyP 2011) (Figure 1.19). Soybean production increased due to a change in the system of production paradigm thanks to the adoption of GMO glyphosate resistant soybean varieties and no-till which allowed farmers to increase yields, lower costs and increase profitability. The increase in planted area was from new land being added from natural forests, permanent pastures being converted to field crops, shifts in the traditional crop-livestock rotation patterns towards greater emphasis on crops in the Pampas, or switching from cotton, black beans and rice to the more profitable soybean crop in the Northwest (Schnepf et al., 2001).

Production of grains in Argentina increased from 40 million metric in tons in 1992/93 to 94 million metric tons in 2009/10 (Figure 1.20) due to increased planted acreage and higher yields (Figures 1.20, 1.21 and 1.22). Cereal production increased from 25.6 to 37 million metric tons while oilseed production increased from 14.5 in 1992/93 to 60 million metric tons in 2009/10 (MAGyP 2011). This growth in oilseeds was from the expansion of soybeans which set production records almost annually from 1993 through 2010 (MAGyP 2011). Soybean production increased in Argentina from 11 to 54 million metric tons over the same period of time (MAGyP 2011). Oilseeds increased the share of total grain production in Argentina from 36% to 61% at the expense of cereals (MAGyP 2011).

Yield growth has resulted from the adoption of seeds, fertilizers, herbicides, insecticides and fungicides from full technological packages from international
agribusiness companies which improved Argentine productivity. Technology transfer from the United States to Argentina has been aided by the similar climate and soils and the fact that the same companies operate in both markets (Schnepf et al., 2001).

Argentina’s largest exports within the agricultural sector are those from soybeans and its joint products: soybean oil, soybean meal, and biodiesel (MAGyP 2011). Soybean complex export nearly quadrupled from 9.1 to 42.2 million metric tons from 1993 to 2010 (Figure 1.23) given the increase in the demand for soybeans and soybean oil from China and the increase in the demand from soybean meal and biodiesel from Europe (USDA 2011). Soybeans account for 29% of the soybean complex exports by quantity in 2010 while soybean meal, soybean oil, and biodiesel were 56%, 12%, and 3%, and respectively, of the soybean complex exports (MAGyP 2011) (Figure 1.23). The high share of byproducts in relation to soybeans has been the result of the differential export tariff that favors crushing domestically by reducing the cost of sourcing the soybean input. The sunflower complex exports have been on average ten times smaller than those of the soybean complex exports, and there has been a negative trend since its peak in 1999 (MAGyP 2011) (Figure 1.24). Cereal complex exports had a positive trend from 1992/1993 until 1998/99 but no clear trend since then (MAGyP 2011) (Figure 1.25).
Figure 1.19: Major row-crops planted area in Argentina between 1993 and 2010.


Figure 1.20: Major row-crops production in Argentina between 1993 and 2010.


Figure 1.21: Soybean and sunflower yield in Argentina between 1993 and 2010.


Figure 1.22: Wheat, corn and sorghum yield in Argentina between 1993 and 2010.

Figure 1.23: Soybean complex exports from Argentina between 1993 and 2010.


Figure 1.24: Sunflower complex exports from Argentina between 1993 and 2010.


Figure 1.25: Cereals exports from Argentina between 1993 and 2010.

The cattle sector output has remained stagnant during the last two decades (Figures 1.26 and 1.27). Between 1993 and 2010 the size of the herd averaged 52.9 million head and fluctuated between 48 and 58.7 million head (MAGyP 2011) (Figure 1.26). The herd reached its largest size in 2007 after six years of retention; however it took only 3 years for the herd to go to the smallest size in over 18 years (MAGyP 2011) (Figure 1.26). During the same period of time, slaughter averaged 13.1 million head and fluctuated between 11.2 and 16 million heads (MAGyP 2011) (Figure 1.26). Slaughter peaked in 2007, 2008, and 2009 when extraction rates were close to 30% after the imposition of the agricultural and food policies described above (MAGyP 2011) (Figure 1.26).

Beef output has followed the quantity of animals slaughtered and the average weight for the different cattle categories. Beef production averaged 2.8 million metric tons between 1993 and 2010, but peaked in 2009 with 3.4 million metric tons (MAGyP 2011) (Figure 1.27). During this period of time, on average 15% of beef production (430 thousand metric tons) was sold abroad while 85% (2.37 million metric tons) was sold domestically (MAGyP 2011) (Figure 1.27). After the lowest level of beef exports in the history of Argentina in 2001 (150 thousand metric tons) due to the outbreak of hoof and mouth disease, exports grew steadily and peaked in 2005 (770 thousand metric tons). However, after this point forward, exports declined until reaching 310 thousand metric tons in 2010 (Figure 1.27) due to the export restrictions mentioned earlier.

Despite the fact higher production of beef and higher supplies for the domestic market, retail prices for beef in Argentina increased since the devaluation of 2002 and
especially since the imposition of export restrictions (Figure 1.28). Domestic per capita per year consumption of beef increased between 2001 and 2007 despite the fact of increasing prices on the retail price of beef (Figure 1.28). This increase resulted from the higher purchasing capacity in the domestic market. The increase in domestic consumption peaked in 2008 and 2009 at 69 Kg per capita but they reached the lowest level in 2010 at 57 Kg per capita after the Executive allowed cattle prices to increase domestically due to the decrease in herd size below 50 million head (MAGyP 2011) (Figures 1.26 and 1.28).

Live cattle prices in Argentina result from the composite of domestic retail prices and export prices for different cuts which yield a carcass weighted average price (Iriarte 2009). Live cattle prices in the region not only follow the FOB international price but also tend to move along (Figures 1.29 to 1.33). The average yearly FOB price for beef increased from 1,289 USD per metric ton CWE in 2002 to 3,462 in 2008 USD per metric ton CWE due to an increase in world market prices for beef (USDA 2011). The price decreased in 2009 due to the world financial crisis but rebounded in 2010 to 3,832 USD per metric ton CWE (USDA 2011). The increase in the FOB prices for beef came at the time that Argentina had devalued the currency and at a time that the Executive was intending to increase the domestic consumption of beef.
Figure 1.26: Herd size, slaughter and extraction rate in Argentina between 1993 and 2010.


Figure 1.27: Beef production, export market and domestic market consumption in Argentina between 1993 and 2010.


Figure 1.28: Beef domestic consumption and retail price in Argentina between 1993 and 2010.


Figure 1.29: Beef exports and FOB price in Argentina between 1993 and 2010.

Starting in 2007 with the interventions described earlier, the live steer price in Argentina decoupled from the live steer prices of neighboring countries of Brazil, Uruguay, Paraguay, and Chile (MAGyP 2011) (Figures 1.30 to 1.33). For instance, in 2002 the steer live price was 0.50 USD per Kg both in Argentina and Brazil, while in 2008 it was 0.85 USD per Kg in Argentina and 1.35 USD per Kg in Brazil (MAGyP 2011) (Figure 1.30). The same difference in prices was observed with Uruguay, Chile, and Paraguay (MAGyP 2011) (Figures 1.31 to 1.33). However, in February 2010 the Executive allowed cattle prices to increase in order to stop the liquidation of the herd. At that time, prices in Argentina started to follow the domestic prices of the neighboring markets (MAGyP 2011) (Figures 1.30 to 1.33). In 2010, the average yearly steer live price was 1.605 USD per Kg in Argentina, 1.705 USD per Kg in Brazil, 1.517 USD per Kg in Paraguay, 1.512 USD per Kg in Uruguay, and 1.646 USD per Kg in Chile (MAGyP 2011) (Figures 1.30 to 1.33).
Figure 1.30: Steer live price in Argentina and Brazil between 2000 and 2010.


Figure 1.31: Steer live price in Argentina and Uruguay between 2000 and 2010.


Figure 1.32: Steer live price in Argentina and Paraguay between 2000 and 2010.


Figure 1.33: Steer live price in Argentina and Chile between 2000 and 2010.

The Political Economy of Agricultural and Food Policy

The previous section not only described the economic, social, and political situation since 2002 and the policies enacted to promote development but also the specific agricultural policies to control inflation and increase fiscal revenue. On the one side, these agricultural policies reduced agricultural revenue on the farming sector. On the other side, these agricultural policies redistributed income through increasing the purchasing power for domestic consumers because of lower food prices (purchasing power effect) and permitted the national government to create social programs and welfare payments (tax effect). These policies are approached in this section from the traditional political economy perspective and then from a new political economy perspective suggested for this Dissertation.

Original Framework

The political economy of agricultural policy in developing countries has been researched extensively by the World Bank for Africa (Krueger et al, 1991c; Anderson and Masters, 2009), Asia (Krueger et al, 1991b; Anderson, 2009a), Eastern and Central Europe (Anderson and Swinnen, 2008), and Latin America (Krueger et al, 1991a; Anderson and Valdes, 2008). These studies estimated the impact of both targeted and broad policies on the agricultural economic sector with respect to prices and output. Targeted policies affect the production costs, revenue, and profits of the agricultural sector. Broad policies affect the trade regime, exchange rates, and the balance of payments. To their surprise, researchers found that broad policies were of greater
importance than targeted policies on the agricultural sector. They argued that major reforms of the agricultural sector were carried out in conjunction with major reforms of the overall trade, exchange rates and payment regimes (Krueger, 1992; Schiff and Valdez, 1992; Anderson, 2009b).

These studies contend that the political-economic equilibrium, i.e. the interaction of the political process and the economic process, at a period of time in a country is through policies (Krueger, 1993). These studies argued that politically determined policies have economic consequences that may change the political-economic equilibrium that generated those policies; and that economically determined policies also have political consequences that may change the political-economic equilibrium that generated those policies. Therefore both the economic process and the political process are dependent to one another and policies are not an enduring phenomenon (Figure 1.34). Finally, both the government and the market can change according to the political and economic responses to a specific policy, resulting in various types of policy cycles (Krueger, 1993).

Figure 1.34: Conceptualization of the political economy of agricultural policy framework suggested by Anne Krueger and Anderson at the World Bank.

Rogowski (1987) further developed this framework by combining the Stolper and Samuelson (1941) theorem of gains and losses from protection and opening of an
economy to trade with a model of politics derived from Becker (1983) in which pressure groups compete for political influence. Rogowski argues that exogenous changes in the costs (or risks) of countries’ international trade will produce conflict between owners of the domestic scarce and domestic abundant resources. This implies that the winners from any exogenous change in international trade will seek to continue and to expand trade, while the losers will seek protection; and that those who gain economically from exogenous changes in international trade will increase their political power as well. Therefore, with shifting increasing or decreasing exposures to international trade political power and policies will shift in each case toward the owners and intensive users of scarce factors. Political class cleavages or urban-rural cleavages will be predicted in nations with different resource endowments when increasing or decreasing their international trade with the rest of the world.

Modified Framework

The framework from the World Bank expanded the understanding of causality in the political economy as argued by Lowi (1972), whether politics determine policies or whether policies determine politics. The conceptual framework for this Dissertation argues that there is causality of politics towards policies and from policies towards economics and vice versa as detailed above. However, the new framework presented below claims that instead a two-way causality, the political economy of policies can be better described and analyzed as a circular causality relationship. Politics cause policies, but policies cause politics through affecting the socioeconomic process first. Then the socioeconomic process in turn affects the political processes through a series of
responses. These responses may be electoral (direct and indirect), or non-electoral, such as lobby, advocacy, and demonstrations (Figure 1.35).

**Figure 1.35: Conceptual framework suggested for this Dissertation.**

Lobbying, advocacy, and social demonstrations are continuous responses in time, as elections (indirect voting) occur only every two years for the Legislative branch and every four years for the Executive branch in those countries that have a consolidated democracy. In some countries direct voting is an alternative to modify policies straight by citizens instead of relying on the representatives. Direct or non-electoral voting may take the form of referendums or plebiscites, recalls, and propositions or initiatives.

Lobbying, advocacy, and social demonstrations try to affect policymakers decisions, either directly or indirectly, either from outside or from inside, either publicly or privately, while elections try to change the policymaker itself. Therefore, society has broadly speaking two main avenues through political participation toward influencing the
allocation of social goods and social values. The first one, in a given point in time, by electing those representatives that best fit their economic policymaking views through electoral voting by rewarding the incumbent party to stay in office or by punishing them and electing the opposition party. The second one, within that period of time between elections and once that those representatives are already elected, through lobbying or interest group access, advocacy coalitions, and demonstrations from social movements, in order to influence social, economic, and political policymaking.

In this Dissertation we employ the conceptual framework described above and we focus in Argentina during the last decade as described in the previous sections. The political process in the conceptual framework takes the form a federal, indirect democratic republic with three layers of government: national, provincial, and departmental. As described in the background, most of the policies analyzed are laws enacted by Congress, presidential decrees, ministerial resolutions, or secretariat dispositions. The socioeconomic process under this framework takes the form of changes in aggregate variables such as the gross domestic product, employment, the level and distribution of income, money supply, fiscal revenue, fiscal expenditures, investment, terms of trade, exchange rates, and sector prices, output and revenue, among the most important ones. Voting takes the form of changes in voting turnout, invalid voting (blank and null votes), and valid votes (for each party). Advocacy may take the form of media campaigns, public speaking, and publishing research to indirectly influence decision makers. Lobbying may take the form of meetings, trips, conference participations to directly influence decision makers. Finally, manifestations and mobilizations may take
different forms of social protest to influence decision makers. The conceptual framework takes into account space and time as well. The geographic location or the territory affects the processes described above, since some processes occur at the local level, while others occur at the regional or national levels. Similarly, time affects the processes mentioned above as well, since the effect of time in the processes is relative to whether they happened in the past, are happening now, or will happen in the future.

Problem Statement

According to different authors, the political economy of Argentina in the XX and early XXI century has been characterized by the difficulty of establishing a sustainable path of balanced and integrated development due to social, economic, and political conflicts (O’ Donnell 1978, Di Tella and Platt 1986, Di Tella and Dornbusch 1989, Sturzenegger et al. 1991, della Paolera and Taylor 2003, Chudnovsky and Lopez 2007, Cortes Conde 2008, Sturzenegger and Salazni 2008, Richardson 2009, and Narodowski and Panigo 2010). Some of the conflicts identified in the literature include: rural versus urban, agriculture versus industry, high class versus low class, internationalist versus nationalist, oligarch versus populist, and Radical versus Justicialist among the most important ones.

O’ Donnell (1978) argues that in the case of Argentina, a small economy which is open to trade, the stop and go cycle in economic development is due to the fact that Argentina’s main historical tradable goods were agricultural commodities, beef and wheat. These commodities were also the components of the urban class diet primarily,
beef, bread and pasta. When economic conditions approached a zero-sum state, where the gains for one side represented the losses for the other side, this linkage between the export market and the domestic market increased political conflict through two distinct alliances. The first one is a populist, domestic oriented alliance composed by the working class, the small national urban bourgeoisie, and the large international urban bourgeoisie which resulted from a rural versus urban cleavage. The second one is a capitalist, export oriented alliance composed by the rural “Pampas” bourgeoisie and the large international urban bourgeoisie which resulted from a class-based cleavage. The large international urban bourgeoisie pivoted between the two alliances. The political shifts between one alliance and the other resulted in recurrent economic crises and a stop and go cycle in which neither side was able to fully develop their policy goals in the long term.

Richardson (2009) claims that because the rise of soybean production in Argentina in the recent decades, and the fact that they are not part of the food diets of Argentines, there is a new era of “export-oriented populism” in Argentina. This new era is supposed to finally be able to break up the stop and go cycle and the conflict between export oriented farmers and domestic low income consumers. However, in the traditional populist alliance export promotion and low domestic food prices are in direct conflict, and policies that lower the domestic price for food are observed (export tariffs, export quotas, export bans, domestic prices set below the market price, among others). Nonetheless, these populist policies have been present since January 2002 in the continued presidencies from the Justicialist Party. The incumbent party has been able to stay in power, winning the 2003, 2007, and 2011 presidential elections.
Narodowski and Panigo (2010) argue that there exists a structural asymmetry between the agricultural and the industrial sectors in Argentina, given by an earlier development and a higher productivity of agriculture over industry. These two factors have given agriculture a higher profitability over industry. Different policies have been implemented on and off during the XX and early XXI century to protect the industrial development from import competition at the expense of agriculture. These policies depressed the revenue for the agricultural sector through either trade restrictions (export quotas or export bans), changes in the real exchange rate (devaluation, overvaluation or multiple exchange rate systems), or import tariffs on inputs and export tariffs on output. The objectives of these policies were to lower the domestic prices for food staples which are considered wage goods, to encourage the domestic processing of farm products, to redistribute income from rural farmers to urban wage earners, and to raise fiscal revenue with low collection costs for the national government (Sturzenegger and Salazni 2008).

According to Williamson (1977) strategic wage goods are defined as all the consumption goods and services for which the income elasticity of demand is less than unity. These are necessities for which food is the prime case. When there are changes in the prices for food, whether inflationary or deflationary, these have different expenditure effects by socioeconomic class. Williamson (1977) concludes that food price inflation has a regressive impact on expenditures given that the low-income class spends a higher share of their income on food than the high-income class.
Purpose

To understand the political economy of agricultural and food policy more fully, this Dissertation develops a new conceptual framework that takes into account electoral, lobbying, advocacy, and social demonstrations responses from the socioeconomic process in order to alter the political process. To understand the political economy of agricultural and food policy in a developing nation, this research empirically analyzes the electoral response in Argentina, a country that has implemented several agricultural and food policies affecting producers and consumers in an environment characterized by stop and go cycles due to shifting political alliances between a populist alliance and a capitalist alliance. More specifically, the empirical estimation of the electoral response is conducted through an economic voting and political referendum model. The difference in vote is measured for the incumbent party in elections at the national, provincial, and department levels as well as executive and legislative elections, with respect to quantity of revenue taxed away from agricultural commodities (grains and livestock). This will help to better understand the relationship between politics, policies, economics and electoral outcomes in a country where agriculture and food play a key role in society and its path to sustained development.

Research Questions

The conceptual framework follows the circular political economy framework described earlier. This framework is based on the assumptions that the political system will generate policies that will positively impact the socioeconomic process, which in
turn will generate a positive electoral outcome that will reward the incumbent party to stay in office for another term. An empirical economic voting and political referendum model is used to test specific hypotheses within this political economy framework. The research questions of this Dissertation follow this circular conceptual framework:

1. What have been the agricultural and food policies enacted by the national government in Argentina since 2002?

2. What have been the impacts of these set of policies in the socioeconomic process?

3. What has been the difference in the electoral response for the incumbent party given increasing agricultural revenue taxed away between 2001 and 2009?
   3a. Taking into account four social cleavages: Urban versus rural, center versus periphery, agricultural versus non-agricultural, and high-income versus low-income.
   3b. Taking into account the different government layers (national, provincial, and departmental) and branches (legislative and executive).

4. What have been the changes in the political process from the electoral responses?

5. Were the changes induced on the agricultural and food sectors through specific policies by the incumbent consistent with the electoral results they obtained?
Therefore, empirical economic voting and political referendum theory is employed to estimate the effect of changes in agricultural revenue by the national government on the vote for the incumbent party.

**Significance of the Study**

This research is important for three reasons. First, this study presents a new conceptual framework that expands the accepted framework by development economists when researching the political economy of agricultural and food policy in developing nations. This new framework furthers the goal of understanding the political economy of developing nations where food represents a higher share of consumers’ expenditures, where agriculture not only provides the main source of foreign exchange through exports of commodities, but also has a higher share in gross domestic product and labor participation relative to developed nations, and where democracies are unstable given high electoral spatial and temporal volatility due to the low degree of party institutionalization, and high degrees of party denationalization and party fragmentation.

Second, this study tests the rationality of adopting specific agricultural and food policies taking into account not only the socioeconomic effects but also the electoral effects on the political system. Following economic voting and political referendum theory, this Dissertation empirically tests through spatial and temporal statistical techniques the validity of the policies generated by the political system through the electoral response in Argentina at the department, provincial and national level.
Third, this research enhances the body of knowledge in the inter-disciplinary social sciences. In economics, this research increases the knowledge in the areas of development and growth, trade, and public finance. In political science, this research expands the knowledge of political referendum and economic voting models, separation of powers, fiscal federalism, party institutionalization, and the geography of voting. In policy studies, this research enhances the knowledge of policy design, policy formulation and policy implementation in the area of agricultural and food policy in Argentina and its relation to voting, lobbying and demonstrations. This study develops real-world implications that will be of help to academics in the fields of economics, political science, policy studies, geography, and history, to better understand and explain within the social sciences the complexities of agricultural and food policies when analyzed under an inter-disciplinary conceptual framework.

**Outline of the Dissertation**

The first part of this chapter provided a background of the broad economic and social policies implemented by the Duhalde, Kirchner, and Fernandez de Kirchner administrations after 2002, and the targeted agricultural and food policies that decreased the revenue of the farming sector in order to favor the manufacturing sector in relation to the broad policies. The second part of this chapter provided the introduction to the political economy of agriculture and food policy in developing nations and the conceptual framework employed by development economists. It was followed by a new conceptual framework that takes into account voting, lobby, advocacy, and demonstrations as
responses from the socioeconomic process to alter the political process. The conceptual
model, the problem statement, the research questions and the significance of the study
were described in the last sections of this chapter.

The literature review is presented in chapter 2. The main topics included are
political referendums and economic voting model theory and empirical estimation
techniques in general and specific to Argentina. It is also included in this chapter the
relationship between the electoral response with lobbying or interest group access,
advocacy coalition, and social demonstrations.

The research methodology is explained in chapter 3. The design of the research
and the unit of analysis are described first together with a description of the data used,
limitations, and threats to validity. Then, the dependent and independent variables of the
model are described. Finally, the hypothesis and each test statistics are shown. The results
of the study are laid out in chapter 4. The descriptive statistics of the dependent and
independent variables as well as the results of the hypotheses are shown both in numeric
and map format. A spatial and temporal analysis of the results from the variables and the
hypotheses is provided to better understand the relationship among them. The final
chapter provides the conclusion, limitations, and recommendations for future research.
CHAPTER TWO
REVIEW OF THE LITERATURE

Since the objective of the present research endeavor is to estimate the electoral effect on the incumbent party in relation to the agricultural and food policies enacted in Argentina during the last decade, this chapter reviews literature related to the electoral response to changes in the socioeconomic and the political conditions, both in general and in particular to Argentina. Economic voting and political referendum theory and empirical estimation methods are reviewed in the first section of this chapter. Previous studies of these models in Argentina during the last two decades are presented in the second section. Finally, in the third section, economic voting and political referendum theory is discussed in relation to the other socioeconomic responses outlined earlier: lobbying, advocacy coalition, and demonstrations from social movements. A summary of these three sections closes the literature review chapter.

**Economic Voting and Political Referendum Theory**

Economic conditions influence voters’ evaluations of the politicians in power, and therefore their behavior in elections (Lewis-Beck 1988). This relationship between the economy and electoral outcome has been called economic voting in the literature. According to Palmer and Whitten (1999) and Lewis-Beck and Stegmaier (2007) the economic voting paradigm is well established through decades of research and hundreds of articles and dozens of books published. Initially, the literature on economic voting and

Assumptions of the Theory

Economic voting and political referendum theory is used both by economists and political scientist to understand the effect of different economic, sociological and political variables on the vote (Lewis-Beck and Paldam 2000). Economic voting builds on the theoretical assumption that voters hold the government responsible and accountable for the performance of the economy on indicators such as unemployment and inflation. The voter rewards the incumbent by voting him or her to stay in office or punishes the incumbent by voting him or her out of office and thus replaced by the challenger. This hypothesis is called the reward-punishment hypothesis. Therefore, the incumbent gains support and votes as unemployment and inflation fall and lose support and votes to the challenging party when unemployment and inflation rise. The electoral support for the incumbent party should correlate negatively with unemployment and inflation.

Given that the perceptions, knowledge and judgment of the economy by voters are not usually defined in economic voting studies, Sanders (2000) argues that two ancillary assumptions underpin the reward-punishment hypothesis. The first one is that it is clear to voters which party (or parties) is (are) responsible for economic policy and
economic performance. Powell and Witten (1993, 406) argue that “where clarity of responsibility is low, the economic factors will be blurred”. For instance, if the relationship between the economy and the government lacks clarity of responsibility, there should not be any correlation between incumbent party electoral support and unemployment and inflation. The second one is that there is a viable and politically credible opposition party (or parties) to which voters can switch their support if the incumbent party’s performance is deemed economically inadequate. For example, in conditions where the challenging party has no history of economic management or its reputation is non-credible there should be no correlation between incumbent party electoral support and changes in unemployment and inflation.

**Voter Dimensions: Time, Target, Grievance Asymmetry and Differential Partisan Capability**

Voters react differently to economic events according a time dimension, such as past or future events. Voters are called retrospective when they react to past events (Key 1966, and Fiorina 1978 and 1981). Retrospective voters look at the past performance of the economy to reward or punish the incumbent in the coming election. Voters are called prospective when they react to potential future events based on their expectations (Downs 1957, MacKuen et al. 1992, Clarke and Stewart 1994, and Norpoth 1996). Prospective voters look at the economic clues revealed in the electoral campaigns of both incumbent and challenger to make a decision in the coming election. In retrospective studies it is usually assumed that voters gauge changes in the economy since the last election, or two years for most democracies. In prospective studies it is usually assumed that voters
estimate changes in the economy for the 12 months after the election. MacKuen et al.
(1992) argues that the usual models of electoral response to economic conditions assume
on the one hand a retrospective voter that bases his expectations solely on recent
economic performance or personal economic experience, naming him a peasant. On the
other hand, MacKuen et al. (1992) suggests that models assume a prospective voter that
incorporates new information about the future into personal economic expectations,
naming him a banker.

Voters react differently to economic events according to a target dimension, such
as personal, local, regional or national events (Markus 1988 and Pattie et al. 1997).
Kinder and Kiewiet (1979 and 1981) argue that individual citizens can be described in
two ways when deciding how to vote: the first one emphasizes the political significance
of the citizens own economic condition, the second one stressing the political importance
of the citizens assessments of the economic condition. Personal or household economic
voting is called pocketbook or egotropic voting, while collective or national economic
voting is called sociotropic voting (Kinder and Kiewiet 1979 and 1981, Kiewiet 1983).
Pocketbook voters usually compare their present economic situation relative to the
previous election. If the pocketbook voter thinks that he is doing better, then he would
support the incumbent and reject the challenger in the coming election, and the opposite
would be true if he is doing worse off. Sociotropic voters usually compare the present
economic situation of the nation relative to the previous election. If the sociotropic voter
thinks that the nation is doing better, then he would reward the incumbent by rejecting the
challenger in the coming election, and the opposite would be true if he considers that the
nation is doing worse off.

The grievance asymmetry happens when voters react more to negative changes than to positive changes in the economy (Bloom and Price 1975 and Nannestad and Paldam 1997). The grievance asymmetry means that voters like an improvement in the economy less than they dislike the corresponding deterioration in the economy. Nannestad and Paldam (1997) argue that this asymmetry in the social welfare function is closely related to risk aversion, and has two important policy implications. The first one is that there is a political tradeoff between economic growth and stability. The second one is that exists a ruling cost for both the party in power and the party in opposition when supporting or opposing a highly sensitive policy. Stiglitz (1998, 8) claims that “citizens are far more sensitive to losses from the status quo than to gains. This might help to explain why the status quo often seems to have such sway; losers scream louder and invest more in blocking policy changes”. Pacek and Radcliff (1995, 757) go even further to argue that “in the developing nations, a shrinking economy imposes enormous electoral costs on incumbent governments, while growth provides no benefits” and “the asymmetry in public response to the economy might itself contribute to the delegitimization of electoral institutions.”

Hibbs (1977 and 1987) claims that voters have differential macroeconomic policy expectations of left leaning and right leaning governments because their ideological understanding of the economy: left leaning parties favor low unemployment while right leaning parties favor low inflation. The differential partisan capability approach assumes
that voters make differential judgments about economic performance on inflation and unemployment depending on party leaning on the left or the right. Voters are therefore less likely to punish a left-leaning incumbent party in periods of high unemployment given that the alternative right-leaning party would be less proactive even to address the issue of unemployment. For the same reason, voters are less likely to punish a right-leaning incumbent party in periods of high inflation. The electoral support for left leaning parties should correlate negatively with inflation but should be uncorrelated or even positively correlated with unemployment while for right leaning parties should correlate negatively with unemployment but should be uncorrelated or even positively correlated with inflation.

Economic voting and political referendum theory rely on specific assumptions to model the causality between changes in the political economy on electoral results. The reward-punishment hypothesis is anchored by the clarity of responsibility and credible opposition hypotheses as described earlier. In this study, we assume that the Argentine voter is able to reward and to punish the incumbent, and we further assume that the voter can discern both the responsibility of the incumbent party on policymaking affairs and the options that the opposition brings in every election. The theory also relies on constructs to understand voting behavior: time, target grievance asymmetry and differential partisan capability as described above. In this research, we assume a retrospective voter that looks into the past two years to evaluate the incumbent party and a pocketbook voter that places more importance on his well being than the overall well being. We also assume that the voter punishes the incumbent more when his well being
decreases than he rewards the incumbent when it increases. Given the economic and social description of Argentina during the Duhalde and Kirchner administrations and the fact that the PJ and FpV are left-leaning parties, we further assume that the voter prefers low unemployment over low inflation. However, as explained in the following chapter, data limitations prevent controlling for the grievance asymmetry or for party capability.

 Aggregate versus Individual Level Studies: Ecological and Atomistic Fallacies

 There have been discrepancies between aggregate-level and individual level studies in economic voting (Kramer 1983). Aggregate-level studies have historically relied on time-series analysis of aggregate data while individual-level studies have focused on analysis of cross-sectional data. The differences in the findings between aggregate and individual-level studies are “a statistical artifact and do not show any real disagreement about the true values of the underlying behavioral parameters of interest; they arise simply because the time-series and cross-sectional analyses are estimating two quite different derivative empirical relationships, neither of which is a perfect reflection of the real behavioral we are ultimately interested in making inferences about” (Kramer 1983, 93). Furthermore, “even when the underlying behavioral relationship that governs individual voting decisions is the same for every voter in every election, the observable aggregate-level and individual-level empirical relationships between measurable economic variables and votes will still differ considerably from each other” (Kramer 1983, 93). Therefore, in general ecological regression analysis should not be employed to make inferences about individual behavior. However under very special circumstances
the analysis of the regression between ecological variables may be used to make such inferences (Robinson 1950 and Goodman 1953).

Ecological fallacy occurs when drawing inferences from the effect of economic conditions on voting behavior at the individual level based on aggregate or group level data (Diez Roux 2002). Correlation or causal associations between variables at the group level (or ecological level) may differ from associations between the same variables measured at the individual level. Therefore, a statistical significant relationship between economic variables and voting behavior using aggregate-level data cannot be taken as evidence of a causal statistical significant relationship between the same variables using individual level-data.

Piantadosi et al. (1987) argue that analyses with variables that rely on group level data may be preferred over individual level data under four factors. First, variables are more conveniently defined or measured on groups (or aggregates) given that the analysis of individuals would be unavailable because of resource constraints (time, funds or both) or unreliable because of errors in finding individuals that represent the group statistitically. Second, analyses with group level data permit a wider study of relationships across standardized defined boundaries (census tracts, counties, states and nations), from datasets regularly published by census and statistics agencies governments across the world. Third, the precision of aggregate measures is likely to be higher for groups than for individuals. Finally, many times it is the interest to understand the response from populations and not individuals.
Atomistic fallacy happens when drawing inferences regarding the effect of economic conditions on voting behavior across units defined at a higher level based on data collected for units at a lower level (Diez Roux 2002). The atomistic fallacy arises because correlation or causal associations between variables at the individual level may differ from associations between the same variables measured at the group level. In this case, individual level variables are used as proxies for unavailable or unreliable group level data.

As described in Chapter 3, in this research we employ aggregate level data for the departments of Argentina. This implies that the inferences drawn are at the group-level and not at the individual-level. It is important to stress this point because many times inferences have been drawn at the individual-level from aggregate-level data, thus falling into the ecology fallacy trap described above. The electoral effects estimated from different independent variables are for the population within the spatial unit, in our case, standardized defined units called departments.

*Modifiable Areal Unit Problem (MAUP)*

The modifiable areal unit problem (MAUP) arises from working with group level data that was originally compiled at a higher detailed level but spatially aggregated into units in an arbitrarily or ad hoc fashion (Openshaw 1983, Fotheringham and Wong 1991, Wong 2009, and O’Sullivan and Unwin 2010). The prime example is a national census, in which data is collected at a household level but aggregated for practical and privacy concerns in different spatial units such as blocks, block groups, census tracts, county subdivisions, counties, states, and country. Since the geographic borders of these
aggregation units are arbitrary with respect to the variables employed in the research, the level and configuration of aggregation employed is going to affect the statistical relationship between the dependent and independent variables. Thus, if the aggregation units are spatially specified at different levels of detail or at different configurations, the statistical relationships are going to be different.

According to Openshaw (1983), Fotheringham and Wong (1991), Wong (2009), and O’Sullivan and Unwin (2010), the reliability of the results reported from an analysis of aggregated spatial data are affected by MAUP in two ways: the scale problem (or effect) and the zoning problem (or effect). In the scale problem, the results are likely to vary with the level of aggregation while in the zoning problem the results are likely to vary with the configuration of the zoning aggregation. In the scale effect, the aggregation of higher detailed data will produce new lower detailed data that is clustered around a regression line and therefore have a stronger coefficient of determination in statistical analyses (O’Sullivan and Unwin 2010, 38). This happens because the combination of values from many data observations through scale aggregation brings the value of the overall data closer to the mean. The scale aggregation effect persists as long as data is aggregated from higher detailed data to lower detailed data or from smaller area units to larger area units. In the zoning effect, the aggregation effect depends on the different ways in which the data can be aggregated. Since the data can be aggregated in many different zones, it is expected that the statistical coefficients may vary accordingly.

Openshaw (1983, 4) argues that since the boundaries of the areal units are arbitrary and modifiable, then the value of any statistical analysis based upon them must
be in some doubt and may not possess any validity independent of the units which are being studied. Since boundaries can be drawn in a different manner, analyses of data tabulated according to different boundaries will yield different results (Wong 2009, 105). Therefore, statistical correlation and regression coefficients and parameters as well as the robustness of statistical tests only apply to the variables defined under the specified scale and zoning aggregation.

In any given national Executive or Legislative election in Argentina there are close to ninety thousand polling booths distributed in close to ten thousand polling places (schools, churches, clubs, etc.) across the country in which 29 million voters are eligible to vote (DINE 2011). In the polling booths, voters cast their chosen paper ballots into the ballot box. Each polling place corresponds to a polling district and the size of the area that covers depends on the density of the population and the quantity of voters assigned to the polling place. Once voters finish casting their ballot papers, the voting data is aggregated and reported as follow: polling booth, polling place (district), department, province, and nation. In this research, the aggregation unit is spatially defined at the department level of detail and at the associated level of configuration. This means that for our estimates to be consistent across the different election periods we have to be consistent in working with departments. Therefore, we cannot switch from departments to polling districts (higher detail level) or provinces (lower detail level), and we have to check that the configuration of the departments has not changed across all the elections analyzed.
Misaligned Data Problem (MIDP)

The misaligned data problem (MIDP) arises from differences in the spatial boundaries of group level variables employed in the research (Banerjee et al. 2004), or similarly, variables that are aggregated over differing sets of regional boundaries (Mugglin et al. 2000). A prime example is that voting data for a given election is presented for the precinct but unemployment and income are given for the county, or that precinct boundaries differ between elections. Misaligned data is the result of two factors. The first factor is that agencies of the government disseminate datasets in different spatial resolution, such as points, lines, and polygons in vector type data and in different grid cell size in raster data. For example, most of the socioeconomic data that is usually reported across the government it is in the form of polygons in different resolutions or boundaries: land parcels, zip codes, blocks, block groups, census tracts, counties, states, watersheds, etc., in the case of the United States. The second factor is that the spatial resolution or boundaries are frequently updated to reflect changes in the underlying variable being measured. For instance, most of the socioeconomic data boundaries, such as blocks, block groups and census tracts, are usually updated every ten years in the decennial census in the United States.

In order to be able to study the statistical relationship of variables with misaligned boundaries, it is a prerequisite to estimate the values of variables on regions over which they were not measured. This process is known as areal interpolation and regions on which data are available are denominated source zones and regions for which data are to be estimated as target zones (Mugglin et al. 2000). Areal interpolation is not necessary
when all the group level data employed in the research shares the same spatial resolution or boundary, such as counties or states. In this research all the variables used in the estimations are spatially defined at the department level of analysis as shown in Chapter 3. There were no MIDP and therefore it was not necessary to conduct areal interpolation statistical techniques.

*Spatial Structure and Spatial Dependence*

According to Anselin (1988 and 1999), spatial econometrics and spatial statistics are subfields of econometrics and statistics respectively, that take into account spatial effects of data with a locational component, specifically both spatial interaction (spatial dependence) and spatial structure (spatial heterogeneity) in regression models for cross-sectional and panel data. Cressie (1993) calls the former dependent-data model and the latter inhomogeneous-data model. In the example provided below, a linear regression model is shown to present terms and concepts regarding spatial econometrics and statistics.

\[
Y_{ij} = \alpha + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 X_{3ij} + \beta_4 X_{4ij} + \epsilon_{ij}
\]

Where:

Dependent variable \((Y_{ij})\): is the value of the dependent variable (e.g., vote for incumbent or challenging party at a given election) in time \(i\) and spatial unit \(j\), this is \(Y_{ij}\).
Independent variables ($X_{nij}$): are the values of the independent variables that cause or explain the dependent variable (e.g., unemployment, inflation, income, etc) in time $i$ and spatial unit $j$, this is $X_{ij}$.

Coefficients ($\beta_1, \beta_2, \beta_3, \text{ and } \beta_4$): are estimates of a set of numerical coefficients, computed by the regression statistical tool, that indicate how the variation of the dependent variable depends on the variation in each of the independent variable (e.g. how a one percent change increase in unemployment affects the vote for the incumbent party in a given election).

Residual (\(\varepsilon_{ij}\)): is an estimate of the portion of the dependent variable that is not explained by the model; this is, the model under- and over-predictions. Therefore, $\varepsilon$ is the error term or residual, and it is the difference between the predicted value of $\hat{Y}_{ij}$ and the observed value of $Y_{ij}$, this is, $\varepsilon_{ij}$. Therefore, $\hat{Y}_{ij} = Y_{ij} - \varepsilon_{ij}$.

There are four assumptions regarding the error term for the regression analysis to be valid and the hypotheses testing to be correct. First, the expected value of $\varepsilon$ is equals to zero. Second, the variance of $\varepsilon$ is constant across the values observed and therefore equal to zero, and this is called the homoskedasticity condition. Third, the covariance of $\varepsilon$ with the $x$’s is equal to zero, and therefore the disturbance terms are independent. Fourth, $\varepsilon$ follows a normal distribution. When all four assumptions are met, $\varepsilon$ is said to be normally, identically, independently, distributed (niid).

Spatial econometric methods are needed when data has a locational component because space affects the relationship between the independent variables and dependent variables through interaction (dependence) and structure (heterogeneity) (Anselin 1988
and 1999, and Cressie 1993). This derives from Tobler’s first law of geography: “everything is related to everything else, but near things are more related than distant things” (Tobler 1970). Therefore, units located closer to each other in space or time are going to be more likely to show or display a similar effect between the dependent variable and independent variables than units that are located farther apart in space or time. If there is spatial dependence or heterogeneity in the error term, then the assumptions listed above are not going to hold, the error term for the regression analysis is not going to not be valid, and the results from hypotheses testing are going to be biased.

Anselin and Bera (1988) loosely define spatial dependence as the coincidence of value similarity with spatial unit similarity. High or low values for a given independent or dependent variable tend to cluster in space (positive spatial autocorrelation), or spatial units tend to be surrounded by spatial units with very dissimilar values (negative spatial autocorrelation). Cressie (1993) argues that data close together, both in time or in space, are likely to be correlated and therefore cannot be modeled as statistically independent. In order to be able to properly carry out a statistical estimation, this loss of information from the effect of the spatial units over the dependent and independent variables must be explicitly acknowledged in statistical tests. There are different approaches to take into account dependency in regression analysis, such as spatial weights, spatial lag operators, spatial lag dependence, spatial error dependence, and higher order spatial processes (Anselin and Bera 1988).
In the case of spatial weights, it is important to have in mind that spatial regression models can be global or local according to the aggregation or disaggregation of spatial units of analysis. On one hand, an ordinary least square (OLS) model is a global regression model that yields coefficient estimates and residual estimates by aggregating the effect of the total spatial units in the analysis. On the other hand, geographically weighted regression (GWR) models generate parameters disaggregated by the spatial units of analysis. Therefore, GWR models allow the assessment of the spatial dependency and heterogeneity in the estimated relationships between the independent and dependent variables at the spatial unit of analysis while OLS models does not (Fotheringham et al. 2002).

According to Anselin and Bera (1988) there are diverse mechanisms best suited to test for spatial dependence, such as the Moran’s I Test and the Kelejian-Robinson Test (KR); to test for spatial error autocorrelation, such as the Likelihood Ratio (LR), the Wald Test (W), and Rao’s Score Test (RS), which is known as the Lagrange multiplier test in econometrics; to test for spatial lag dependence, such as LR and RS; and to test for possible presence of both spatial error and lag autocorrelation, such as RS, LR and WS.

The presence of spatial dependency in the errors indicates that the estimate of the mean squared error, which as an estimate of the variance of the errors, will not be reliable as well as any of the hypothesis tests that are based on that estimate. If there is positive spatial autocorrelation, i.e. the effect of the independent variables on the dependent variables are clustered spatial units of analysis, the estimate of the mean squared error will be an underestimate of its true value. If this biased estimate is used to evaluate the
model, it will indicate that the model fits the data better than it really does, and therefore
the coefficient of determination $R^2$ will be higher than it really is. The mean squared error
is also used to calculate standard errors for each of the regression coefficients ($\beta_1, \beta_2, \beta_3,$
and $\beta_4$ in our example above) and these standard errors are then used to test the
hypothesis that the regression coefficients are significantly different from zero. If they are
different from zero, then a statistically significant effect exists between the independent
variables and the dependent variables (a change in the unemployment affects the change
in the vote for the incumbent party, for instance). However, the standard errors used in
these significance tests will be underestimated whenever the mean squared error is
underestimated, and the tests will be misleading. This will lead to state that the dependent
and independent variables are related when they may not be related.

The empirical estimation of the electoral effect on the incumbent party in
Argentina during the last decade given the changes in the agricultural revenue from
specific sector-related policies requires specific statistical techniques to address the
limitations imposed from the data available, as described in the following chapter. The
estimations of the effects have to fulfill the requirements of the statistical technique
regarding spatial structure (heteroskedasticity) and spatial dependence (autocorrelation)
in order for the estimates to be valid.

**Dependent and Independent Variables**

In the earlier economic voting studies, the dependent variable used was popularity
of the government leader (president or prime minister) but later extended to percentage of
vote for the incumbent party or coalition of incumbent parties. There are many
independent variables that can be used in economic voting and political referendum studies and they are usually grouped in the following categories: economic variables, sociological variables, and political variables. The usage of independent variables has varied in the last decades given the adoption and innovation of economic voting and political referendum theory across the social sciences.

Economic variables that can be used to explain how voters react to the economy include unemployment, inflation, income, economic growth, fiscal spending, fiscal borrowing, and currency devaluation among the most important ones. Unemployment, inflation and growth have been the independent variables most thoroughly researched and the ones that consistently have had the expected coefficient in strong and weak democracies around the world where positive macroeconomic performance is found highly correlated with incumbent support (Wilkin et al. 1997 and Lewis-Beck and Stegmaier 2007).

Sociologic variables employed in economic voting include age, race, ethnicity, language and social cleavages (Roberts and Wibbels 1999 and Brooks et al. 2006). Social cleavages are political differences and voting differences grounded in the social structure of a society (Bartolini and Mair 1990). Lipset and Rokkan (1967) argued that once a cleavage structure was established in society it provided a durable basis for political alignment and confrontation which in turn manifested itself in a consistent voting behavior across elections. Among social cleavages we can differentiate among gender (men versus women), class (high income versus low income or highly educated versus poorly educated), residence (urban versus rural), work type (blue collar versus white
collar), relation to factors of production (working versus owner), economic and political gravity (center versus periphery), and beliefs (religion versus secularism) (Roberts and Wibbels 1999, Manza 1999 and Brooks et al. 2006). Many studies came to criticize Lipset and Rokkan’s argument that cleavage structures were stable in society, especially after the economic integration of nations around the world through globalization and adoption of democracy in the 1980’s and early 1990’s (Franklin 1992 and Dalton 1996). Despite the fact of high electoral volatility in developed and developing nations and strong and weak democracies, some studies found that cleavage structures still remain important in society (Brooks et al. 2006). These social cleavages are the result of ideological divisions that tend to change with changes in the political, economic and social currents.

Political variables employed in economic voting models are diverse and usually not easily categorized. The first group of political variables takes into account the characteristics of the political parties in the elections. This group includes party-systems categories: one-party, two-party, and multi-party (Bawn and Rosenbluth 2006 and Pappalardo 2007); party-systems properties: degree of institutionalization (poorly or highly institutionalized regimes), fragmentation (low or high levels), and ideological polarization (Anckar 2000, Mainwaring and Scully 1995, Roberts and Wibbels 1999, and Calvo and Escolar 2005). The second group of political variables looks into the characteristics of the government and its relation to elections. This group includes variables such as type of government: presidential or parliamentary (Lewis-Beck and Paldam 2000, Mainwaring 1993, and Linz and Valenzuela 1994); separation of powers:
weak or strong (Torsten et al. 1997, Acemoglu et al. 2010, and Granlund 2010); federalism, or the relationship between federal, state, and local governments and elections (Peltzman 1987, Chubb 1988, Stein 1990, Besley and Case 1995b, Atkeson and Partin 1995, Niemi et al. 1995, and Calvo and Murillo 2006); unified or divided government (Leyden and Borrelli 1995 and Norpoth 2001); coattails effect (Ferejohn and Calvert 1984, Campbell and Sumners 1990, Ames 1994, and Samuels 2000); term limits (Besley and Case 1995a); and apportionment in the upper and lower chambers of congress: presence or absence of malapportionment (Cabrera 1996 and Samuels and Snyder 2001). These political variables have been adopted in the economic and political referendum studies as the result of the expansion of the literature both into other social science disciplines as well as the expansion into developing nations that usually have a newer history of democratization or lower per capita income.

The variables described above show that there are many different ways to measure the effect of the political-economy on the vote, being usually classified in economic, sociological and political variables. In the present research economic, political and sociological variables are employed as described in Chapter 3. However, only a subset of all the variables listed above is used.

Contingent versus Categorical Relationship

Leithner (1993, 371-372) argues that “it no longer seems appropriate to ask simply, 'Do economic conditions influence the behavior of voters in elections to legislatures?' Rather it may be better to ask, 'How, where, under what conditions and to what extent do these conditions influence the behavior of voters in elections to
Leithner claims that the impact of economic and political conditions on voting behavior is contingent rather than categorical.

**Conflicting Results**

There have been many conflicting results in the literature regarding the economic effect on the vote for studies in one country and across countries (Paldam 1991 and Lewis-Beck and Stegmaier 2000). These conflicting results arise due to different causes. First, the time series employed in these studies cover different time periods. Some studies use one or two elections while others use several elections that span several decades. Second, variables are not measured and specified in the same way in these studies. Studies use different indicators, different lags, or categorize or weight data differently. Third, the statistical models employed are not similar for many of the studies. Studies rely on different sets of statistical analysis such as ordinary least squares, logit, probit, and logistic regressions. Fourth, the coefficients may be unstable because of multicollinearity, i.e. two or more independent variables are related. Finally, heteroskedasticity may affect the statistical significance of the coefficients if the error term does not have a constant variance.

Studies of economic voting not only have covered all the developed nations, such as the United States, France, Britain, Denmark, Japan, and others (Lewis-Beck and Stegmaier 2000), but developing nations as well, such as those located in Africa and the Middle East, Asia, Eastern Europe and Latin America (Lewis-Beck and Stegmaier 2008) in both single-country and multi-country studies. These studies have found that economic variables affect voting behavior in countries with different level of economic conditions
and different degrees of political institutionalization (Lewis-Beck and Stegmaier 2000 and 2008).

Economic Voting and Political Referendum Studies in Argentina

There have been five economic voting studies in Argentina that have demonstrated important economic effects, using both aggregate-level and individual level data. These studies are: Canton and Jorrat (2002), Remmer and Gelineau (2003), Echegaray (2005), Gelineau and Remmer (2005), and Calvo and Murillo (2006). Their scope, methodology and findings are briefly described below for each article.

Canton and Jorrat (2002) studied the influence of four variables (class, ideology, economic evaluations and partisanship) on the vote for the presidential elections in 1995 and 1999. They worked with individual level data from surveys of the metropolitan statistical area of Buenos Aires before the presidential elections and used a logistic regression model. The respondents not only were asked about their personal (egotropic) situation a year ago (retrospective) and in the next 12 months (prospective), but also about the national (sociotropic) situation a year ago (retrospective) and in the next 12 months (prospective). Canton and Jorrat (2002, 420) found that voters in Argentina followed class patterns, which were strongly conditioned by their political-partisan tradition, and influenced by retrospective and prospective economic evaluations which differed to specific electoral circumstances. For instance, in 1995 retrospective national evaluation of the economy carries more weight than even party identification in determining the vote choice; however, in 1999 party identification weighs more than
economic evaluation. Finally, Canton and Jorrat (2002) concluded that economic evaluations do matter, but their relative importance is contingent upon elections, similar to Leithner’s (1993) conclusion.

Remmer and Gelineau (2003) applied a referendum voting model to the national and subnational levels of Argentine government, from the period of the democratic transition from military rule in 1983 until 1999. They estimated the influence of five economic variables (inflation, unemployment, GDP growth, ratio of provincial to national revenues, and fiscal balance) and three political variables (presidential approval, interim election, and opposition governor) on the percentage of the vote obtained by the party of the president in the national legislative elections, the gubernatorial elections, and in the provincial legislative elections. They used an ordinary least squares regression model and aggregate level data. They found that national inflation and unemployment affect all levels of voting, despite the imposition of heavy controls on the relevant political variables (presidential approval, interim election, opposition governor, lagged dependent variable). Remmer and Gelineau (2003) argue that the chances of the candidates in both national and subnational elections are shaped by the economic performance of the incumbent presidential administration. At the same time, they also find evidence that voters do respond to the economic performance of subnational governments, however, in ways that weaken, rather than strengthen, the link between economic policy responsibility and electoral accountability.

Echegaray (2005) studied the effect of five variables (prior vote, inflation change, political climate change, party strength, and net candidate advantage) with aggregate
level data on vote share for the incumbent party on forty one electoral results in Latin America in the 1980’s and 1990’s through ordinary least squares regression models. He also studied the effect of eleven variables (personal retrospective, personal prospective, national retrospective, national prospective, responsibility attribution, presidential approval, partisanship, and social class) at the individual level on the probability of voting in favor of the incumbent party rather than against it for three countries (Argentina, Peru and Uruguay) through binomial logistic regression models. Echegaray (2005) found that in general similar decision rules are applied by voters both at the aggregate and individual levels of analysis. However, in the case of Argentine voters in the 1995 presidential election the economic evaluation is strong as the one depicted by Canton and Jorrat (2002) but the national effect is strictly prospective, rather than retrospective (Echegaray, 2005: 138).

Gelineau and Remmer (2005) studied the influence of five economic conditions (inflation, unemployment, GDP growth, ratio of provincial to national revenues, and fiscal balance) and three political variables (presidential approval, interim election, and opposition governor) both on individual and aggregate level variables in both gubernatorial elections and provincial legislative elections between 1983 and 2001. For the individual level variables, they used survey data from every province to measure the intention of individual voters to cast their ballots for candidates of the national in-party in subnational elections. For the aggregate level variables they used a pooled cross-sectional time-series analysis comparing the electoral results across provincial units of the percentage of the vote obtained by the party of the president. They used ordinary least
squares regression models for their analyses. They found that vote choice in provincial elections is heavily influenced by the track record of the national government and that voters also factor subnational performance into their choice of subnational candidates. However, Gelineau and Remmer (2005, 152) argue that “not only do assessments of national performance influence subnational elections; subnational assessments also influence the choices of voters in national elections in accordance with what might be described as a ‘reverse coattails’ effect”.

Finally, Calvo and Murillo (2006) conducted two studies using aggregate level data to show the existence of a pro-Peronist bias in the allocation of resources at the subnational level and to explaining the impact of patron-client relationship in the PJ and UCR vote at the national level. In the first study, the effect of four variables (UCR and Peronist vote, population share, median income, and voting power from overrepresentation) is estimated on the share of expenditures financed by the federal government and the relative revenue-sharing ratio for the twenty four provinces and the city of Buenos Aires for the years 1987, 1990, 1995, and 2000. In the second study, the effect of six variables (incumbent governor, incumbent president, median income, public employment, public expenditures per capita, and the effective number of competing parties) is estimated on PJ and UCR vote for the 1995 election.

In regard to the first study, Calvo and Murillo (2006) found positive and significant effects from the Peronist vote on both the amount of federally financed expenditures and on revenue sharing (a 1 percent increase in the Peronist provincial vote yields a 0.28 percent increase in the percent of expenditures financed by the federal
government and a 0.39 percent increase in revenue sharing), negative and significant effects from median income (a 1 percent decline in median income leads to a 1.03 percent increase in federal financing and a 0.67 percent increase in revenue sharing), and positive and significant effects from overrepresentation. Therefore, regardless of who controls the presidency, provinces with Peronist governors received higher levels of federal funding for their expenditures and a larger proportion of revenue-shared resources than the provinces with UCR governors. This implies that the localization of Peronist voters in provinces with overrepresentation gives them an edge in access to fiscal resources compared to UCR voters with underrepresentation. In regard to the second study, they found that changes in public employment and in public spending had a positive and significant association with Peronist vote gains and with UCR losses.

Calvo and Murillo (2006, 220) concluded that Peronist controlled provinces receive not only a larger share of fiscal resources, but also larger returns for every peso spent at the provincial level. These results are in line with the argument from Echegaray (2005), who asserts that in inchoate party systems, or poorly institutionalized party systems such as the Peronist party in Argentina, the strength of the party relies less in terms of a structure of ideological partisanship and more in terms of a structure of patron-client ties. In the former, electoral support to the party relies on ideological identification and attachment. In the latter, electoral support depends on the private access to patronage and individual or group benefits granted by the incumbent party to sectors of society.

The literature from Argentina shows that it is both theoretically and empirically possible to study the effect of the political economy on the vote. As explained in the
following chapters, this Dissertation expands the knowledge on economic voting and political referendum models through adding other socioeconomic responses into the conceptual framework, and by conducting an empirical estimation including social cleavages and the three levels of government with regards to agricultural and food policies.

**Economic Voting and Political Referendum Theory in Relationship with Lobbying, Advocacy and Demonstrations.**

The previous sections focused on the electoral response by voters given perceived changes in the socioeconomic and political conditions through economic voting and political referendum theory. Given that elections in democratic nations occur every two years for legislative elections and four years for presidential elections and seem to be a discontinuous response in time, there are other forms of socioeconomic responses to the political system that are continuous in time and take the form of lobbying, advocacy, and demonstrations.

Rosenstone and Hansen (1993, 4) define political participation as “action directed explicitly toward influencing the distribution of social goods and social values”, “encompassing pressures on private as well as public actors, indirect as well as direct pressures, outsider as well as insider activities”. They found that in the second half of the twentieth century in the United States the participation of citizens in elections has declined while participation through other means has risen constantly. These other forms of political participation have been defined in this Dissertation as the socioeconomic response to the political system and reviewed in the following sub-sections.
Lobbying or Interest Group Access to Policymakers

In the special case of the United States farm lobby in Congress during the twentieth century, Hansen (1991) presents two views on lobbying. The first view is based on Schattschneider (1935) and displays congressmen at the service of powerful interest groups. The second view is based on Bauer et al. (1972) and shows legislators using interest groups for information and advice in order to better understand their constituents’ demands. Hansen (1991, 2) suggests to adopt Bauer et al. means to Schattschneider ends, as “the decisive stage of interest group influence is the choice of the problems and pressures to which to respond. Lobbies achieve influence in Congress to the degree that legislators choose their counsel, to the degree that legislators grant them access”.

Hansen (1993, 5) argues that interest group access or lobbying “results from congressional strategies for dealing with electoral uncertainty.” In order to be reelected, congressmen need to eliminate the uncertainty in their electoral environment and in exchange for consideration of their policy views, interest groups can offer their support to reduce this electoral uncertainty. However, congressmen will only grant access to a particular interest group when this interest group has a competitive advantage over other interest groups in deciphering the electoral uncertainty, and when congressmen expect that the problems and pressures that forged the competitive advantage of this interest group in the first place are going to remain. Hansen (1993, 6) defines competitive advantage as “an interpretation of the advice that helped legislators most in their past elections” and recurrence as “a prediction that the advice will help legislators in their future elections”. When competitive advantage and prediction hold, the exchange
between a specific interest group and the policymaker is going to persevere in time. However, social, economic and political change brings new problems, new pressures, and new electoral uncertainties, and probably new interest groups.

Mobilization and counter-mobilization of new and old interest groups will depend on the degree that a policy subsystem has become a policy monopoly and the institutional design of the political system. Baumgartner and Jones (1993, 6) define a policy monopoly as a “monopoly on political understandings concerning the policy of interest, and an institutional arrangement that reinforces that understanding” and has been called iron triangles, policy whirlpools and subsystem politics in the past. The institutional design of the political system can be open and fragmented or closed and centralized. In the case of the American political system, given the characteristics of federalism (federal, state and local governments) and a strong separation of powers (legislative, executive and judicial branches), it is considered open and fragmented, and Sheingate (2001, 247) argues that the institutional design “was developed to protect private exchange from the encroachment of public power but at the same time to protect public functions from the encroachment of private interests.”

McFarland (1987) argues that there have been distinct methodological approaches to estimate the effect of interest groups in policymaking in the United States and other democracies in the twentieth century. Pluralism theory was set forth by Dahl (1956 and 1961), Truman (1951), Braybrooke and Lindblom (1963), and Lindblom (1977). Plural elitism was developed by Lowi (1964 and 1969), McConnell (1966), Olson (1965) and Schattschneider (1960). Finally, the triadic model was constructed by Wilson (1980).
Each of these theories and models has relied on different assumptions and rationale when researching the effect of interest groups on policymaking in the United States and other democracies. Nonetheless, they indeed show that lobbying is another response by society through interest groups to affect the political system and policymaking.

*Advocacy Coalition*

Sabatier and Jenkins-Smith (1988 and 1993) bring the idea of the advocacy coalition in order to be able to better understand causality in the policy process given the complexity of a process in which: substantial goal conflicts are present, technical information disputes are common, and there are hundreds of actors in different organizations involved in policy change. They define the advocacy coalition as “actors from a variety of governmental and private organizations at different levels of government who share a set of policy beliefs and seek to realize them by influencing the behavior of multiple governmental institutions over time” (Sabatier and Jenkins-Smith 1993, 212).

The notion of an advocacy coalition in policy analysis is a clear departure from political science which aggregates actors by specific type of government institution in their focus of analysis (i.e. the executive, the Senate, the House of Representatives, a bureaucracy, interest groups, etc). The Advocacy Coalition Framework (ACF) makes special emphasis on the core and secondary beliefs of the advocacy coalition; thus, these beliefs bring them together and make them to coalesce (i.e. to unite for a common end). The policy subsystem is the unit of analysis of the ACF and it is composed by different advocacy coalitions which exchange ideas and technical information which in turn affect
their belief system (deep, core and secondary). The ACF also uses a time perspective of a decade or more, as Sabatier and Jenkins-Smith argue that the process of policy change and the role of policy learning require a long time perspective.

According to Sabatier and Weible (2007) the ACF has three foundation levels: macro, micro and meso levels. The macro-level relies on the assumption that most policymaking occurs among specialists within the policy subsystem which is defined by both a functional and substantive dimension and territory, but their behavior is affected by factors in the broader political and socioeconomic system. The micro-level is the model of the individual drawn from the social psychology. The meso-level relies on the assumption that the best way to deal with the multiplicity of actors in a subsystem is to aggregate them into advocacy coalitions.

These three foundations affect beliefs and policy change which are the two dependent variables employed in the ACF. Beliefs are stable over a long period of time and will bring allies and opponents together in different advocacy coalitions. Therefore, substantial consensus will be found on the beliefs for actors within an advocacy coalition. Policy change is related to the attributes of government programs and the possibility of being revised and transformed. A policy is unlikely to be revised as long as the subsystem advocacy coalition that instituted the program remains in power, and in the absence of significant perturbations external to the subsystem or capable people in the opposite advocacy coalition that can exploit the external perturbations in their favor.

Sabatier and Weible (2007) argue that there are four critical paths that can affect the two dependent variables (beliefs and policy change) in the ACF. These critical paths
are policy-oriented learning, external perturbations, internal shocks and negotiated agreements (Sabatier and Jenkins-Smith 1993 and Sabatier and Weible 2007). The first path, policy-oriented learning is a “relatively enduring alternations of thought or behavioral intentions that result from experience and/or new information and that are concerned with the attainment or revision of policy objectives” (Sabatier and Weible 1999, 123). Policy-oriented learning affects beliefs of the actors within the policy subsystem. Policy-oriented learning across belief system is most likely when there is an intermediate level of informed conflict, quantitative data and theory is readily available, the nature of the problem involves natural systems instead of purely social or political systems, and when there exists a prestigious and/or professional forum.

The second path, external perturbations or shocks from outside the policy subsystem produces the “redistribution of resources or opening and closing venues within a policy subsystem, which can lead to the replacement of the previously dominant coalition by a minority coalition; and might also change components of the policy core beliefs of a dominant advocacy coalition” (Sabatier and Weible 2007, 199.) An external shock “provides the stimulus to change which is largely outside the control of the subsystem actors” (Sabatier and Weible in 2007, 204). Internal shocks, on the other hand, are from within the policy subsystem and can lead to major policy change. The third path, internal shocks tend to confirm core beliefs in the minority advocacy coalition and increase doubt within the dominant coalition, usually from monumental failures in the policy process. The final path, negotiated agreements happens because of a hurting
stalemate or policy stalemate. This path arises when all advocacy coalitions within the policy subsystem view a continuation of the status quo unacceptable.

The ACF shows that advocacy coalition is another response by society, through the four critical paths (policy-oriented learning, external perturbations, internal shocks and negotiated agreements), to affect both the political system and policymaking (belief and policy change). As described above, this theory elaborates more on what makes the policymakers and the people with influence to change policies through different routes. The empirical estimation of these effects is more complex than the electoral response or the lobby response given the quantity of dependent and independent variables and the possibilities this theory offers to explain changes in beliefs and changes in policy.

Demonstrations from Social Movements

Tarrow (1996, 874) defines social movements as “sustained challenges to powerholders in the name of a disadvantaged population living under the jurisdiction or influence of those powerholders” which is not the same as rioting behavior, despite the fact that both the former and the latter are instances of challenging the political status quo. Tarrow (1996, 874) defines contentious politics as “collective activity on the part of claimants, or those who claim to represent them, relying at least in part on non-institutionalized forms of interaction with elites, opponents, or the state”.

Rochon and Mazmanian (1993) argue that people join social movements in order to change through demonstrations not only public policy but the policy process and the values of society as well. Gamson (1990), on the other hand, distinguished between two forms of success for social movements. The first form of success is to gain new
advantages for the demonstrating movement while the second form of success is the acceptance of the demonstrating movement itself as a valid representative for social interests that have become legitimate. Rochon and Mazmanian (1993) suggest that the first form represents a policy change while the second form represents a change in the policy process.

Giugni (1998) claims that social movements attempt to make their message be heard simultaneously to the policymakers and the general public when they express themselves through public demonstrations. Social movements directly press the policymakers for recognition and to get their demands addressed. However, at the same time social movements seek public support and try to sensitize society to their plight. Given that policymakers pay particular attention to public opinion, social movements indirectly press them through the public opinion.

Gamson (1990) found that groups demanding only one issue were more successful than groups with multiple-issue demands. He also found that the use of specific incentives as well as the use of violence and disruptive tactics by groups (strikes, lockouts, urban and rural riots) was positively correlated with success. However, he found that groups being the objects of violence were associated with failure. Finally, he found that successful groups were more probable to be more bureaucratized, centralized, and unfactionalized. Gamson (1990) also tested the role of context variables and found that quiet or turbulent times did not matter much. However, political crises seemed to have an effect on the outcomes of the 53 challenging groups that he examined in the United States between 1800 and 1945 (Gamson 1990).
Based on his two forms of success for social movements, Gamson (1990) bases the outcome of a challenge according to four possible outcomes: full response, preemption, co-optation, and collapse. In full response, the challenging group is accepted by its antagonists as a valid spokesman for a legitimate set of interests, and the challenging group gains new advantages during the challenge and its aftermath. In preemption, the challenging group gains new advantages during the challenge and its aftermath, but it is not accepted by its antagonists as a valid spokesman for a legitimate set of interests. The opposite happens in cooptation where the challenging group is accepted but there are no gains. Finally, in collapse the challenging groups is neither accepted by it antagonists as a valid spokesman, nor gains any new advantages.

Tilly (1998) argues three sets of variables should be taken into consideration when estimating the possible outcome of social movements: the movement claims, the effects of movements’ actions, and the effects of outside events and actions. The overlapping of these three variables through diagrams creates four situations that must be distinguished. The first situation is the intersection of movement claims and the effect of movements’ actions, which represent the effects of movement actions that bear directly on movement claims: if the effects are positive they represent a success for the social movement but if the effects are negative, they represent a failure. The second situation is the intersection of movement claims, the effect of movements’ actions, and the effects of outside events and actions. In this case the effect of movement actions is the joint effect of the movement itself and external influences: the success and failure do not rest alone on the movement. The third situation is the intersection of movement claims and external
events and actions. Sometimes the effects of external influences bear directly on the movement claims, satisficing or not their claims, but they do not affect movement actions. Finally, the fourth situation is the intersection of effects of movement actions and effects of outside events and actions. These are the joint effects of movement actions and outside influences that do not bear on movement claims, and would represent unintended consequences.

Demonstrations from social movements are another response by society, through the outcomes and effects described above to affect both the political system and policymaking. Together with the electoral response, lobbying or interest group, and advocacy coalition, this is the last of the four socioeconomic responses covered in this chapter. In the next chapter the economic voting and political referendum model is specified in detail for the electoral response to agricultural policies in Argentina since 2002.

Summary

This chapter focused first on reviewing the economic voting and political referendum theory literature. Economic voting and political referendum theory is built on the assumption that voters hold the government accountable for the performance of the economy. Electoral support on the incumbent party is further influenced by clarity of responsibility and by credible opposition. If the voter cannot clearly view the incumbent party as responsible in affairs of economic policymaking or cannot see a credible opposition party ready for taking office, then the voter will not have the chance to reward
or to punish the incumbent party in the election. Voting dimensions affect the relationship between electoral outcome and the economy, such as time (retrospective and prospective), target (egotropic and sociotropic), grievance (different response on economic recessions than expansions), and partisan capability (different response on different leaning parties). Economic voting and political referendum theory can be modeled with aggregate and individual level data and the associated risks can be ecological and atomistic fallacies, respectively. Problems may also arise because of the modifiable areal unit problem or the misaligned data problem. Furthermore, heteroskedasticity, spatial autocorrelation, and multicollinearity can nullify the results of the modeling.

The dependent variable is usually defined as the percentage of votes for the incumbent party or coalition of incumbent parties at a given election, whether national, provincial or local, and whether for the executive or the legislative branches. There are many independent variables that can be used when modeling the electoral response to the incumbent party, and are usually grouped into economic variables, sociologic variables, and political variables. These variables try to model not only the economic effects but also political effects (related to parties and government) as well as sociologic (cleavages resulting from ideological divisions) on voting for the incumbent party. Results from employing economic voting and political referendum theory differ because the relationship between the economy and voting for the incumbent party is said to be contingent rather than categorical.
This chapter then focused on reviewing the economic voting and political referendum theory literature on Argentina. The five studies cited in the chapter found a statistically significant relationship between changes in the economy and changes in voting support on the incumbent party. These studies employed aggregate and individual level data; economic, sociologic, and political independent variables; assumed not only retrospective or prospective voting but also egotropic or sociotropic voting; elections for national and provincial levels of government; elections for the executive and the legislative branches of government; among the most important characteristics. However, these studies did not include the effect of sector specific policies, such as food and agricultural policies, in their analyses.

Finally, this chapter focused on reviewing the economic voting and political referendum theory compared to the other forms of socioeconomic responses on the political system, these are, lobbying, advocacy, and social demonstrations. The first difference is that these responses are continuous in time, as elections only occur every two years for the legislative branch and every four years for the executive branch. The second difference is that these responses try to affect policymakers decisions, either directly or indirectly, either from outside or from inside, either publicly or privately, while elections try to change the policymaker itself. Therefore, society has broadly speaking two main avenues through political participation toward influencing the allocation of social goods and social values. The first one, in a given point in time by electing those representatives that best fit their economic policymaking views through electoral voting. The second one, within that period of time between elections and once
that those representatives are already elected, through lobbying or interest group access, advocacy coalitions, and demonstrations from social movements, in order to influence economic policymaking.
CHAPTER THREE
RESEARCH METHODOLOGY

In this chapter the research methodology of the dissertation is described and presented in detail. First, the design of the research and the unit of analysis are described. Second, the dependent and independent variables of the model are described together with the conceptual and mathematical models. Third, the hypotheses, the test statistics, and their marginal effects are shown and explained in detail.

Research Design

The design of the research included data finding and data collection, data processing and standardization, and finally data analysis.

Data Finding and Collection

Data finding was not simple in Argentina, given that most of the information collected by government agencies is published by paper and if published digitally is not available over the Internet. First, data were searched during visits to specialized libraries within universities and agencies in the national government. Second, data were gathered during meetings and interviews with academic researchers in different universities and senior managers from different agencies across the national government in Buenos Aires.

Data finding was conducted during several trips to Argentina during the years of 2005 through 2010. Phone calls and e-mails were also exchanged regularly with a network of contacts in order to better understand the data that was provided. The
limitations in the quantity and quality of the time and spatial data series was a severe constraint in the dissertation endeavor.

With respect to data collection, numeric data were grouped into three main databases according to their use in the analysis. The first group of data was electoral statistics in Argentina for national, provincial, and local elections between 1983 and 2009. Since Argentina returned to democracy in 1983 this data have been collected by the Direcccion Nacional Electoral (DINE) within the Secretaria de Asuntos Politicos y Electorales from the Ministerio del Interior de la Nacion. DINE gathers national electoral data from Secretarias Electorales Nacionales in each province. Provincial and local electoral data are collected independently in each province by Secretarias Electorales Provinciales. Therefore, national and provincial/local data are collected separately by their respective agencies, as each of them have their own jurisdictions. When national, provincial, and local elections are concurrent, then both secretarias will cooperate and carry out the electoral work jointly. However, when national and provincial/local elections are not concurrent, then each secretaria will cover their respective election. Nonetheless, usually after the provincial/local elections, the secretaria provincial will share the partial count and final count results with the secretaria nacional.

The Camara Nacional Electoral (CNE) of the Ministerio del Poder Judicial de la Nacion collects data on the status of each political party and the alliance that each party makes in each election (i.e. presidential and Congress, gubernatorial and Legislature, and mayoral and Council). Given that in Argentina there are political parties at the national level, provincial level, and local level, these alliances may differ between levels and
across elections. For instance, sometimes a national party may not be present in one province, or a provincial party will not be present at a national election, and thus make an alliance for an election.

The second group of data was economic, housing, educational and social statistics from the decennial censuses of 1991 and 2001. In Argentina, these data are collected by the Instituto Nacional de Estadísticas y Censos (INDEC) of the Ministerio de Economía y Finanzas Publicas de la Nación. INDEC relies on the support of secretarias estadísticas provinciales for carrying out the decennial census as well as for monthly, quarterly and annual estimates.

The third group of data was agricultural statistics from the Ministerio de Agricultura, Pesca y Alimentacion (MAGyP) which included yearly row-crop production, yearly livestock herd size, monthly grain prices at the terminal elevators, monthly livestock prices by category, and monthly livestock live weights at the Mercado de Liniers. These statistics are produced by a network of agencies that work in cooperation with MAGyP. The most important agencies are SENASA (Servicio Nacional de Sanidad y Calidad Agroalimentaria), INTA (Instituto Nacional de Tecnología Agropecuaria), and ONCCA (Organismo Nacional para el Control Comercial Agropecuario).

Data collection not only involved numeric data but also spatial vector data for Argentina. Spatial vector data takes the form of points (e.g. cities and towns); lines (e.g. streets, roads, highways, railroads, waterways and pipelines), and polygons (e.g. blocks, municipalities, counties, states and countries). Spatial data are produced, maintained and
distributed by the Instituto Geográfico Nacional (IGN) from the Secretaria de Planeamiento of the Ministerio de Defensa de la Nación. IGN spatial data for Argentina has been produced at a scale of 1:250,000 with a projected coordinate system of Argentina Zone 4 (Projection: Universal Transverse Mercator), and with a geographic coordinate system of GCS Campo Inchauspe (Datum: D Campo Inchauspe). A geodatabase was created using ArcGIS 10 software application to include all the relevant spatial vector data used in the research.

Data Processing and Standardization

Data processing and data standardization were required given that the data used for the modeling were from different sources and in different formats. Each source had its own reporting format as there are no standardized data reporting formats established in Argentina. Electoral data were provided by the DINE in hundreds of Excel workbooks for each executive and legislative national and provincial election at the national, provincial and departmental level. Data from these files had to be cleaned, formatted, and copied into a new Excel file in which each voting result from each party for each election had to match a five-digit code for each department. Party and alliance data were provided by the CNE in dozens of Word documents for each election at the national and provincial level. Data from these files had to be cleaned, formatted and copied into a new Excel file as well in which each alliance for each year for election type had to match each party name and party number. Census data were purchased from INDEC in digital media (CD’s) for the 1991 and 2001 censuses. Data could be extracted from the CD’s with Excel but it have to be cleaned and formatted in order to match a five-digit code for each
Agricultural data provided by the MAGyP were provided in hundreds of Excel files at the national, provincial, and department level for each grain commodity and livestock category. Similarly, data have to be cleaned, formatted, and copied into a new Excel file in which each variable had to match a five-digit code for each department.

Data processing and data standardization were the most time-consuming activities of the whole dissertation research endeavor. These activities were conducted during the years of 2009, 2010, and 2011. The electoral, census, and agricultural databases were fully standardized at the department level for each electoral variable, for each socioeconomic variable, and for each agricultural variable, respectively.

**Data Analysis**

The standardization of the data allowed the analysis with ArcGIS 10 and SAS 9.2 software applications which was conducted during 2011. A geodatabase was built using ArcCatalog in which different Excel files and vector files were brought together. Data in Excel files were joined with vector data within ArcMap to create new files in the form of shapefiles. These shapefiles were given a projected coordinate system and a geographic coordinate system for Argentina as described above and saved within the geodatabase.

The regressions were performed with the Ordinary Least Squares tool within the Spatial Statistics Toolset in the ArcToolbox. The input for each regression was a shapefile containing the dependent and the independent variables, while the output was a new shapefile containing the regression estimates, the regression residuals, and the standardized regression residuals. The output files were saved within the geodatabase as well. The standardized regression residuals for each model were exported in ArcMap as
image files and displayed in Chapter 4 as maps at the department level. The over predictions are colored in red and show where the predicted values ($\bar{Y}_{ij}$) were larger than the observed value ($Y_{ij}$), i.e. the residuals ($\epsilon_{ij}$) are positive. The under predictions are colored in blue and show where the predicted values ($\bar{Y}_{ij}$) were smaller than the observed value ($Y_{ij}$), i.e. the residuals ($\epsilon_{ij}$) are negative. The better the OLS regression model, the higher the proportion of predicted values that are closer to the observed values. If the standardized regression residuals were clustered then spatial autocorrelation was a problem for the regression model estimates. However, if the standardized regression residuals were randomly displayed then spatial autocorrelation was not a problem for the regression model estimates.

There were two tables associated with each shapefile output: the regression coefficients table and the regression diagnostic table. These two tables were produced by the OLS tool and saved as dbase files in the Geodatabase. Therefore, the tables have to be transformed to Excel files in order to make further calculations and to be exported to Word and shown in Chapter 4 as tables for each regression.

The Coefficient Output Table displayed the following statistics: variables, coefficients ($\alpha$, $\beta_1$, $\beta_2$, $\beta_3$, $\beta_k$), t-statistics, and probability. The variables indicate the name for the dependent and independent variables. The $\beta$ coefficients indicate the effect of the independent variables on the dependent variables, i.e. a unit increase in the independent variable, has a positive or negative effect of a given magnitude in the dependent variable. The $\alpha$ coefficient is the intercept, i.e. the value of the dependent variable when the value of all the independent variables is equal to zero. The t-statistic
measures the difference between $\hat{\beta}$ and $\beta_0$ (a constant value which is usually zero) over the standard error of $\hat{\beta}$, for each variable in the model. This t-statistic is compared to the t-student for $(n-k-1)$ degrees of freedom and a probability of alpha (significance level) to test the null hypothesis that $\hat{\beta}$ is equal from zero, i.e. that the independent variable does not have an effect on the dependent variable. The letter $n$ corresponds to the number of observations and the letter $k$ is the number of explanatory variables. The p-value indicates the smallest significance level at which the null hypothesis would be rejected.

The Diagnostic Output Table displayed the following statistics: coefficient of determination or R$^2$, adjusted R$^2$, Variance Inflation Factor (VIF), Joint F-Statistic, Wald Statistic, Koenker’s studentized Breush-Pagan Statistic, Jarque-Bera Statistic, and Sigma-Squared ($\sigma^2$). The R$^2$ is the proportion of variation in the dependent variable that is explained by the model, i.e. the independent variables. The Variance Inflation Factor (VIF) explains redundancy in the variables, or multicollinearity. The Joint F-Statistic is used to assess overall model significance. The Wald Statistic is used to assess overall robust model significance. The Koenker’s studentized Breush-Pagan Statistic is used to test the reliability of standard error values when heteroskedasticity (non-constant variance) is present. The Jarque-Bera Statistic, is used to test whether the residuals deviate from a normal distribution. Finally, Sigma-Squared ($\sigma^2$) is the OLS estimate of the error term.

The following procedure was performed to analyze the results obtained from the coefficient output table and the diagnostic output table. First, the model performance was assessed with R$^2$ and adjusted R$^2$. Second, each explanatory variable in the model was
assessed according to the variable’s coefficient, probability, and Variance Inflation Factor (VIF). Third, the model significance was assessed with the Joint F-Statistic and Joint Wald Statistic. Fourth, heteroskedasticity was assessed with the Koenker’s (BP) Statistic. Fifth, the normality of the errors or model bias was assessed with Jarque-Bera. Since we employed an OLS model which is a global model, the normality of the errors does not affect the estimates but it is still worthwhile to know whether future improvements can be achieved through other statistical methods. Finally, spatial autocorrelation of the standardized residuals was assessed with the Moran's I Statistic.

**Unit of Analysis**

The unit of analysis can be defined both in space and time and differs for the national elections and the provincial and local elections. In the national elections, the unit of analysis is the department for the whole country, or the 512 departments of the 24 provinces. In the provincial and local elections, the unit of analysis is the department for the province of Buenos Aires, or 134 departments.

**National Elections**

For each national election the spatial unit of analysis is the department or electoral sections as they are called by the DINE. Since 1995, there are a total of 512 departments in Argentina distributed in each of the 23 provinces, or electoral districts, as follow: Buenos Aires (134 departments), Catamarca (16 departments), Chaco (25 departments), Chubut (15 departments), Cordoba (26 departments), Corrientes (25 departments), Entre Ríos (17 departments), Formosa (9 departments), Jujuy (16 departments), La Pampa (22
departments), La Rioja (18 departments), Mendoza (18 departments), Misiones (17 departments), Neuquén (16 departments), Rio Negro (13 departments), Salta (23 departments), San Juan (19 departments), San Luis (9 departments), Santa Cruz (7 departments), Santa Fe (19 departments), Santiago del Estero (27 departments), Tierra del Fuego (4 departments), and Tucumán (17 departments). Tierra del Fuego has 4 departments, but electoral data is available for 3 of them, given that the Southern Atlantic Islands department (Islas Malvinas, Islas Georgia del Sur, Islas Sandwich del Sur, Islas Shetland del Sur, and Islas Orcadas del Sur) are under British possession. Finally, the Capital Federal had 28 electoral sections from 1995 until 2008, but 15 after that year. Given this change in the redistricting of the city, it was not possible to include the electoral sections of Capital Federal in the research. Appendix A contains maps showing the departments for each province in Argentina.

The temporal unit of analysis is the election for the chamber and the presidency at the national level. Since 2001 the elections at the national level have been distributed as follow: chamber and senate (2001); chamber, senate, and presidency (2003); chamber and senate (2005); chamber, senate, and presidency (2007); and chamber and senate (2009).

**Provincial and Local Elections**

The spatial unit of analysis for each provincial and local election is the department or electoral sections within the province of Buenos Aires. The departments within province of Buenos Aires are grouped into eight electoral provincial sections for the election of deputies and senators in the legislature, as follows: first section (24
departments), second section (15), third section (19), fourth section (19), fifth section (26), sixth section (22), seventh section (8), and eighth section (1). Finally, splitting departments have been common in the province, as there were 125 departments in the elections of 1983 and 1985; 126 in 1987 and 1989; 127 in 1991 and 1993; 134 in 1995, 1997, 1999, 2001, 2003, 2005, 2007, and 2009; and there will be 135 departments in the election of 2011. Fortunately, for the elections analyzed, the number of departments in the province of Buenos Aires was constant. Therefore, the number of spatial units for provincial and local elections was equal to 134. Appendix A contains maps of the departments of the province of Buenos Aires and their corresponding electoral sections for provincial elections.

The temporal unit of analysis is the election for the governor and the legislature at the provincial level, and the councils at the department level. Since 2001 the elections for the province of Buenos Aires at the provincial level have been as follow: legislature (2001), governor and legislature (2003), legislature (2005), governor and legislature (2007), and legislature (2009). Finally, since 2001 the elections for the province of Buenos Aires at the departmental level have been as follow: council (2001), mayor and council (2003), council (2005), mayor and council (2007), and council (2009).

Description of the Variables

The description of the independent and dependent variables, as well as their data sources is listed in Table 3.1.
Table 3.1: Description of the variables employed in the model.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
</tr>
<tr>
<td>$Y$ Vote Difference</td>
<td>Difference in vote for the PJ-FpV party is calculated as the difference in share of valid votes for two consecutive elections for the Chamber and the Presidency at the national level; the Legislature and the Governorship at the provincial level; and the Council at the department level. The methodology for this variable is outlined in the next subsection. This variable is based on data from DINE and CNE. The unit of measurement of the variable is in percentage.</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
</tr>
<tr>
<td>$X_1$ Total Agricultural Revenue Taxed Away</td>
<td>(Quantitative) Revenue is defined as the multiplication of price and output for every agricultural commodity in the year of the election and the previous year. Change is defined as the absolute change in revenue taxed away by the government for every commodity. The revenue is normalized by the population in the department. This variable is based on data from MAGyP and INDEC. This variable is the result of adding two variables, total grain revenue change and total cattle revenue change, which are explained in the next subsection. The unit of measurement of this variable is in USD per capita.</td>
</tr>
<tr>
<td>$X_2$ Urban versus rural</td>
<td>(Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is urban, or the value of 0 otherwise. The department is classified urban if 90 percent or more of the population living in the department is in an urban area. This variable is based on urban and rural housing data from the INDEC 2001 census. There are two levels for this variable, 1 or 0.</td>
</tr>
<tr>
<td>$X_3$ Center versus periphery</td>
<td>(Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the center, or takes the value of 0 otherwise. A department is classified within the center if it is located in Buenos Aires, Cordoba, Entre Rios, La Pampa, San Luis or Santa Fe provinces. This variable is based on data from the INDEC 2002 national agricultural census. There are two levels for this variable, 1 or 0.</td>
</tr>
<tr>
<td>$X_4$ Agricultural versus non-agricultural</td>
<td>(Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is agricultural, or takes the value of 0 otherwise. A department is classified as agricultural if it the Total Agricultural Revenue Change is higher than 10 USD per capita in the two years to the election. There are two levels for this variable, 1 or 0.</td>
</tr>
<tr>
<td>$X_5$ Income</td>
<td>(Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is high income, or takes the value of 0 if it is low income. A department is defined as high income if the share of the top two job qualifications combined (professional and technical) is higher than 27 percent of the total job qualifications. There are two levels for this variable, 1 or 0.</td>
</tr>
<tr>
<td>$X_6$ Housing quality</td>
<td>(Quantitative). A control variable that measures the share of the population within the department living in a house within the top two quality of material ranking of five. This variable is based on housing data from the INDEC 2001 census. The unit of measurement of the variable is in percentage.</td>
</tr>
<tr>
<td>$X_7$ Education attainment</td>
<td>(Quantitative). A control variable that measures the share of the population within the department that has obtained at least a high school diploma. This variable is based on education situation data from the INDEC 2001 census. The unit of measurement of the variable is in percentage.</td>
</tr>
</tbody>
</table>
\( X_8 \) Age. (Quantitative). A control variable that measures the share of the population within the department older than 20 years old. This variable is based on age by five year periods data from the INDEC 2001 census. The unit of measurement of the variable is in percentage.

\( X_9 \) Sex. (Quantitative). A control variable that measures the share of the population within the department that are males. This variable is based on sex data from the INDEC 2001 census.

\( X_{10} \) Ciudad de Buenos Aires: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in Ciudad de Buenos Aires, or takes the value of 0 if it is not. 1 department.

\( X_{11} \) Buenos Aires: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Buenos Aires, or takes the value of 0 if it is not. 134 departments.

\( X_{12} \) Catamarca: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Catamarca, or takes the value of 0 if it is not. 16 departments.

\( X_{13} \) Cordoba: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Cordoba, or takes the value of 0 if it is not. 26 departments.

\( X_{14} \) Corrientes: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Corrientes, or takes the value of 0 if it is not. 25 departments.

\( X_{15} \) Chaco: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Chaco, or takes the value of 0 if it is not. 25 departments.

\( X_{16} \) Chubut: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Chubut, or takes the value of 0 if it is not. 15 departments.

\( X_{17} \) Entre Rios: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Entre Rios, or takes the value of 0 if it is not. 17 departments.

\( X_{18} \) Formosa: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Formosa, or takes the value of 0 if it is not. 9 departments.

\( X_{19} \) Jujuy: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Jujuy, or takes the value of 0 if it is not. 16 departments.

\( X_{20} \) La Pampa: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of La Pampa, or takes the value of 0 if it is not. 22 departments.

\( X_{21} \) La Rioja: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of La Rioja, or takes the value of 0 if it is not. 18 departments.

\( X_{22} \) Mendoza: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Mendoza, or takes the value of 0 if it is not. 18 departments.

\( X_{23} \) Misiones: (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Misiones, or takes the value of 0 if it is not. 17 departments.
\(X_{24}\) **Neuquén:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Neuquén, or takes the value of 0 if it is not. 16 departments.

\(X_{25}\) **Rio Negro:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Rio Negro, or takes the value of 0 if it is not. 13 departments.

\(X_{26}\) **Salta:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Salta, or takes the value of 0 if it is not. 23 departments.

\(X_{27}\) **San Juan:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of San Juan, or takes the value of 0 if it is not. 19 departments.

\(X_{28}\) **San Luis:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of San Luis, or takes the value of 0 if it is not. 9 departments.

\(X_{29}\) **Santa Cruz:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Santa Cruz, or takes the value of 0 if it is not. 7 departments.

\(X_{30}\) **Santa Fe:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Santa Fe, or takes the value of 0 if it is not. 19 departments.

\(X_{31}\) **Santiago del Estero:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Santiago del Estero, or takes the value of 0 if it is not. 27 departments.

\(X_{32}\) **Tucuman:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of Tucuman, or takes the value of 0 if it is not. 17 departments.

\(X_{33}\) **Tierra del Fuego:** (Qualitative) A categorical (or dummy) variable that takes the value of 1 if the department is in the province of, or takes the value of 0 if it is not. 3 departments.

**Estimation of Vote Difference (Y)**

Vote is defined in this variable as the proportion of the eligible electorate within the department \(d\) casting a valid vote for the PJ-FpV party at a particular election \(e\). Vote difference for the PJ-FpV party is calculated as the difference in share of valid votes for two consecutive elections for the Chamber and the Presidency at the national level; the Legislature and the Governorship at the provincial level; and the Council at the department level. The unit of measurement of this variable is in percentage and the relationship among the parameters is:
\[
Y_{(dte)} = PJFpV_{(det)} - PJFpV_{(det-1)} \tag{3.1}
\]

Where:

\( Y \) Vote difference for the PJ-FpV party between consecutive elections.

\( PJFpV \) Vote for the PJ-FPV party.


\( d \) Space: 512 departments in 23 provinces.


\( e \) Election: chamber and presidency; legislature and governorship; and council.

**Estimation of Total Agricultural Revenue Taxed Away (X1)**

Total agricultural revenue taxed away by the national government is the result of adding two variables, total grain revenue taxed away and total cattle revenue taxed away. Total grain revenue taxed away \((X_G)\) is estimated as follows. Revenue is defined as the multiplication of output \((q\), or quantity in metric tons\) and price \((p\), or price in USD per metric ton\) for every major grain commodity produced in Argentina \((c\), soybeans, sunflower, corn, sorghum, and wheat\). The output used for every commodity is the quantity produced in every department that had marketable production. The price used for every commodity is the monthly FOB-FAS difference averaged for the marketing year (July 01 through June 30) at the Rosario market. The difference between the FOB and FAS prices reflects the export tariff applied for each grain throughout the period under analysis. This difference also accounts for storage, moving the grain through the terminal facility in and out, surveyor cost, and other minor costs. However, it is assumed that most of the difference in the FOB-FAS prices is due to the export tariffs levied on
the grains as described in the first chapter. The total grain revenue taxed away is added for the year of election and the year prior to election and normalized by the quantity of people that live in the department. The unit of measurement of this variable is in USD per capita and the relationship among the parameters is:

\[
X_{G(dt)} = \left( \sum_{c=5}^{c} (q_{(dt, c)} \times p_{(c)}) \right) / P_{(dt)}
\]

Where:

- \(X_G\): Total grain revenue taxed away in department \(d\) in time \(t\) (USD / capita)
- \(q\): Quantity of grain \(n\) produced in department \(d\) in time \(t\) (metric tons).
- \(p\): Monthly FOB-FAS price difference averaged for the marketing year \(t\) (July 01 through June 30) at the Rosario market (USD / metric tons).
- \(P\): Total population in department \(d\) (people) in time \(t\).
- \(c\): Grain commodities: soybeans, sunflower, corn, sorghum, and wheat.
- \(d\): Space: 512 departments in 23 provinces and the city of Buenos Aires.

Total cattle revenue change \((X_L)\) is estimated in a similar fashion. Revenue is defined as the multiplication of output \((q\), or quantity measured in kilograms\) and price \((p\), or price in USD per kilogram\) for every cattle category in Argentina \((c\), light steers, heavy steers, male calves, female calves, bulls, cows, and heifers\). The output used for every cattle category is the herd size in every department. The herd size may not be the most appropriate measure of output, given that output is usually defined over time and thus a flow variable, while the herd size is a stock variable. However, due to data limitations the herd size was chosen. The price used for every cattle category is the price difference between the Argentine price and the international price. The Argentine price is
the monthly marketing year average (July 1st through June 30) for every cattle category in the Mercado de Liners. The international price is the monthly marketing year average (July 1st through June 30) for three markets (Sao Paulo and Rio Grande do Sul in Brazil, and Montevideo in Uruguay) for the steer cattle category. It is assumed that the percent price difference between the domestic and the international markets is constant for all the cattle categories and representative of the export tariffs and domestic price controls imposed in Argentina as explained in the first chapter. The total livestock revenue change is added for the year of election and the year prior to election and normalized by the quantity of people that live in the department. The unit of measurement of this variable is in USD per capita and the relationship among the parameters is:

\[
X_{L(dt)} = \left( \frac{\sum_{c=1}^{c=7} (q_{(dt)n} \times p_n)}{P_{(dt)}} \right)
\]

(3.3)

Where:

\(X_L\) Total cattle revenue taxed away in department \(d\) in time \(t\) (USD / capita)

\(q\) Quantity of cattle \(n\) produced in department \(d\) in time \(t\) (kilograms).

\(p\) Monthly Foreign-Domestic price difference averaged for the marketing year \(t\) (July 01 through June 30) at the Mercado de Liniers market (USD / kilogram).

\(P\) Total population in department \(d\) (people) in time \(t\).

\(c\) Cattle categories: light steers, heavy steers, male calves, female calves, bulls, cows, and heifers

\(d\) Space: 512 departments in 23 provinces and the city of Buenos Aires.


Finally, total agricultural revenue taxed away by the government is the result of adding two variables, total grain revenue taxed away and total cattle revenue taxed away.
The unit of measurement of this variable is in USD per capita and the relationship among the parameters is:

\[ X_{1(dt)} = X_{G(dt)} + X_{L(dt)} \]  

(3.4)

Where:

- \( X_1 \): Total agricultural revenue taxed away in department \( d \) in time \( t \). (USD / capita)
- \( X_G \): Total grain revenue taxed away in department \( d \) in time \( t \). (USD / capita)
- \( X_L \): Total cattle revenue taxed away in department \( d \) in time \( t \). (USD / capita)
- \( d \): Space: 512 departments in 23 provinces and the city of Buenos Aires.

**Conceptual Model**

The conceptual model follows an economic voting and political referendum model in which it is assumed that the voter identifies the incumbent party as responsible in affairs of economic policymaking and that there is a credible opposition party available for taking office. The voter has the ability to reward or to punish the incumbent party in the election according to his positive or negative evaluation in economic, political, and social affairs, respectively. It is assumed that the voter is retrospective as looks into past events to judge the incumbent party policymaking. It is also assumed that that the voter is egotropic as evaluates its own economic, political, and social well being when rewarding or punishing the incumbent party in the elections.

The model employs aggregate level data at the department level as unit of analysis and analyzes electoral results at the three level of government (national,
between 2001 and 2009 through OLS and SUR modeling. The model focuses on agricultural and food policies enacted by the national government and measures the effect that these polices had on the vote for the incumbent party through the taxation of revenue on grain and livestock commodities.

The conceptual model tests if there are fundamental differences in the voting behavior along social cleavages for the incumbent party. According to Bartolini and Mair (1990) social cleavages are political differences and voting differences grounded in the social structure of a society while Lipset and Rokkan (1967) argue that once a cleavage structure is established in society it provides a durable basis for political alignment and confrontation which in turn manifest itself in a consistent voting behavior across elections. This Dissertation considers four social cleavages for testing: an urban versus rural cleavage, a center versus periphery cleavage, an agricultural versus non-agricultural cleavage, and a class cleavage. This Dissertation also tests for differences in voting behavior for the incumbent party between the national, provincial, and department level, and between the executive and legislative branches.

This conceptual model shares some features of prior economic voting and political referendum models that focused in Argentina (Canton and Jorrat 2002, Remmer and Gelineau 2003, Echegaray 2005, Gelineau and Remmer 2005, and Calvo and Murillo 2006). However, this conceptual model differs in three aspects. First, it assumes a retrospective and egotropic voter when evaluating the incumbent party in the elections. Second, and most importantly, this conceptual model tests for social cleavages in
Argentina during the first decade of the XXI century and whether the politics that determined specific agricultural and food policies were electorally rewarded or punished. Finally, this conceptual model helps to better understand whether the impact of economic, political, and social conditions on voting behavior is contingent rather than categorical Leithner (1993).

**Empirical Model**

The empirical model follows previous studies when estimating the effect of economic, political, and sociological variables on the vote for the incumbent. First, it employs aggregate level data instead of individual level data. Second, it estimates the effects through OLS regression analysis for the social cleavage hypotheses and SUR analysis for across the government and between branches hypotheses. However, this empirical model differs with previous studies in many ways. First, it uses aggregate level data at the department level for Argentina. Second, it covers the three layers of government and the two branches of power. Third, and most importantly, this empirical model employs the difference in vote for consecutive elections for the incumbent party instead of the vote in one election. The reward or the punishment of the economic and social policies enacted by the party in power is measured not only by the outcome in one particular election, but with respect to the previous election.

Following Calvo and Murillo (2006), the empirical model used for the research has both a deterministic and an error component, yielding a probabilistic regression model, which is shown below:
\[ Y_{(dte)} = \alpha + \beta_1 X_{1(dte)} + \sum_{k=2}^{n=33} \beta_k X_{k(dte)} + \varepsilon \]  

Where:

- \( Y \): Vote difference for the PJ-FpV party between consecutive elections.
- \( \alpha \): Regression intercept.
- \( \beta_n \): Regression coefficients.
- \( X_1 \): Total agricultural revenue taxed away by the national government.
- \( X_2 \): Urban versus rural dummy variable.
- \( X_3 \): Center versus periphery dummy variable.
- \( X_4 \): Agricultural versus non-agricultural dummy variable.
- \( X_5 \): Income dummy variable.
- \( X_6 \): Housing quality control variable.
- \( X_7 \): Education attainment control variable.
- \( X_8 \): Age control variable.
- \( X_9 \): Sex control variable.
- \( X_{10} \): Ciudad de Buenos Aires dummy variable.
- \( X_{11} \): Buenos Aires province dummy variable.
- \( X_{12} \): Catamarca province dummy variable.
- \( X_{13} \): Córdoba province dummy variable.
- \( X_{14} \): Corrientes province dummy variable.
- \( X_{15} \): Chaco province dummy variable.
- \( X_{16} \): Chubut province dummy variable.
- \( X_{17} \): Entre Ríos province dummy variable.
- \( X_{18} \): Formosa province dummy variable.
- \( X_{19} \): Jujuy province dummy variable.
- \( X_{20} \): La Pampa province dummy variable.
- \( X_{21} \): La Rioja province dummy variable.
- \( X_{22} \): Mendoza province dummy variable.
- \( X_{23} \): Misiones province dummy variable.
- \( X_{24} \): Neuquén province dummy variable.
- \( X_{25} \): Rio Negro province dummy variable.
- \( X_{26} \): Salta province dummy variable.
- \( X_{27} \): San Juan province dummy variable.
- \( X_{28} \): San Luis province dummy variable.
- \( X_{29} \): Santa Cruz province dummy variable.
- \( X_{30} \): Santa Fe province dummy variable.
- \( X_{31} \): Santiago del Estero province dummy variable.
- \( X_{32} \): Tucuman province dummy variable.
There are seven hypotheses that model and test the effect of the total agricultural revenue taxed away in the year of the election and the year prior to the election on the difference in vote for the PJ-FpV between elections according to different variables. The first four hypotheses test social cleavage effects: urban versus rural, center versus periphery, agricultural versus non-agricultural, and high-income versus low-income. The last three hypotheses test for national versus provincial effect, provincial versus local effect, and executive versus legislative effect, respectively. These hypotheses, their test statistics, and their marginal effects are presented in this section.

First Hypothesis: Urban versus Rural Cleavage Hypothesis

The increase in total agricultural revenue taxed away by the government will negatively affect the rural vote from the departments that produced these commodities while positively affect the urban vote from the departments that did not produce these commodities. The income transfer from the rural countryside to the urban cities will yield opposite voting behavior for the PJ-FpV party at the elections for the Chamber of Deputies in the National Congress from 2001 through 2009. The regression model used to test this hypothesis is:
\[ Y_{(dte)} = \alpha + \beta_1 X_1(dte) + \beta_2 X_2(dte) + \beta_{1\times2} X_1(dte) X_2(dte) + W + Z + \varepsilon \]  

(3.6.a)

Where:

- \( Y \): Vote difference for the PJ-FpV party between consecutive elections.
- \( \beta_1 \): Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue taxed away.
- \( X_1 \): Total agricultural revenue taxed away by the national government.
- \( \beta_2 \): Marginal change in vote for the PJ-FpV party with a change in urban versus rural.
- \( X_2 \): Urban versus rural dummy variable.
  - 1 if department is larger than 90 percent urban.
  - 0 if department is lower than 90 percent urban.
- \( \beta_{1\times2} \): Combined marginal effect from the interaction term.
- \( W \): Vector of control independent variables: \( X_6, X_7, X_8, \) and \( X_9 \).
- \( Z \): Vector of dummy variables: \( X_{10} \) through \( X_{33} \).
- \( d \): Space: 512 departments in 23 provinces and the city of Buenos Aires.
- \( e \): Election: chamber.
- \( \varepsilon \): Error term or residual.

The null hypothesis in the first case is that there is no effect between agricultural revenue taxed away on the vote for the PJ-FpV. The null hypothesis in the second case is that there is no difference of this effect between urban and rural departments. Although the alternative hypothesis should be one sided in all of the following cases, to facilitate the analysis we use 2-sided alternatives for the calculation of p-values. This approach is a more conservative approach since the p-values for tests with 1-side alternatives are one half of those with 2-sides alternatives. The mathematical representation of these null hypotheses and their corresponding alternative hypotheses is:

\[
\begin{align*}
H_O: \beta_1 &= 0 \\
H_A: \beta_1 &\neq 0
\end{align*}
\]

(3.6.b)
The marginal effects of the total agricultural revenue taxed away by the national government on the vote difference for the PJ-FpV party between consecutive elections for urban and rural areas can be calculated as:

When $X_2$ equals to 1 (i.e. urban)  
\[
\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1 + \beta_{1*2}
\]

Expected sign (3.6.c)  
$> 0$

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a higher vote share for the PJ-FpV party between elections in urban departments.

When $X_2$ equals to 0 (i.e. rural)  
\[
\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1
\]

Expected sign (3.6.d)  
$< 0$

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a lower vote share for the PJ-FpV party between elections in rural departments.

Second Hypothesis: Center versus Periphery Cleavage Hypothesis

The increase in total agricultural revenue taxed away by the government will negatively affect the vote in the center (Pampas region) while it will positively affect the vote in the periphery (Patagonia, Cuyo, Northeast and Northwest regions). Given that most of grains and livestock production is concentrated in the Pampas region, the income transfer to the periphery will make people better off, therefore the income transfer will yield a higher voting behavior for the periphery than the center for the PJ-FpV party at
the elections for the Chamber of Deputies in the National Congress from 2001 through 2009. The regression model used to test this hypothesis is:

\[
Y_{(dte)} = \alpha + \beta_1 X_{1(dte)} + \beta_3 X_{3(dte)} + \beta_{1+3} X_{1(dte)} X_{3(dte)} + W + \epsilon \tag{3.7.a}
\]

Where:

- \(Y\) Vote difference for the PJ-FpV party between consecutive elections.
- \(\beta_1\) Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue taxed away.
- \(X_1\) Total agricultural revenue taxed away by the national government.
- \(\beta_3\) Marginal change in vote for the PJ-FpV party with a change in center versus periphery.
- \(X_3\) Center versus periphery dummy variable.
  - 1 if department is in the Pampas (considered the Center region).
  - 0 if department is in the Patagonia, Cuyo, Northwest or Northeast region (considered the Periphery region).
- \(\beta_{1+3}\) Combined marginal effect from the interaction term.
- \(W\) Vector of control independent variables: \(X_6, X_7, X_8,\) and \(X_9.\)
- \(d\) Space: 512 departments in 23 provinces and the city of Buenos Aires.
- \(e\) Election: chamber.
- \(\epsilon\) Error term or residual.

The null hypothesis in the first case is that there is no effect between agricultural revenue taxed away on the vote for the PJ-FpV. The null hypothesis in the second case is that there is no difference of this effect between departments in the center and departments in the periphery regions. The mathematical representation of these null hypotheses and their corresponding alternative hypotheses is:

\[
\begin{align*}
H_0: \beta_1 &= 0 & H_0: \beta_{1+3} &= 0 \tag{3.7.b} \\
H_A: \beta_1 &\neq 0 & H_A: \beta_{1+3} &\neq 0
\end{align*}
\]
The marginal effects of the total agricultural revenue taxed away by the national government on the difference in vote for the PJ-FpV party between consecutive elections for the center and the periphery departments can be calculated as:

When $X_3$ equals to 1 (i.e. center)

\[
\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1 + \beta_{1*3}
\]

Expected sign \( < 0 \) \hspace{1cm} (3.7.c)

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a lower vote share for the PJ-FpV party between elections in departments located in the center.

When $X_3$ equals to 0 (i.e. periphery)

\[
\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1
\]

Expected sign \( > 0 \) \hspace{1cm} (3.7.d)

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a higher vote share for the PJ-FpV party between elections in departments located in the periphery.

**Third Hypothesis: Agricultural versus Non-Agricultural Cleavage Hypothesis**

The increase in total agricultural revenue taxed away by the government will negatively affect the vote in the agricultural departments while it will positively affect the vote in the non-agricultural departments. Given that most of grains and livestock production is concentrated in the grain and livestock regions of Argentina, the income transfer to the non-agricultural regions will make people better off. Therefore, the income transfer will yield a higher voting behavior for the non-agricultural departments for the PJ-FpV party than the agricultural departments at the elections for the Chamber of
Deputies in the National Congress from 2001 through 2009. The regression model used to test this hypothesis is:

\[
Y_{(dte)} = \alpha + \beta_1X_{1(dte)} + \beta_4X_{4(dte)} + \beta_{1+4}X_{1(dte)}X_{4(dte)} + W + Z + \varepsilon
\]  

Where:

- \(Y\): Vote difference for the PJ-FpV party between consecutive elections.
- \(\beta_1\): Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue.
- \(X_1\): Total agricultural revenue taxed away by the national government.
- \(\beta_4\): Marginal change in vote for the PJ-FpV party with a change in agricultural versus non-agricultural department taxed away.
- \(X_4\): Agricultural versus non-agricultural dummy variable.
  - \(1\) if department is agricultural.
  - \(0\) if department is non-agricultural.
- \(\beta_{1+4}\): Combined marginal effect from the interaction term.
- \(W\): Vector of control independent variables: \(X_6, X_7, X_8, \) and \(X_9\).
- \(Z\): Vector of dummy variables: \(X_{10}\) through \(X_{33}\).
- \(d\): Space: 512 departments in 23 provinces and the city of Buenos Aires.
- \(e\): Election: chamber.
- \(\varepsilon\): Error term or residual.

The null hypothesis in the first case is that there is no effect between agricultural revenue taxed away on the vote for the PJ-FpV. The null hypothesis in the second case is that there is no difference of this effect between the agricultural and non-agricultural departments. The mathematical representation of these null hypotheses and their corresponding alternative hypotheses is:

\[
\begin{align*}
H_0: \beta_1 &= 0 \\
H_0: \beta_{1+4} &= 0 \\
H_A: \beta_1 &\neq 0 \\
H_A: \beta_{1+4} &\neq 0
\end{align*}
\]  

(3.8.b)
The marginal effects of the total agricultural revenue taxed away by the national government on the difference in vote for the PJ-FpV party between consecutive elections for the agricultural and non-agricultural departments can be calculated as:

\[
\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1 + \beta_{1*4}
\]

\(\text{Expected sign} \quad (3.8.c)\)

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a lower vote share for the PJ-FpV party between elections in agricultural departments.

<table>
<thead>
<tr>
<th>When (X_4) equals to 1 (i.e. agricultural)</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1 + \beta_{1*4})</td>
<td>(&lt; 0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When (X_4) equals to 0 (i.e. non-agricultural)</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{\partial Y_{(dte)}}{\partial X_{1(dte)}} = \beta_1)</td>
<td>(&gt; 0)</td>
</tr>
</tbody>
</table>

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a higher vote share for the PJ-FpV party between elections in non-agricultural departments.

**Fourth Hypothesis: Class Cleavage Hypothesis**

The increase in total agricultural revenue taxed away by the government will negatively affect the high income vote while it will positively affect the low income vote. Given that relative to their level of income poorer households spend more on food than richer households, the income transfer makes less affluent people better off compared to the more affluent people, therefore the income transfer will yield a higher voting behavior for the lower class than the higher class for the PJ-FpV party at the elections for the
Chamber of Deputies in the National Congress from 2001 through 2009. The regression model used to test this hypothesis is:

\[ Y_{(dte)} = \alpha + \beta_1 X_{1(dte)} + \beta_5 X_{5(dte)} + \beta_{1*5} X_{1(dte)} X_{5(dte)} + W + Z + \varepsilon \] (3.9.a)

Where:

- \( Y \): Vote difference for the PJ-FpV party between consecutive elections.
- \( \beta_1 \): Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue taxed away.
- \( X_1 \): Total agricultural revenue taxed away by the national government.
- \( X_5 \): Income dummy variable.  
  - 1 if department is high income.  
  - 0 if department is low income.
- \( \beta_{1*5} \): Combined marginal effect from the interaction term.
- \( W \): Vector of control independent variables: \( X_6, X_7, X_8, \) and \( X_9 \).
- \( Z \): Vector of dummy variables: \( X_{10} \) through \( X_{33} \).
- \( d \): Space: 512 departments in 23 provinces and the city of Buenos Aires.
- \( e \): Election: chamber.
- \( \varepsilon \): Error term or residual.

The null hypothesis in the first case is that there is no effect between agricultural revenue taxed away on the vote for the PJ-FpV. The null hypothesis in the second case is that there is no difference of this effect between the high-income and low-income departments. The mathematical representation of these null hypotheses and their corresponding alternative hypotheses is:

\[
\begin{align*}
H_0: \beta_1 &= 0 \\
H_A: \beta_1 &\neq 0
\end{align*}
\]
\[
\begin{align*}
H_0: \beta_{1*5} &= 0 \\
H_A: \beta_{1*5} &\neq 0
\end{align*}
\] (3.9.b)
The marginal effects of the total agricultural revenue taxed away by the national government on the difference in vote for the PJ-FpV party between consecutive elections for the high-income and low-income departments can be calculated as:

When \( X_5 \) equals to 1 (i.e. high-income) Expected sign \( \frac{\partial Y}{\partial X_{1,5}} = \beta_1 + \beta_{1*5} \) (3.9.c) \(< 0\)

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a lower vote share for the PJ-FpV party between elections in high-income departments.

When \( X_5 \) equals to 0 (i.e. low-income) Expected sign \( \frac{\partial Y}{\partial X_{1,5}} = \beta_1 \) (3.9.d) \(> 0\)

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a higher vote share for the PJ-FpV party between elections in low-income departments.

**Fifth Hypothesis: Nation versus Province Hypothesis**

The increase in total agricultural revenue taxed away by the government will affect differently the vote between the national government and the provincial government in the province of Buenos Aires. Given that most of the agricultural and food policies originated at the national government instead of the provincial governments, the voting behavior will differ accordingly by the electorate for the PJ-FpV party at the elections for the Chamber of Deputies in the National Congress and the Legislature in the
The Provincial Congress of Buenos Aires from 2001 through 2009. The regression model used to test this hypothesis is:

\[
Y_{(dtchamber)} = \alpha + \beta_1 X_{1(dtchamber)} + W + \varepsilon
\]
\[
Y_{(dtlegislature)} = \alpha + \beta_1 X_{1(dtlegislature)} + W + \varepsilon
\]

Where:

- \(Y\) Vote difference for the PJ-FpV party between consecutive elections.
- \(\beta_1\) Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue taxed away.
- \(X_1\) Total agricultural revenue taxed away by the national government.
- \(W\) Vector of control independent variables: \(X_6, X_7, X_8,\) and \(X_9.\)
- \(d\) Space: 134 departments in the province of Buenos Aires.
- \(e\) Election: chamber and legislature.
- \(\varepsilon\) Error term or residual.

The null hypothesis is that agricultural revenue taxed away by the national government affects equally the vote for the PJ-FpV at the Chamber of Deputies and at the Legislature. The mathematical representation of this null hypothesis and their corresponding alternative hypothesis is:

\[
H_0: \beta_{1chamber} = \beta_{1legislature}
\]
\[
H_A: \beta_{1chamber} \neq \beta_{1legislature}
\]

Where: an increase in agricultural revenue taxed away from the agricultural sector is expected to generate a different vote share for the PJ-FpV party between elections at the national and provincial level in the province of Buenos Aires.
Sixth Hypothesis: Nation versus Department Hypothesis

The increase in total agricultural revenue taxed away by the government will negatively affect the vote for the national government compared to the municipal government at the department level. Given that most of the agricultural and food policies originated at the national government instead of the department governments, the voting behavior will differ accordingly by the electorate for the PJ-FpV party at the elections for the Chamber of Deputies in the National Congress and the Council in the Council of the departments in the province of Buenos Aires from 2001 through 2009. The regression model used to test this hypothesis is:

\[
Y_{(dtchamber)} = \alpha + \beta_1 X_{1(dtchamber)} + W + \epsilon \\
Y_{(dtcouncil)} = \alpha + \beta_1 X_{1(dtcouncil)} + W + \epsilon
\]  

Where:

- \( Y \) Vote difference for the PJ-FpV party between consecutive elections.
- \( \beta_1 \) Marginal change in vote for the PJ-FpV party with a unit change in total agricultural revenue taxed away.
- \( X_1 \) Total agricultural revenue taxed away by the national government.
- \( W \) Vector of control independent variables: \( X_6, X_7, X_8, \) and \( X_9 \).
- \( d \) Space: 134 departments in the province of Buenos Aires.
- \( e \) Election: chamber and council.
- \( \epsilon \) Error term or residual.

The null hypothesis is that agricultural revenue taxed away by the national government affects equally the vote for the PJ-FpV at the Chamber of Deputies and the Council. The mathematical representation of this null hypothesis and their corresponding alternative hypothesis is:
Where: an increase in agricultural revenue taxed away from the rural sector is expected to generate a different vote share for the PJ-FpV party between elections at the national and department level in the province of Buenos Aires.

Seventh Hypothesis: Executive versus Legislative Hypothesis

The increase in total agricultural revenue taxed away by the government will negatively affect the vote for the presidency compared to the legislative at the national government. Given that most of the agricultural and food policies originated at the national government through presidential decrees and ministerial resolutions, instead of laws enacted by Congress, the voting behavior will differ accordingly by the electorate for the PJ-FpV party. The regression models used to test these hypotheses are:

\[
\begin{align*}
Y_{(dtchamber)} &= \alpha + \beta_1 X_{1(dtchamber)} + W + \varepsilon \\
Y_{(dpresidency)} &= \alpha + \beta_1 X_{1(dpresidency)} + W + \varepsilon \\
Y_{(dtlegislature)} &= \alpha + \beta_1 X_{1(dtlegislature)} + W + \varepsilon \\
Y_{(dtgovernorship)} &= \alpha + \beta_1 X_{1(dtgovernorship)} + W + \varepsilon
\end{align*}
\] (3.12.a)

Where:

- \(Y\) Vote difference for the PJ-FpV party between consecutive elections.
- \(\beta_1\) Marginal change in vote for PJ-FpV with a unit change in total agricultural revenue taxed away.
- \(X_1\) Total agricultural revenue taxed away by the national government.
- \(W\) Vector of control independent variables: \(X_6, X_7, X_8, \text{ and } X_9\).
Space: 134 departments in the province of Buenos Aires.
Election: chamber, and presidency; and legislature and governorship.

Error term or residual.

In the first case, the null hypothesis is that agricultural revenue taxed away by the national government affects equally the vote for the PJ-FpV at the Chamber of Deputies and at the Presidency. The mathematical representation of this null hypothesis and their corresponding alternative hypothesis is:

\[
H_0: \beta_{1\text{chamber}} = \beta_{1\text{presidency}}
\]
\[
H_A: \beta_{1\text{chamber}} \neq \beta_{1\text{presidency}}
\]

Where: an increase in agricultural revenue taxed away from the rural sector is expected to generate a different vote share for the PJ-FpV party between elections at the national level between the executive and legislative branches in the province of Buenos Aires.

In the second case, The null hypothesis is that agricultural revenue taxed away by the national government affects equally the vote for the PJ-FpV at the Legislature and at the Governorship. The mathematical representation of this null hypothesis and their corresponding alternative hypothesis is:

\[
H_0: \beta_{1\text{legislature}} = \beta_{1\text{governorship}}
\]
\[
H_A: \beta_{1\text{legislature}} \neq \beta_{1\text{governorship}}
\]
Where: an increase in agricultural revenue taxed away from the rural sector is expected to generate a different vote share for the PJ-FpV party between elections at the provincial level between the executive and legislative branches in the province of Buenos Aires.
CHAPTER FOUR
RESULTS

In this chapter the results of the dissertation are presented in detail. First, the descriptive statistics of the dependent and independent variables are shown and discussed. Second, the results of the hypotheses are presented both in numeric and map format. A spatial and temporal analysis of the results from the variables and the hypotheses is provided to better understand the relationship among them.

Descriptive Statistics of the Variables

The variables employed in the different OLS and SUR models specified in Chapter 3 for the seven hypotheses are shown and discussed in this section in general. The results are shown in detail in map format with their respective descriptive statistics at the department level in Appendix B. As described earlier, in Argentina there are 23 provinces and the Capital Federal (Ciudad Autónoma de Buenos Aires). The difference in the share of valid votes for the PJ-FpV for the Chamber of Deputies by province and the total for Argentina for the last five elections shows great variability (Table 4.1). This heterogeneity can be explained by the conflicting nature between the PJ and the FpV across elections and within provinces. In some provinces and in some elections, the FpV was able to form alliances with the PJ while in other provinces and in other elections it was not able to reach an agreement and therefore the FpV supported candidates from
another party. This phenomenon was the result of the party fragmentation after the 2002 socioeconomic and political crisis due to the weak institutionalization of the party system in Argentina. The PJ party morphed from an urban unionized worker structure to a provincial structure which transverses across the political spectrum. Furthermore, Calvo and Escolar (2005) argue that the PJ became a competing organizational structure for the FpV and PJ Federal.


<table>
<thead>
<tr>
<th>#</th>
<th>Province</th>
<th>Count</th>
<th>Difference in Legislative Elections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buenos Aires</td>
<td>134</td>
<td>5.9%      -3.5%     7.0%     -20.5%</td>
</tr>
<tr>
<td>2</td>
<td>Catamarca</td>
<td>16</td>
<td>-12.2%    6.3%      -9.3%    15.0%</td>
</tr>
<tr>
<td>3</td>
<td>Chaco</td>
<td>25</td>
<td>5.8%      -14.4%    21.6%    -0.9%</td>
</tr>
<tr>
<td>4</td>
<td>Chubut</td>
<td>15</td>
<td>6.7%      17.7%     -56.4%   0.0%</td>
</tr>
<tr>
<td>5</td>
<td>Ciudad de Buenos Aires</td>
<td>1</td>
<td>-11.7%    20.5%     -7.7%    -1.1%</td>
</tr>
<tr>
<td>6</td>
<td>Cordoba</td>
<td>26</td>
<td>11.2%     4.4%      -25.4%   -15.1%</td>
</tr>
<tr>
<td>7</td>
<td>Corrientes</td>
<td>25</td>
<td>-4.6%     34.1%     -66.3%   -4.4%</td>
</tr>
<tr>
<td>8</td>
<td>Entre Rios</td>
<td>17</td>
<td>0.2%      -1.4%     2.7%     -48.4%</td>
</tr>
<tr>
<td>9</td>
<td>Formosa</td>
<td>9</td>
<td>25.4%     -6.6%     10.0%    -7.8%</td>
</tr>
<tr>
<td>10</td>
<td>Jujuy</td>
<td>16</td>
<td>17.0%     4.2%      -16.0%   -45.4%</td>
</tr>
<tr>
<td>11</td>
<td>La Pampa</td>
<td>22</td>
<td>-2.2%     -51.3%    3.3%     -1.4%</td>
</tr>
<tr>
<td>12</td>
<td>La Rioja</td>
<td>18</td>
<td>10.4%     -7.9%     15.9%    -13.6%</td>
</tr>
<tr>
<td>13</td>
<td>Mendoza</td>
<td>18</td>
<td>8.0%      -14.0%    -23.3%   2.6%</td>
</tr>
<tr>
<td>14</td>
<td>Misiones</td>
<td>17</td>
<td>-11.0%    -7.6%     -1.1%    -9.4%</td>
</tr>
<tr>
<td>15</td>
<td>Neuquén</td>
<td>16</td>
<td>-11.5%    21.4%     3.2%     -23.4%</td>
</tr>
<tr>
<td>16</td>
<td>Rio Negro</td>
<td>13</td>
<td>-4.1%     14.0%     -7.0%    -35.8%</td>
</tr>
<tr>
<td>17</td>
<td>Salta</td>
<td>23</td>
<td>-12.7%    -38.8%    77.1%    -87.1%</td>
</tr>
<tr>
<td>18</td>
<td>San Juan</td>
<td>19</td>
<td>-2.6%     12.2%     1.6%     7.3%</td>
</tr>
<tr>
<td>19</td>
<td>San Luis</td>
<td>9</td>
<td>12.3%     -68.5%    -3.2%    -5.6%</td>
</tr>
<tr>
<td>20</td>
<td>Santa Cruz</td>
<td>7</td>
<td>17.7%     -17.3%    12.4%    -25.8%</td>
</tr>
<tr>
<td>21</td>
<td>Santa Fe</td>
<td>19</td>
<td>16.3%     -18.7%    0.2%     -30.1%</td>
</tr>
<tr>
<td>22</td>
<td>Santiago del Estero</td>
<td>27</td>
<td>-24.0%    -33.6%    5.6%     6.7%</td>
</tr>
<tr>
<td>23</td>
<td>Tierra del Fuego</td>
<td>3</td>
<td>6.2%      -6.0%     -16.3%   -7.9%</td>
</tr>
<tr>
<td>24</td>
<td>Tucuman</td>
<td>17</td>
<td>-11.9%    40.2%     0.1%     -9.8%</td>
</tr>
<tr>
<td>25</td>
<td>Argentina</td>
<td>512</td>
<td>-1.4%     -5.1%     -0.2%    -16.7%</td>
</tr>
</tbody>
</table>

Note: Averages for provinces and Argentina are calculated from county values.
The quantity of agricultural revenue taxed away by the national government increased from 493 to 2,591 USD per capita between 2002-2003 and 2008-2009 on average for the whole country (Table 4.2). This variable shows more homogeneity than the previous one, as agricultural taxation has been very high in the Pampas and the northeast while medium in the northwest. Agricultural taxation has been very low in the provinces of Patagonia and Cuyo and some other provinces in the periphery regions.


<table>
<thead>
<tr>
<th>#</th>
<th>Province</th>
<th>Count</th>
<th>Agricultural Revenue Taxed Away</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buenos Aires</td>
<td>134</td>
<td>791</td>
</tr>
<tr>
<td>2</td>
<td>Catamarca</td>
<td>16</td>
<td>114</td>
</tr>
<tr>
<td>3</td>
<td>Chaco</td>
<td>25</td>
<td>607</td>
</tr>
<tr>
<td>4</td>
<td>Chubut</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Ciudad de Buenos Aires</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Cordoba</td>
<td>26</td>
<td>1,017</td>
</tr>
<tr>
<td>7</td>
<td>Corrientes</td>
<td>25</td>
<td>291</td>
</tr>
<tr>
<td>8</td>
<td>Entre Ríos</td>
<td>17</td>
<td>562</td>
</tr>
<tr>
<td>9</td>
<td>Formosa</td>
<td>9</td>
<td>350</td>
</tr>
<tr>
<td>10</td>
<td>Jujuy</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>La Pampa</td>
<td>22</td>
<td>2,104</td>
</tr>
<tr>
<td>12</td>
<td>La Rioja</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>Mendoza</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Misiones</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>Neuquén</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>Rio Negro</td>
<td>13</td>
<td>98</td>
</tr>
<tr>
<td>17</td>
<td>Salta</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>18</td>
<td>San Juan</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>San Luis</td>
<td>9</td>
<td>457</td>
</tr>
<tr>
<td>20</td>
<td>Santa Cruz</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>Santa Fe</td>
<td>19</td>
<td>815</td>
</tr>
<tr>
<td>22</td>
<td>Santiago del Estero</td>
<td>27</td>
<td>505</td>
</tr>
<tr>
<td>23</td>
<td>Tierra del Fuego</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>Tucumán</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>Argentina</td>
<td>512</td>
<td>493</td>
</tr>
</tbody>
</table>

Note: Averages for provinces and Argentina are calculated from county values.
The control variables show that there is a contrasting socioeconomic difference in Argentina between the Pampas and Patagonia versus the rest of the country (Table 4.3). Ciudad de Buenos Aires, Tierra del Fuego, Buenos Aires, Santa Cruz, La Pampa, Cordoba and Santa Fe have the highest share of people living in higher quality houses, people with more years of education, older citizens and more women than men.

Table 4.3: Averages of the control variables by province and country in 2001 in Argentina.

<table>
<thead>
<tr>
<th>#</th>
<th>Province</th>
<th>Count</th>
<th>Housing</th>
<th>Education</th>
<th>Age</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buenos Aires</td>
<td>134</td>
<td>88.3%</td>
<td>9.8%</td>
<td>65.3%</td>
<td>49.3%</td>
</tr>
<tr>
<td>2</td>
<td>Catamarca</td>
<td>16</td>
<td>50.3%</td>
<td>7.0%</td>
<td>55.8%</td>
<td>51.4%</td>
</tr>
<tr>
<td>3</td>
<td>Chaco</td>
<td>25</td>
<td>47.7%</td>
<td>4.0%</td>
<td>51.6%</td>
<td>51.0%</td>
</tr>
<tr>
<td>4</td>
<td>Chubut</td>
<td>15</td>
<td>74.4%</td>
<td>6.3%</td>
<td>59.0%</td>
<td>54.1%</td>
</tr>
<tr>
<td>5</td>
<td>Ciudad de Buenos Aires</td>
<td>1</td>
<td>97.4%</td>
<td>17.4%</td>
<td>76.6%</td>
<td>45.3%</td>
</tr>
<tr>
<td>6</td>
<td>Cordoba</td>
<td>26</td>
<td>83.8%</td>
<td>8.9%</td>
<td>63.0%</td>
<td>49.9%</td>
</tr>
<tr>
<td>7</td>
<td>Corrientes</td>
<td>25</td>
<td>54.0%</td>
<td>6.4%</td>
<td>53.7%</td>
<td>50.2%</td>
</tr>
<tr>
<td>8</td>
<td>Entre Rios</td>
<td>17</td>
<td>74.1%</td>
<td>8.8%</td>
<td>60.1%</td>
<td>49.7%</td>
</tr>
<tr>
<td>9</td>
<td>Formosa</td>
<td>9</td>
<td>32.6%</td>
<td>4.9%</td>
<td>49.2%</td>
<td>51.4%</td>
</tr>
<tr>
<td>10</td>
<td>Jujuy</td>
<td>16</td>
<td>26.8%</td>
<td>5.4%</td>
<td>50.7%</td>
<td>49.4%</td>
</tr>
<tr>
<td>11</td>
<td>La Pampa</td>
<td>22</td>
<td>85.0%</td>
<td>6.8%</td>
<td>62.5%</td>
<td>52.2%</td>
</tr>
<tr>
<td>12</td>
<td>La Rioja</td>
<td>18</td>
<td>59.0%</td>
<td>8.3%</td>
<td>56.3%</td>
<td>51.1%</td>
</tr>
<tr>
<td>13</td>
<td>Mendoza</td>
<td>18</td>
<td>75.6%</td>
<td>8.0%</td>
<td>60.3%</td>
<td>49.5%</td>
</tr>
<tr>
<td>14</td>
<td>Misiones</td>
<td>17</td>
<td>61.8%</td>
<td>4.7%</td>
<td>50.4%</td>
<td>50.9%</td>
</tr>
<tr>
<td>15</td>
<td>Neuquén</td>
<td>16</td>
<td>77.7%</td>
<td>6.7%</td>
<td>55.8%</td>
<td>52.2%</td>
</tr>
<tr>
<td>16</td>
<td>Rio Negro</td>
<td>13</td>
<td>73.9%</td>
<td>6.1%</td>
<td>58.4%</td>
<td>51.8%</td>
</tr>
<tr>
<td>17</td>
<td>Salta</td>
<td>23</td>
<td>35.1%</td>
<td>5.9%</td>
<td>50.5%</td>
<td>50.7%</td>
</tr>
<tr>
<td>18</td>
<td>San Juan</td>
<td>19</td>
<td>49.7%</td>
<td>6.9%</td>
<td>56.7%</td>
<td>50.2%</td>
</tr>
<tr>
<td>19</td>
<td>San Luis</td>
<td>9</td>
<td>72.1%</td>
<td>7.4%</td>
<td>60.9%</td>
<td>51.9%</td>
</tr>
<tr>
<td>20</td>
<td>Santa Cruz</td>
<td>7</td>
<td>87.3%</td>
<td>12.0%</td>
<td>60.1%</td>
<td>52.1%</td>
</tr>
<tr>
<td>21</td>
<td>Santa Fe</td>
<td>19</td>
<td>79.5%</td>
<td>10.4%</td>
<td>63.0%</td>
<td>49.4%</td>
</tr>
<tr>
<td>22</td>
<td>Santiago del Estero</td>
<td>27</td>
<td>41.4%</td>
<td>3.9%</td>
<td>52.5%</td>
<td>51.7%</td>
</tr>
<tr>
<td>23</td>
<td>Tierra del Fuego</td>
<td>3</td>
<td>89.1%</td>
<td>20.5%</td>
<td>69.9%</td>
<td>64.5%</td>
</tr>
<tr>
<td>24</td>
<td>Tucuman</td>
<td>17</td>
<td>46.3%</td>
<td>6.3%</td>
<td>56.4%</td>
<td>50.6%</td>
</tr>
<tr>
<td>25</td>
<td>Argentina</td>
<td>512</td>
<td>68.0%</td>
<td>7.6%</td>
<td>58.9%</td>
<td>50.6%</td>
</tr>
</tbody>
</table>

Housing: Share of population that lives in houses built within the top two quality rankings of five. 
Education: Share of population that at least has high-school degree. 
Age: Share of population that is older than twenty years old. 
Male: Share of the population that are males 
Note: Averages for provinces and Argentina are calculated from county values.
On the contrary, provinces in the Northeast and Northwest tend to have a higher share of people living in lower quality houses, people with less years of education, younger citizens and have a higher proportion of males. These differences between the provinces in housing, education, age, and proportion of males has been consistent with previous decennial national statistical censuses (INDEC 2011).

When we focus on the electoral response across the three layers of government, the difference in the voting results for PJ-FpV in the province of Buenos Aires tend to be heterogeneous for 2003-2001, 2005-2003, and 2007-2005 (Table 4.4). However, in 2009-2007 the voting results were consistent, given that the PJ-FpV was punished in the elections at the three levels of government (Table 4.4). Again, this heterogeneity can be explained by the fragmentation of the party system and the swings in alliances between the different factions of the PJ party at the different levels of government and within the province of Buenos Aires.


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National Chamber</td>
<td>134</td>
<td>-5.9%</td>
<td>-3.5%</td>
<td>7.0%</td>
<td>-20.5%</td>
</tr>
<tr>
<td>Provincial Legislature</td>
<td>134</td>
<td>6.4%</td>
<td>14.6%</td>
<td>-7.5%</td>
<td>-21.1%</td>
</tr>
<tr>
<td>Departmental Council</td>
<td>134</td>
<td>-5.4%</td>
<td>14.9%</td>
<td>-8.6%</td>
<td>-14.7%</td>
</tr>
</tbody>
</table>

Note: Averages for the province of Buenos Aires are calculated from 134 county values.

Finally, when we focus on the different branches of government we can observe that the results are homogeneous between the Executive and the Legislative (Table 4.5). This can be explained by the coattail effects in which voters tend to vote for the same party or alliances for different roles as it is well documented in the literature (Ferejohn and Calvert 1984, Campbell and Sumners 1990, Ames 1994, and Samuels 2000).
Table 4.5: Average of the difference in the share of valid votes for PJ-FpV for the Presidency and Chamber of Deputies, Governorship and Legislature in Buenos Aires province: 2007-2003 elections.

<table>
<thead>
<tr>
<th>Election</th>
<th>Count</th>
<th>2007-2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Presidential</td>
<td>134</td>
<td>20.3%</td>
</tr>
<tr>
<td>National Chamber</td>
<td>134</td>
<td>3.4%</td>
</tr>
<tr>
<td>Provincial Governorship</td>
<td>134</td>
<td>3.8%</td>
</tr>
<tr>
<td>Provincial Legislature</td>
<td>134</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

Note: Averages for the province of Buenos Aires are calculated from 134 county values.

Analysis and Results of the Tests of Hypotheses

The results for the seven hypotheses, their test statistics, and their marginal effects are presented in this section. The first four hypotheses tested for social cleavage effects: urban versus rural, center versus periphery, agricultural versus non-agricultural, and high-income versus low-income. The last three hypotheses tested for national versus provincial effects, provincial versus local effects, and executive versus legislative effects, respectively.

First Hypothesis: Urban versus Rural Cleavage Hypothesis

The first hypothesis tested whether an increase in agricultural revenue taxed away by the government would generate a higher vote share for the PJ-FpV party between elections in urban departments versus rural departments. Therefore, this hypothesis tested whether an urban versus rural cleavage existed in Argentina in the elections of the first decade of the XXI century. The coefficient estimates and the probability results for each variable employed in the model are shown in Table 4.6 while the model diagnostics are shown in Table 4.7. The standardized residuals estimates from the four equations are shown in Figures 4.1 through 4.4.
According to the coefficient of determination ($R^2$), the model explains a very large proportion of the variation in the dependent variable, change in votes for the PJ-FpV party, for 2009-2007, 2007-2005, 2005-2003, and 2003-2001 in the elections for the Chamber of Deputies (Table 4.7). The effect of total agricultural revenue taxed away on the difference in votes for the PJ-FpV party ($\beta_1$) is equal to zero for 2009-2007 and 2005-2003 while it is different from zero but small for 2005-2003 and 2003-2001 (Table 4.6). Furthermore, the estimates are statistically different than zero for three of the four election periods. The difference in the effect between urban and rural departments of agricultural revenue taxed away on the vote ($\beta_{1\times 2}$) is small for the four election periods (Table 4.6). However, the estimates are not statistically significant for the interaction term. We reject both null hypotheses and therefore we accept the alternate hypotheses, as there is an effect between agricultural revenue taxed away and difference in voting for the PJ-FpV while at the same time this effect is different between urban and rural departments.

When we take into account the marginal effects in urban departments ($\beta_1 + \beta_{1\times 2}$) we can observe in three out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector indeed generates a higher vote share for the PJ-FpV party between elections (Table 4.6). However, as mentioned earlier, the overall effects are small. For instance, the effect is 0.00003 for 2009-2007, which means that for every 1,000 USD per capita of agricultural revenue taxed by the national government there would be a 3% increase in the share of valid votes in the national election for the Chamber of Deputies between 2009 and 2007 for the incumbent party (relative to the
base level of the multiple regression, Tierra del Fuego province, that was not coded). During that period, the average agricultural revenue taxed away was USD 2,591 for the whole country which translates into an increase of 7.77% in valid votes for the PJ-FpV in urban departments (Table 4.2).

When we look for marginal effects in rural departments ($\beta_1$) we can only observe in one out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a lower vote share for the PJ-FpV party between elections (Table 4.6). This is, in only one election we can observe the expected sign for the effect as described in Chapter 3. For instance, in 2005-2003 we observe that the effect is -0.00002, which means that for every 1,000 USD per capita of agricultural revenue taxed away by the Executive there would be a decrease of only 2% of the valid vote for the PJ-FpV party between elections in rural departments (relative to the base level of the multiple regression, Tierra del Fuego province, that was not coded). During that period the average agricultural revenue taxed away was USD 473 for the whole country which translates into a decrease of 0.09% in valid votes for the PJ-FpV in rural departments (Table 4.2).

From a political standpoint, this implies that an increase in agricultural revenue taxed away by the government from the agricultural sector would produce a positive change in voting for the incumbent party, PJ-FpV, for the Chamber of Deputies in National Congress in the urban departments. On the other hand, it would produce a negative change in voting in the rural departments. However, since two thirds of the population lives in urban departments versus one third that lives in rural departments as
defined in this study, it would be rational to tax the agricultural sector in order to favor other sectors of the economy.

The effect of the control variables on the vote for PJ-FpV party during the election periods is mixed (Table 4.1). The effect of housing quality on the vote is negative for the first two election periods, but is positive for the last two election periods (Table 4.1). The opposite happens with education attainment, the effect on the vote is positive for the first two election periods, but is negative for the last two election periods (Table 4.1). The effect of age on the vote is positive for the first and third voting period, but negative for the second and fourth (Table 4.1). Finally, the effect of sex on the vote is negative for the first two election periods, but is positive for the last two election periods (Table 4.6).

The effect of the regional variables on the vote for PJ-FpV party during the elections is mixed as well (Table 4.6). For instance, for Buenos Aires province, the first electoral district by size with almost forty percent of the national electorate share, and Santa Fe province, the fourth electoral district by size, the effect on the vote is positive for the first and third voting period, but negative for the second and fourth (Table 4.6). In the case of Capital Federal, the second electoral district by size, the effect on the vote is negative for the first period, but positive for the three reminding periods (Table 4.6). In Cordoba, the third electoral district by size, the effect on the vote is positive for the first two election periods, but is negative for the last two election periods (Table 4.6). In Mendoza, the fifth electoral district by size, the effect on the vote is positive for the first
and last election periods, but is negative for the second and third election periods (Table 4.6).

According to the Joint F-statistic and Joint Wald statistic the independent variables of this model indeed had an effect on the dependent variable for the four time periods analyzed (Table 4.7). Since the Variance Inflation Factor (VIF) values were smaller than 7.5 for most of the variables, there was no multicollinearity (redundancy in the variables) present in the four elections periods (Table 4.7). According to the statistical results of the Koenker’s studentized Breush-Pagan statistic, there was no heteroskedasticity present for the four time periods analyzed (Table 4.7). Finally, the Jarque-Bera statistic revealed that the residuals in this model were not normally distributed (Table 4.7). This can also be observed from the maps (Figures 4.1-4.4) and from the OLS Diagnostics Table (Table 4.7). The over and under predictions of the model are clearly clustered in the maps as a consequence of the PJ-FpV vote being stronger in some provinces and weaker in other provinces. Finally, spatial autocorrelation of the standardized residuals was assessed with the Moran's I Statistic and confirmed that the standardized residuals were clustered.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parameter</td>
<td>Pr &gt;</td>
<td>Parameter</td>
<td>Pr &gt;</td>
<td>Parameter</td>
<td>Pr &gt;</td>
<td>Parameter</td>
<td>Pr &gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>t</td>
<td></td>
<td>t</td>
<td></td>
<td>t</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>$\beta_0$</td>
<td>-0.1416</td>
<td>0.2571</td>
<td>-0.4482</td>
<td>0.25062</td>
<td>0.24686</td>
<td>0.11919</td>
<td>-0.05885</td>
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<td>Age revenue taxed away</td>
<td>$\beta_1$</td>
<td>0</td>
<td>0.6307</td>
<td>0</td>
<td>0.52787</td>
<td>0.00002</td>
<td>0.131</td>
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<td>Urban</td>
<td>$\beta_2$</td>
<td>-0.01645</td>
<td>0.13002</td>
<td>-0.01293</td>
<td>0.32212</td>
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<td>0.05609</td>
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<td>Housing quality</td>
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<td>0.03719</td>
<td>0.37346</td>
<td>0.15614</td>
<td>0.00193</td>
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<td>-0.1197</td>
<td>0.52816</td>
<td>-0.8769</td>
<td>0.00014</td>
<td>0.15373</td>
<td>0.52732</td>
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<td>Age</td>
<td>$\beta_8$</td>
<td>-0.1009</td>
<td>0.41616</td>
<td>0.1687</td>
<td>0.25471</td>
<td>0.11722</td>
<td>0.46506</td>
<td>0.17442</td>
</tr>
<tr>
<td>Sex</td>
<td>$\beta_9$</td>
<td>0.20931</td>
<td>0.23098</td>
<td>0.33676</td>
<td>0.10508</td>
<td>-0.38245</td>
<td>0.08459</td>
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</tr>
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<td>Ciudad de Buenos Aires</td>
<td>$\beta_{10}$</td>
<td>0.1138</td>
<td>0.21345</td>
<td>0.10258</td>
<td>0.34725</td>
<td>0.19781</td>
<td>0.09444</td>
<td>-0.18371</td>
</tr>
<tr>
<td>Catamarca</td>
<td>$\beta_{11}$</td>
<td>-0.11727</td>
<td>0.02455</td>
<td>0.20386</td>
<td>0.00111</td>
<td>-0.00142</td>
<td>0.98303</td>
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</tr>
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<td>Cordoba</td>
<td>$\beta_{13}$</td>
<td>0.23251</td>
<td>0.00003</td>
<td>0.07385</td>
<td>0.25389</td>
<td>0.08333</td>
<td>0.23466</td>
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<tr>
<td>San Juan</td>
<td>$\beta_{25}$</td>
<td>-0.28315</td>
<td>0</td>
<td>0.04698</td>
<td>0.4726</td>
<td>0.16981</td>
<td>0.01701</td>
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<td>San Luis</td>
<td>$\beta_{28}$</td>
<td>0.16088</td>
<td>0.00343</td>
<td>0.18565</td>
<td>0.00463</td>
<td>0.13238</td>
<td>0.06173</td>
<td>-0.02862</td>
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<tr>
<td>Santa Fe</td>
<td>$\beta_{29}$</td>
<td>-0.21394</td>
<td>0.00009</td>
<td>0.15519</td>
<td>0.01587</td>
<td>-0.15174</td>
<td>0.02912</td>
<td>0.12385</td>
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<td>Santiago del Estero</td>
<td>$\beta_{31}$</td>
<td>0.14348</td>
<td>0.00844</td>
<td>0.21678</td>
<td>0.00089</td>
<td>-0.30916</td>
<td>0.00002</td>
<td>-0.23325</td>
</tr>
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<td>Tucumán</td>
<td>$\beta_{32}$</td>
<td>-0.01309</td>
<td>0.81281</td>
<td>0.16906</td>
<td>0.01061</td>
<td>0.41893</td>
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<td>-1017.9984</td>
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<td>Multiple R-Squared (R²)</td>
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<td>Adjusted R-Squared (R²)</td>
<td>0.89317</td>
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<td>0.90155</td>
<td></td>
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<tr>
<td>Joint F-Statistic</td>
<td>143.40846</td>
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<td>156.98652</td>
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<td>Joint Wald Statistic</td>
<td>8084.14508</td>
<td></td>
<td>7069.31921</td>
<td></td>
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<tr>
<td>Koenker (BP) Statistic</td>
<td>60.06658</td>
<td>0.0009</td>
<td>57.35946</td>
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<td>Jarque-Bera (JB) Statistic</td>
<td>114.51535</td>
<td></td>
<td>40.51272</td>
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<td>Variance (Sigma²)</td>
<td>0.0053</td>
<td></td>
<td>0.00756</td>
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Figure 4.1: Urban versus rural hypothesis standardized residuals for 2009-2007 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.

Figure 4.2: Urban versus rural hypothesis standardized residuals for 2007-2005 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Figure 4.3: Urban versus rural hypothesis standardized residuals for 2005-2003 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.

Figure 4.4: Urban versus rural hypothesis standardized residuals for 2003-2001 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Second Hypothesis: Center versus Periphery Cleavage Hypothesis

The second hypothesis tested whether an increase in total agricultural revenue taxed away by the government would negatively affect the vote in the departments in the center (Pampas region) while it would positively affect the vote in the departments in the periphery (Patagonia, Cuyo, Northeast and Northwest regions). Therefore, this hypothesis tested whether a center versus a periphery cleavage existed in Argentina during the first decade of the XXI century. The coefficient estimates and the probability results for each variables employed in the model are shown in Table 4.8 while the model diagnostics are shown in Table 4.9. The standardized residuals estimates from the four equations are shown in Figures 4.5 through 4.8.

According to the coefficient of determination (R²), the model explains a very small proportion of the variation in the dependent variable, difference in votes for the PJ-FpV party, for the 2009-2007, 2007-2005, 2005-2003, and 2003-2001 in the elections for the Chamber of Deputies (Table 4.9). The effect of agricultural revenue taxed away on the difference in votes for the PJ-FpV party (β₁) is equal to zero for 2003-2001 but different from zero and small for 2005-2003, 2007-2005, and 2009-2007 (Table 4.8). The estimates are statistically different in two of the four election periods (Table 4.8). Furthermore, this effect differs between departments located in the center and the periphery (β₁*3) for all the elections for the Chamber of Deputies (Table 4.8). The estimates are statistically significant in two of the four election periods. Therefore, we reject both null hypotheses and we accept the alternate hypotheses. We can argue that there is an effect between agricultural revenue taxed away and difference in voting for the
PJ-FpV. We can also argue that this effect is different between the center and the periphery.

When we consider the marginal effects of departments within the center \((\beta_1 + \beta_{1,3})\) we can observe that in two out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a higher vote share for the PJ-FpV party between elections while in other two elections the effect is zero (Table 4.8). In none of the elections we can observe the expected sign. However, despite the fact that the overall effects are positive, they are still small. For instance, the effect is 0.00006 for 2005-2003, which means that for every 1,000 USD per capita of agricultural revenue taxed by the national government there would be a 6% increase in the share of valid votes in the national election for the Chamber of Deputies between 2005 and 2003 for the incumbent party. During that period, the average agricultural revenue taxed away was USD 473 for the whole country which translates into an increase of 2.83% in valid votes for the PJ-FpV in the departments within the center (Table 4.2). The effect having the opposite sign can be explained by the fact that there are many departments in the center that are urban and not rural.

When we take into account marginal effects in departments within the periphery \((\beta_1)\) we can observe in one out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a higher vote share for the PJ-FpV party between elections (Table 4.8). This is, in only one election we can observe the expected sign for the effect. For instance, in 2009-2007 we observe that the effect is 0.00002, which means that for every 1,000 USD per capita of agricultural revenue taxed
away by the Executive there would be an increase of only 2% of the valid vote for the PJ-FpV party between elections in departments within the periphery. During that period the average agricultural revenue taxed away was USD 2,591 for the whole country which translates into a decrease of 5.18% in valid votes for the PJ-FpV in rural departments (Table 4.2)

The effect of the control variables on the vote for PJ-FpV party during the election periods is mixed (Table 4.8). In this case, the effect of housing quality on the vote is negative for the first and third voting period, but positive for the second and fourth (Table 4.8). The effect of education attainment on the vote is positive for the first three election periods, but is negative for the last election period (Table 4.8). The effect of age on the vote is positive for the first, second, and last period, but negative for the third one (Table 4.8). Finally, the effect of sex on the vote is negative for the first three election periods, but is positive for the last election period (Table 4.8).

According to the Joint F-statistic and Joint Wald statistic the independent variables are jointly significant (Table 4.9). Given that the VIF values were smaller than 7.5 for most of the variables, multicollinearity does not seem to have been a problem for the variables (Table 4.9). According to the statistical results of the Koenker’s studentized Breush-Pagan statistic, there was no heteroskedasticity present for the four time periods analyzed (Table 4.9). Finally, the Jarque-Bera statistic revealed that the residuals in this model were not normally distributed (Table 4.9) which can also be confirmed from the maps (Figures 4.5-4.8) and from the OLS Diagnostics Table (Table 4.9). As described earlier, the over and under predictions of the model are clearly clustered in the maps as a
consequence of the PJ-FpV vote being stronger in some provinces and weaker in other provinces. Finally, spatial autocorrelation of the standardized residuals was assessed with the Moran's I Statistic and confirmed that the standardized residuals were clustered.

| Variables                        | Parameter | Pr > |t| | Parameter | Pr > |t| | Parameter | Pr > |t| | Parameter | Pr > |t| |
|---------------------------------|-----------|------|---|-----------|------|---|-----------|------|---|-----------|------|---|-----------|------|---|
| Intercept                       | $\beta_0$ | -1.02431 | | 0.00002 | 0.00667 | | 0.00002 | 0.22923 | | -0.0001 | 0.00811 | | -0.001 | 0.29294 | | 0 | 0.17492 | | 0.02501 | 0.84378 | |
| Ag revenue taxed away           | $\beta_1$ | 0.00002 | | 0.00667 | 0 | | -0.0002 | 0.00676 | | -0.00002 | 0.22923 | | 0.0001 | 0.00811 | | 0 | 0.81165 | | 0.05034 | 0.0078 | |
| Center                          | $\beta_3$ | -0.15674 | | 0 | 0.13231 | | 0.00002 | 0.00676 | | -0.0001 | 0.22923 | | 0.00002 | 0.22923 | | 0 | 0.81165 | | 0.05034 | 0.0078 | |
| Ag revenue taxed away * Center  | $\beta_1 \times \beta_3$ | -0.00002 | | 0.00676 | 0 | | -0.0002 | 0.00676 | | -0.00002 | 0.22923 | | 0.0001 | 0.00811 | | 0 | 0.81165 | | 0.05034 | 0.0078 | |
| Housing quality                 | $\beta_6$ | 0.31754 | | 0.00005 | 0 | | -0.35897 | 0.00037 | | -0.0007 | 0.00811 | | 0 | 0.81165 | | 0 | 0.81165 | | 0 | 0.81165 | |
| Education attainment            | $\beta_7$ | -2.09063 | | 0 | 0.89539 | | 0.09686 | 0 | | 0.07149 | 0.86988 | | 0 | 0.86988 | | 0 | 0.86988 | | 0 | 0.86988 | |
| Age                             | $\beta_8$ | 0.88878 | | 0.00281 | 0 | | -0.43611 | 0.25676 | | 0.90678 | 0.00463 | | 0 | 0.49906 | | 0 | 0.49906 | | 0 | 0.49906 | |
| Sex                             | $\beta_9$ | 0.66956 | | 0.07335 | 0 | | -0.37796 | 0.43373 | | -1.5802 | 0.00007 | | 0 | 0.4297 | | 0 | 0.4297 | | 0 | 0.4297 | |


| Variables                        | Parameter | Pr > |F| | Parameter | Pr > |F| | Parameter | Pr > |F| | Parameter | Pr > |F| |
|---------------------------------|-----------|------|---|-----------|------|---|-----------|------|---|-----------|------|---|-----------|------|---|
| Number of observations          | 512       |     |   | 512       |     |   | 512       |     |   | 512       |     |   |
| Number of variables             | 8         |     |   | 8         |     |   | 8         |     |   | 8         |     |   |
| Degrees of freedom              | 504       |     |   | 504       |     |   | 504       |     |   | 504       |     |   |
| Akaike's Information Criterion (AIC) | -143.46904 |     |   | 123.18005 |     |   | -69.08131 |     |   | -633.57685 |     |   |
| Multiple R-Squared (R²)         | 0.13434   |     |   | 0.05826   |     |   | 0.13968   |     |   | 0.14493   |     |   |
| Adjusted R-Squared (R²)         | 0.12231   |     |   | 0.04518   |     |   | 0.12773   |     |   | 0.13305   |     |   |
| Joint F-Statistic               | 11.17325  |     |   | 4.4544    | 0.00008 |   | 11.69001  |     |   | 12.20329  |     |   |
| Joint Wald Statistic            | 113.00723 |     |   | 32.20747  | 0.00004 |   | 82.16992  |     |   | 118.41558 |     |   |
| Koenker (BP) Statistic          | 76.859    |     |   | 64.93455  | 0     |   | 27.22988  | 0.0003 |   | 80.05301  |     |   |
| Jarque-Bera (JB) Statistic      | 287.57494 |     |   | 85.13704  | 0     |   | 11.6934   | 0.00289 |   | 1.06958   | 0.58579 |   |
| Variance (Sigma²)               | 0.04356   |     |   | 0.07333   |     |   | 0.05037   |     |   | 0.01673   |     |   |
Figure 4.5: Center versus periphery hypothesis standardized residuals for 2009-2007 PJ-FpV in Argentina by department.

Figure 4.6: Center versus periphery hypothesis standardized residuals for 2007-2005 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Figure 4.7: Center versus periphery hypothesis standardized residuals for 2005-2003 PJ-FpV in Argentina by department.

Figure 4.8: Center versus periphery hypothesis standardized residuals for 2003-2001 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Third Hypothesis: Agricultural versus Non-Agricultural Cleavage Hypothesis

The third hypothesis tested whether an increase in total agricultural revenue taxed away by the government would negatively affect the vote in the agricultural departments while it would positively affect the vote in the non-agricultural departments. Therefore, this hypothesis tested whether an agricultural versus a non-agricultural cleavage existed in Argentina during the first decade of the XXI century. The coefficient estimates and the probability results for each variable employed in the model are shown in Table 4.10 while the model diagnostics are shown in Table 4.6. The standardized residuals estimates from the four equations are shown in Figures 4.9 through 4.12.

According to the coefficient of determination ($R^2$), the model explains a large proportion of the variation in the dependent variable, difference in votes for the PJ-FpV party, for the 2009-2007, 2007-2005, 2005-2003, and 2003-2001 in the elections for the Chamber of Deputies (Table 4.11). The effect of agricultural revenue taxed away on the difference in votes for the PJ-FpV party ($\beta_1$) is different from zero for all the election periods (Table 4.10). The estimates are statistically significant in one of the four election periods (Table 4.10). Furthermore, this effect differs between agricultural and non-agricultural departments ($\beta_{1,4}$) for all the elections for the Chamber of Deputies (Table 4.10). The estimates are statistically significant in one of the four election periods. Therefore, we reject both null hypotheses and we accept the alternate hypotheses. We can say that there is an effect between agricultural revenue taxed away and difference in voting for the PJ-FpV and that this effect is different between agricultural and non-agricultural departments.
When we consider the marginal effects in agricultural departments \((\beta_1 + \beta_1+4)\) we can observe that in two out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a lower vote share for the PJ-FpV party between elections while in one election period the effect is negative and in the last election period is equal to zero (Table 4.10). In only one of the election periods we can observe the expected sign. However, the overall effects are still very small. For instance, the effect is -0.00001 for 2007-2005, which means that for every 1,000 USD per capita of agricultural revenue taxed by the national government there would be a 1% decrease in the share of valid votes in the national election for the Chamber of Deputies between 2007 and 2005 for the incumbent party (relative to the base level of the multiple regression, Tierra del Fuego province, that was not coded). During that period, the average agricultural revenue taxed away was USD 1,321 for the whole country which translates into an increase of 1.32% in valid votes for the PJ-FpV in the agricultural departments (Table 4.2).

When we take into account marginal effects in non-agricultural departments \((\beta_1)\) we can observe in two out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a higher vote share for the PJ-FpV party between elections (Table 4.10). This is, in only two elections we can observe the expected sign for the effect. For instance, in 2009-2007 we observe that the effect is 0.00195, which means that for every 1,000 USD per capita of agricultural revenue taxed away by the Executive there would be an increase of 195% of the valid vote for the PJ-FpV party between elections in non-agricultural departments (relative to the base level of
the multiple regression, Tierra del Fuego province, that was not coded). During that period the average agricultural revenue taxed away was USD 2,591 for the whole country which translates into an increase of 505% in valid votes for the PJ-FpV in non-agricultural departments (Table 4.2)

The effect of the control variables on the vote for PJ-FpV party during the elections is mixed but similar to what happened with the first hypothesis (Table 4.10). The effect of housing quality on the vote is negative for the first two election periods, but is positive for the last two election periods (Table 4.10). The opposite happens with education attainment, the effect on the vote is positive for the first two election periods, but is negative for the last two election periods (Table 4.10). The effect of age on the vote is positive for the first and third voting period, but negative for the second and fourth election periods (Table 4.10). Finally, the effect of sex on the vote is negative for the first two election periods, but is positive for the last two election periods (Table 4.10).

The effect of the regional variables on the vote for PJ-FpV party during the election periods is mixed as well (Table 4.10). For instance, for Buenos Aires province, the first electoral district by size, the effect on the vote is positive for the first, second and third voting period, but negative for the last one (Table 4.10). In the case of Capital Federal, the second electoral district by size, the opposite happens; the effect on the vote is negative for the first period, but positive for the three reminding periods as it was the case with the first hypothesis (Table 4.10). In Cordoba, the third electoral district by size, the effect on the vote is positive for the first two election periods, but is negative for the last two election periods as it was the case with the first hypothesis (Table 4.10). In Santa
Fe, the fourth electoral district by size, the effect on the vote is positive for the second and fourth election periods, but is negative for the first and third election periods (Table 4.10). In Mendoza, the fifth electoral district by size, the effect on the vote is positive for the second and third election periods, but is negative for the first and fourth election periods (Table 4.10).

According to the statistical results, this model is both significant (Joint F-statistic) and robust (Joint Wald statistic) for the four time periods analyzed (Table 4.11). Given the Variance Inflation Factor (VIF) values for the four election periods, there was no multicollinearity present for most of the variables employed in the model. According to the statistical results, this model is stationary for the four time periods analyzed (Table 4.11). According to the Jarque-Bera statistic, this model is statistically significant and therefore the residuals are not normally distributed (Table 4.11). This can also be observed from the maps (Figures 4.9-4.12) and from the OLS Diagnostics Table (Table 4.11). Finally, spatial autocorrelation of the standardized residuals was assessed with the Moran's I Statistic and confirmed that the standardized residuals were clustered.
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<td>0.01628</td>
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<td>$\beta_7$</td>
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<td>0.31564</td>
<td>-0.89532</td>
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<td>Age</td>
<td>$\beta_8$</td>
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<td>0.38382</td>
<td>0.16738</td>
</tr>
<tr>
<td>Sex</td>
<td>$\beta_9$</td>
<td>0.26347</td>
<td>0.12383</td>
<td>0.37509</td>
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<td>$\beta_{12}$</td>
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Figure 4.9: Agricultural versus non-agricultural hypothesis standardized residuals for 2009-2007 PJ-FpV in Argentina by department.

Figure 4.10: Agricultural versus non-agricultural hypothesis standardized residuals for 2007-2005 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Figure 4.11: Agricultural versus non-agricultural hypothesis standardized residuals for 2005-2003 PJ-FpV in Argentina by department.

Figure 4.12: Agricultural versus non-agricultural hypothesis standardized residuals for 2003-2001 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Fourth Hypothesis: High-Income versus Low-Income Cleavage Hypothesis

The fourth hypothesis tested whether an increase in total agricultural revenue taxed away by the government would negatively affect the high income vote while it would positively affect the low income vote. Therefore, this hypothesis tested whether a class cleavage existed in Argentina during the first decade of the XXI century. The coefficient estimates and the probability results for each variable employed in the model are shown in Table 4.12 while the model diagnostics are shown in Table 4.13. The standardized residuals estimates from the four equations are shown in Figures 4.13 through 4.16.

According to the coefficient of determination ($R^2$), the model explains a high proportion of the variation in the dependent variable, change in votes for the PJ-FpV party, for the 2009-2007, 2007-2005, 2005-2003, and 2003-2001 in the elections for the Chamber of Deputies (Table 4.13).

The effect of agricultural revenue taxed away on the difference in votes for the PJ-FpV party ($\beta_1$) is different from zero for three out of the four election periods (Table 4.12). The estimates are statistically significant in only one of the four election periods (Table 4.12). Besides, this effect differs between high-income and low-income departments ($\beta_{1,5}$) for only one out of the four elections for the Chamber of Deputies (Table 4.12). However, the estimates are not statistically significant for any of the election periods (Table 4.12). Therefore, we reject both null hypotheses and we accept the alternate hypotheses. We can say that there is an effect between agricultural revenue
taxed away and difference in voting for the PJ-FpV and that this effect is different between high-income and low-income departments.

When we consider the marginal effects in high-income departments \((\beta_1 + \beta_{1*5})\) we can observe that in only one of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a lower vote share for the PJ-FpV party between elections while in the remaining election periods is equal to zero (Table 4.12). However, the overall effects are still very small. The effect is -0.00001 for 2005-2003, which means that for every 1,000 USD per capita of agricultural revenue taxed by the national government there would be a 1% decrease in the share of valid votes in the national election for the Chamber of Deputies between 2005 and 2003 for the incumbent party (relative to the base level of the multiple regression, Tierra del Fuego province, that was not coded). During that period, the average agricultural revenue taxed away was USD 473 for the whole country which translates into a decrease of 0.47% in valid votes for the PJ-FpV in the high-income departments (Table 4.2).

When we take into account marginal effects in low-income departments \(\beta_1\) we can observe in one out of the four elections that an increase in agricultural revenue taxed away from the agricultural sector generates a higher vote share for the PJ-FpV party between elections (Table 4.12). Therefore, in only one election we can observe the expected sign for the effect, while in one election is zero and two others is negative (Table 4.12). For instance, in 2003-2001 we observe that the effect is 0.00002, which means that for every 1,000 USD per capita of agricultural revenue taxed away by the Executive there would be an increase of 2% of the valid vote for the PJ-FpV party.
between elections in low-income departments (relative to the base level of the multiple regression, Tierra del Fuego province, that was not coded). During that period the average agricultural revenue taxed away was USD 493 for the whole country which translates into an increase of 0.98% in valid votes for the PJ-FpV in low-income departments (Table 4.2)

The effect of the control variables on the vote for PJ-FpV party during the election periods is mixed (Table 4.12). The effect of housing quality on the vote is positive for all the election periods (Table 4.12). The effect of education attainment on the vote is positive for the first two election periods, but is negative for the last two election periods as it happened in the first and third hypotheses (Table 4.12). The effect of age on the vote is positive for the first, second and fourth voting period, but negative for the third voting period (Table 4.12). Finally, the effect of sex on the vote is negative for the first two election periods, but is positive for the last two election periods as it happened in the first and third hypotheses (Table 4.12).

The effect of the regional variables on the vote for PJ-FpV party during the elections is mixed as well (Table 4.12). For instance, for Buenos Aires province, the first electoral district by size, the effect on the vote is positive for the second and fourth voting periods, but negative for the first and third voting periods as it was the case in the first hypothesis (Table 4.12). In the case of Capital Federal, the second electoral district by size, the opposite happens; the effect on the vote is negative for the first period, but positive for the three reminding periods as it was the case with the first and third hypotheses (Table 4.12). In Cordoba, the third electoral district by size, the effect on the
vote is positive for the first two election periods, but is negative for the last two election periods as it was the case with the first and third hypotheses (Table 4.12). In Santa Fe, the fourth electoral district by size, the effect on the vote is negative for the second and fourth election periods, but is positive for the first and third election periods, the opposite of what happened in the third hypothesis (Table 4.12). In Mendoza, the fifth electoral district by size, the effect on the vote is positive for the second and third election periods, but is negative for the first and fourth election periods, as it happened in the third hypothesis (Table 4.12).

According to the Joint F-statistic and Joint Wald statistic the independent variables of this model did have an effect on the dependent variable for the four time periods analyzed (Table 4.13). Given that the VIF values were smaller than 7.5 for most of the variables, multicollinearity does not seem to have been a problem for the variables (Table 4.13). According to the statistical results of the Koenker’s studentized Breush-Pagan statistic, there was no heteroskedasticity present for the four time periods analyzed (Table 4.13). Finally, the Jarque-Bera statistic revealed that the residuals in this model were not normally distributed (Table 4.13) which can also be confirmed from the maps (Figures 4.13-4.16) and from the OLS Diagnostics Table (Table 4.13). As described earlier, the over and under predictions of the model are clearly clustered in the maps as a consequence of the PJ-FpV vote being stronger in some provinces and weaker in other provinces. Finally, spatial autocorrelation of the standardized residuals was assessed with the Moran's I Statistic and confirmed that the standardized residuals were clustered.

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<td>-0.22848</td>
<td>0.00053</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tucumán</td>
<td>$\beta_{32}$</td>
<td>-0.00601</td>
<td>0.91389</td>
<td>0.16598</td>
<td>0.012</td>
<td>0.40996</td>
<td>0</td>
<td>-0.11409</td>
<td>0.08729</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tierra del Fuego</td>
<td>$\beta_{33}$</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Parameter</td>
<td>Pr &gt; [F]</td>
<td>Parameter</td>
<td>Pr &gt; [F]</td>
</tr>
<tr>
<td>Number of observations</td>
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<td>512</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>Number of variables</td>
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<td>31</td>
<td>31</td>
<td>31</td>
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<tr>
<td>Degrees of freedom</td>
<td>481</td>
<td>481</td>
<td>481</td>
<td>481</td>
</tr>
<tr>
<td>Akaike's Information Criterion (AIC)</td>
<td>-1195.8620</td>
<td>-1019.53671</td>
<td>-928.93449</td>
<td>-1008.6368</td>
</tr>
<tr>
<td>Multiple R-Squared (R²)</td>
<td>0.89869</td>
<td>0.90761</td>
<td>0.85335</td>
<td>0.62429</td>
</tr>
<tr>
<td>Adjusted R-Squared (R²)</td>
<td>0.89237</td>
<td>0.90185</td>
<td>0.8442</td>
<td>0.60086</td>
</tr>
<tr>
<td>Joint F-Statistic</td>
<td>142.22494</td>
<td>0</td>
<td>93.29634</td>
<td>0</td>
</tr>
<tr>
<td>Joint Wald Statistic</td>
<td>8257.48563</td>
<td>0</td>
<td>8422.0309</td>
<td>0</td>
</tr>
<tr>
<td>Koenker (BP) Statistic</td>
<td>64.44226</td>
<td>0.00026</td>
<td>60.85574</td>
<td>0.00072</td>
</tr>
<tr>
<td>Jarque-Bera (JB) Statistic</td>
<td>96.63244</td>
<td>0</td>
<td>41.69933</td>
<td>0</td>
</tr>
<tr>
<td>Variance (Sigma²)</td>
<td>0.00534</td>
<td>0.00754</td>
<td>0.009</td>
<td>0.0077</td>
</tr>
</tbody>
</table>
Figure 4.13: High-income versus low-income hypothesis standardized residuals for 2009-2007 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.

Figure 4.14: High-income versus low-income hypothesis standardized residuals for 2007-2005 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Figure 4.15: High-income versus low-income hypothesis standardized residuals for 2005-2003 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.

Figure 4.16: High-income versus low-income hypothesis standardized residuals for 2003-2001 PJ-FpV in Argentina by department.

Observation: data in the legend is arranged by standard deviations.
Fifth Hypothesis: Nation versus Province Hypothesis

The fifth hypothesis tested whether an increase in total agricultural revenue taxed away by the national government would affect differently the vote for the national government and the provincial government in the province of Buenos Aires. The value of the statistic and the associated probability for each restriction according to their specific model is shown in Table 4.14.


<table>
<thead>
<tr>
<th>Period</th>
<th>Model</th>
<th>Restriction Tested</th>
<th>Value</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-2001</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.26</td>
<td>0.6069</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>4.47</td>
<td>0.0346</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>2.62</td>
<td>0.1055</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>3.17</td>
<td>0.0749</td>
</tr>
<tr>
<td>2003-2001</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.15</td>
<td>0.6952</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>4.37</td>
<td>0.0366</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>2.71</td>
<td>0.0997</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>5.02</td>
<td>0.025</td>
</tr>
<tr>
<td>2003-2001</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.4</td>
<td>0.5294</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.76</td>
<td>0.3835</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.8</td>
<td>0.3706</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>7.9</td>
<td>0.0049</td>
</tr>
<tr>
<td>2003-2001</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.35</td>
<td>0.5551</td>
</tr>
<tr>
<td>2005-2003</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.14</td>
<td>0.7123</td>
</tr>
<tr>
<td>2007-2005</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>0.01</td>
<td>0.9318</td>
</tr>
<tr>
<td>2009-2007</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{legislature}} )</td>
<td>1.09</td>
<td>0.2956</td>
</tr>
</tbody>
</table>

The statistical results show that the effect of agricultural revenue taxed away by the national government on the vote for the incumbent party is different at the national
level from the provincial level for the total, urban versus rural, and agricultural versus non-agricultural models, but not for high versus low income for some election periods (Table 4.14). The 2005-2003 and 2009-2007 periods are statistically significant for the three models at the 10% level. Given that these were mid-term elections this could have been related to mid-term effects, such as differential coattail effects. These results would suggest that there has been an effect on voting for the PJ-FpV given by the change in agricultural revenue taxed away between the chamber and the legislature in the province of Buenos Aires in the elections analyzed.

*Sixth Hypothesis: Nation versus Department Hypothesis*

The sixth hypothesis tested whether an increase in total agricultural revenue taxed away by the government would differently affect the vote for the national government and the municipal government at the department level in the province of Buenos Aires. The value of the statistic and the associated probability for each restriction according to their specific model is shown in Table 4.15.

In this case, the statistical results show that the effect of agricultural revenue taxed away by the national government on the vote for the incumbent party is different at the national level from the department level for the at least one electoral period in the four models analyzed (Table 4.15). In this particular case no clear trend was detected between the models and the electoral periods. This may be a consequence of switching alliances between elections, this is, a local party that has been entrenched in a department for years switches from one national party to another national party in order not to be defeated. These results would suggest that agricultural revenue taxed away has had an effect on the
vote for the chamber and the council in the province of Buenos Aires during the elections of the last decade.


<table>
<thead>
<tr>
<th>Period</th>
<th>Model</th>
<th>Restriction Tested</th>
<th>Value</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-2001</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>4.77</td>
<td>0.029</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.2</td>
<td>0.6585</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>2.03</td>
<td>0.1541</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Total</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.24</td>
<td>0.6276</td>
</tr>
<tr>
<td>2003-2001</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>4.8</td>
<td>0.0285</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.44</td>
<td>0.5089</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>1.75</td>
<td>0.1853</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Urban vs Rural</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.11</td>
<td>0.7457</td>
</tr>
<tr>
<td>2003-2001</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0</td>
<td>0.9824</td>
</tr>
<tr>
<td>2005-2003</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.4</td>
<td>0.5261</td>
</tr>
<tr>
<td>2007-2005</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.19</td>
<td>0.6614</td>
</tr>
<tr>
<td>2009-2007</td>
<td>Ag vs Non-ag</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>10.88</td>
<td>0.001</td>
</tr>
<tr>
<td>2003-2001</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>2.05</td>
<td>0.1518</td>
</tr>
<tr>
<td>2005-2003</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>0.07</td>
<td>0.791</td>
</tr>
<tr>
<td>2007-2005</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>5.57</td>
<td>0.0182</td>
</tr>
<tr>
<td>2009-2007</td>
<td>High vs Low-income</td>
<td>( \beta_{\text{chamber}} = \beta_{\text{council}} )</td>
<td>2.29</td>
<td>0.1305</td>
</tr>
</tbody>
</table>

Seventh Hypothesis: Executive versus Legislative

The seventh hypothesis tested whether the increase in total agricultural revenue taxed away by the government will negatively affect the vote for the presidency compared to the legislative at the national government and at the provincial government. Given that most of the agricultural and food policies originated at the national government through presidential decrees and ministerial resolutions, instead of laws
enacted by Congress, the voting behavior could differ accordingly by the electorate for the PJ-FpV party. The value of the statistic and the associated probability for each restriction according to their specific model is shown in Table 4.16.

Table 4.16: Executive versus legislative hypothesis value of the statistic and probability > [ChiSq] results: Chamber of Deputies and Presidency national election, and governorship and legislature provincial election for PJ-FpV in 2003 and 2007 in the Province of Buenos Aires.

<table>
<thead>
<tr>
<th>Period</th>
<th>Model</th>
<th>Restriction Tested</th>
<th>Statistic</th>
<th>Pr &gt; ChiSq</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2003</td>
<td>Total</td>
<td>$\beta_{1\text{chamber}} = \beta_{1\text{presidency}}$</td>
<td>0.07</td>
<td>0.7976</td>
</tr>
<tr>
<td>2007-2003</td>
<td>Urban vs Rural</td>
<td>$\beta_{1\text{chamber}} = \beta_{1\text{presidency}}$</td>
<td>0.12</td>
<td>0.7308</td>
</tr>
<tr>
<td>2007-2003</td>
<td>Ag vs Non-ag</td>
<td>$\beta_{1\text{chamber}} = \beta_{1\text{presidency}}$</td>
<td>0.03</td>
<td>0.8525</td>
</tr>
<tr>
<td>2007-2003</td>
<td>High vs Low-income</td>
<td>$\beta_{1\text{chamber}} = \beta_{1\text{presidency}}$</td>
<td>3.15</td>
<td>0.0757</td>
</tr>
<tr>
<td>2007-2003</td>
<td>Total</td>
<td>$\beta_{1\text{legislature}} = \beta_{1\text{governorship}}$</td>
<td>0.84</td>
<td>0.3596</td>
</tr>
<tr>
<td>2007-2003</td>
<td>Urban vs Rural</td>
<td>$\beta_{1\text{legislature}} = \beta_{1\text{governorship}}$</td>
<td>0.71</td>
<td>0.3998</td>
</tr>
<tr>
<td>2007-2003</td>
<td>Ag vs Non-ag</td>
<td>$\beta_{1\text{legislature}} = \beta_{1\text{governorship}}$</td>
<td>0</td>
<td>0.9463</td>
</tr>
<tr>
<td>2007-2003</td>
<td>High vs Low-income</td>
<td>$\beta_{1\text{legislature}} = \beta_{1\text{governorship}}$</td>
<td>0.88</td>
<td>0.3468</td>
</tr>
</tbody>
</table>

In this case the statistical results show that there is no difference in the effect of agricultural and food policies on the change in vote for the PJ-FpV party between elections (Table 4.16). These results suggest that the voter punishes or rewards the incumbent party for their policymaking without taking into account whether these policies were enacted by the Congress or through presidential decrees or ministerial resolutions.
CHAPTER FIVE
CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

As previously stated, this study researched the political economy of agricultural and food policies in Argentina by developing a circular conceptual framework. Specifically, this study empirically tested the electoral response through an economic voting and political referendum model. The change in vote for the incumbent party was tested for social cleavages and different levels and branches of government through specific hypotheses. The conclusions from the results of these hypotheses are presented in the first section of this chapter. The limitations of the present research related to variables not accounted for in the model and the statistical methodology employed are outlined in the second section. Finally, in the third section there are suggestions for further research in the area of political economy of agricultural and food policies.

Conclusions

In this study we found that there is an overall effect between agricultural revenue taxed away by the national government and difference in voting for the PJ-FpV during the last four election periods. Also, we found that this effect indeed is different between urban and rural departments, between departments in the center and in the periphery, between agricultural and non-agricultural departments, and between high-income and low-income departments. However, the magnitudes of the empirically estimated effects are small and heterogeneous across the election periods analyzed, which may suggest that
urban-rural, center-periphery, agricultural-industry, and class-based cleavages have been present in Argentina during the first decade of this century. This finding provides a weak empirical argument that supports the economic, social, and political conceptual literature about the conflict nature in the political economy of Argentina between agriculture and industry, as suggested by O’Donnell (1978) for the XX century. Overcoming serious data availability and statistical technique limitations, as explained in the next section, would have permitted a better estimation of the economic effects on the vote for the different social cleavages.

The political relevance of this finding is that changes in agricultural revenue from agricultural and food policies will have an impact on the electoral response. The incumbent party will be rewarded or punished by its policymaking depending on whether voters are producers or consumers, whether voters live in the urban area or in the rural area, whether voters live in the center or in the periphery, or whether voters are better off or worse off income wise. Given that the rural farming population does not have a voting density comparable to that of the urban wage earner population in Argentina, farming organizations will have to affect policymaking via other social responses, such as lobbying or interest group access and advocacy coalitions. However, if these two ways to produce a change in the policy process fail, they will have to resort to social demonstrations with the risks that social response entails.

After Resolution 125/2008 increased export tariffs on grains, the social response led by the four farming organizations (SRA, CRA, FAA, and CONINAGRO) in order to force the Executive to send the policy to Congress for a vote on both Chambers, is a
prime example of the use of social demonstrations to affect the policymaking process. As stated in the framework, if farmers cannot change the policymaker during the elections, then the only available alternative is to change the policymaker’s decision between elections through lobbying or interest group access, advocacy coalitions, and demonstrations. Given the lack of party institutionalization and that parties are the ones that compete in elections; it is very difficult for the citizens, not just farmers, in Argentina to resolve conflict through their elected representatives in a republican manner.

We found an effect between agricultural revenue taxed away and difference in voting for the PJ-FpV across layers of government, nation versus province and nation versus department, but no effect for the different branches of government for the four election periods analyzed. Again, the magnitudes of the estimated effects were small and heterogeneous across the election periods studied. This would suggest that the voter has the ability to reward or to punish the incumbent policymaker across different levels of government (local, regional and national) but not within the same level (either provincial or national). This finding, despite the fact it was weak, supports the construct that the voter assigns different responsibility for affairs that differ in scale but not in procedure. The political implication for this is that delegation of power from the legislative branch to the executive branch does not seem to be punished or rewarded accordingly by the electorate which undermines the separation of powers and the checks and balances that it provides to democracy.
Limitations

The first limitation of the present research was that this study did not control for economic variables usually employed in economic voting political referendum models such as GDP growth, unemployment, inflation, and fiscal transfers from the national government to provinces and municipalities. These variables were not included in the research due to serious limitations in data availability. Most provincial governments have started to publish GDP estimates from input-output models at the provincial and department level in the recent years which has made the study for the four elections during the last decade not feasible. Unemployment statistics are from a continuous household survey (EPH) carried out by the INDEC for the major urban centers which are measured every six months. Inflation statistics are carried out by the INDEC for the major urban centers and aggregated into six regions and published monthly. Spatial statistics techniques, such as areal interpolation may be a valuable statistical tool that can be employed in order to transform unemployment and inflation data from urban centers into urban and rural departments. Fiscal transfers from the national government to provinces and municipalities through the tax sharing agreement in place in Argentina are governed by the Federal Coparticipation Regime by Law 21548/1988 (Tomassi et al., 2001). Fiscal transfer statistics have been published in the recent years at the provincial and department level.

A solution to this serious data availability limitation for GDP growth, unemployment, inflation, and fiscal transfers would be to focus in one province, such as Buenos Aires, Santa Fe, or Cordoba, as any of them has a high relevance in the size of
the variables that we studied in this research. The results from the research of this case-study province may provide an insight on the effect of these omitted variables on the vote for the PJ-FpV during the last decade.

The second limitation of this Dissertation is that this study did not control for political variables usually employed in economic voting and political referendum models such as voter turnout and share of valid votes, coattails effect, effective number of parties competing in the elections, and party institutionalization. Calvo and Escolar (2005) argue that after the socioeconomic and political crisis of 2002 electoral participation decreased and that there was a fragmentation of the political parties. The UCR fragmented into several parties with different provincial and local relevance while the PJ party morphed from an urban unionized worker structure to a provincial structure which transverses across the political spectrum. The PJ became a competing organizational structure for the FpV and PJ Federal. These variables were not included in the research due to the complexity of modeling these simultaneous effects.

Again, a solution to this complexity would be to model the political effects on the vote in the province of Buenos Aires, which is a prime example of the political changes observed during the last decade in Argentina regarding the PJ and the FpV. The results from the research of this case-study province may provide an insight on the effect of these omitted variables on the vote for the PJ-FpV during the last decade.

The third limitation was related to the statistical methodology employed in the empirical estimations. The first of such limitations is that we employed an OLS regression model which estimated the global effects for the variables in the first four
hypotheses. In order to overcome this limitation there are different statistical estimations that can be employed. One of such estimations is the GWR model that estimates the effect for every spatial unit and therefore removes autocorrelation problems in the standard errors. The second statistical limitation was that the effect on local elections could not be estimated in departments outside the province of Buenos Aires given that most provinces in Argentina have more than one municipality per department. Therefore, the boundaries of the municipalities within the departments tend to change over time because of redistricting. This problem is related to MAUP and MIDP and could be solved through statistical areal interpolation.

The final limitation, which is related to the three previous ones, is the impossibility to separate the economic effects of the agricultural policies on producers and consumers, on other sectors of the economy, and across factors of production (Piermartini 2004). The income distribution effects from the implementation of agricultural and food policies on producers and consumers are difficult to estimate for two reasons. On producers, the export tariff effect differs according to the size of the enterprise and to the distance to the port. Given the lack of data on netback prices at the farm level and quantities of farms per department, it was not possible to estimate the regressive effect of the export tariffs. This limitation could be overcome for producers if yearly farm-level data was available at the department level or using individual level data from sampling. On consumers, there are two simultaneous effects: a purchasing power effect from lower food prices on expenditures and a tax effect from welfare payment transfers through social programs. This limitation could be overcome for consumers if
yearly household level data was available at the department level or using individual level data from sampling.

**Suggestions for Future Research**

Future studies should be conducted in order to understand the nature of the political economy of agricultural and food policies in Argentina further. In this research we focused on the electoral response between 2001 and 2009 given changes in the agricultural and food policies and we did not look into the other social responses, lobbying, advocacy coalition, and social demonstrations. Therefore, we believe that there are four promising areas for future research.

The first area would be to extend the time under analysis to test if the electoral effects that we found for the four last elections are similar under different agricultural and food policies. An interesting period to focus for testing these hypotheses would be during the Convertibility between 1991 and 2001; an era characterized by the fixed currency exchange between the ARS and the USD, reduced barriers to trade, and diminished power of the Executive versus the Legislative, and of the manufacturing sector versus the agricultural sector. We expect the results from this study to differ given an scenario where the agricultural sector does not face export tariffs, export quotas and export bans, and where the capitalist alliance prevails over the populist alliance (O’ Donnell 1978).

The second area would be to include other relevant policies that affect the profitability of the farming sector besides the agricultural and food policies employed in the research. Environmental policies have been enacted in Argentina in the last decade
that affects production and marketing of commodities. For instance, land use and land change policies have been enacted to exclude sensible areas (native forests, floodplains, wetlands, etc.) from production but the national law has been implemented differently by the provincial provinces due to political pressure by the farming organizations. The electoral effects that we found in this research may differ in those regions were agricultural production has been curtailed by environmental restricting policies such as the one described above.

The third area would be to expand the research to test for the other socioeconomic responses, lobbying, advocacy coalition and social demonstrations. Given the recent consolidation of democracy in Argentina, the weakly institutionalization of political parties and the highly fragmentation of the party system, it would be relevant to understand how the different union or farmer organizations attempt to change policies through these socioeconomic responses. This better understanding of the socioeconomic responses will have profound policy implications because not only it will shed light on how policies are made but also on how the process can be improved. In the particular case of Argentina, this better understanding will allow policymakers to formulate and enact policies that are supported by the society they represent. For instance, Resolution 125/2008 was a ministerial resolution formulated by a group of technocrats that had little understanding both of the economic and political consequences of the implementation of the variable progressive export tariffs. That policy mistake created a political and economic crisis that paralyzed the country and lasted for months. Furthermore, a better
policymaking process will help to consolidate democracy and the institutions and organizations that sustain it.

Finally, an area for promising future research is that of comparative studies. The electoral response and the other socioeconomic responses can be researched in countries that have a different political economy of agricultural and food policy than Argentina. For instance, developed countries and advanced democracies such as the United States, the European Union, Japan and South Korea have a political economy that protects the agricultural sector through a generous welfare system despite the fact that farmers represent a small percentage of population as in Argentina. Hopefully, other researchers will follow these suggestions and the conceptual and empirical findings of this Dissertation and expand our understanding of the political economy of agricultural and food policies.
APENDICES
APENDIX A

ARGENTINE PROVINCES AND DEPARTMENTS
Figure A1.1: Argentina: Localization of the 23 provinces and the Capital Federal.
Figure A1.2: Buenos Aires province: Localization of the 8 electoral sections and 134 departments.
Figure A1.3: Buenos Aires province: Localization of the First Electoral section and its 24 departments.
Figure A1.4: Buenos Aires province: Localization of the Second Electoral section and its 15 departments.
Figure A1.5: Buenos Aires province: Localization of the Third Electoral section and its 19 departments.
Figure A1.6: Buenos Aires province: Localization of the Fourth Electoral section and its 19 departments.
Figure A1.7: Buenos Aires province: Localization of the Fifth Electoral section and its 26 departments.
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Figure A1.10: Catamarca province: Localization of the 16 departments.
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Figure A1.13: Chaco province: Localization of the 25 departments.
Figure A1.14: Chubut province: Localization of the 15 departments.
Figure A1.15: Entre Rios province: Localization of the 17 departments.
Figure A1.16: Formosa province: Localization of the 9 departments.
Figure A1.17: Jujuy province: Localization of the 16 departments.
Figure A1.18: La Pampa province: Localization of the 22 departments.
Figure A1.19: La Rioja province: Localization of the 18 departments.
Figure A1.20: Mendoza province: Localization of the 18 departments.
Figure A1.21: Misiones province: Localization of the 17 departments.
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Figure A1.29: Santiago del Estero province: Localization of the 27 departments.
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Figure A1.31: Tierra del Fuego, Antártida Argentina e Islas del Atlántico Sur province: Localization of the 3 departments.
APENDIX B

DESCRIPTIVE STATISTICS OF THE VARIABLES
Introduction

The variables employed in the different OLS models and specified in Chapter 3 are shown in map format with their respective descriptive statistics. The first set of four maps is the difference in vote for the PJ-FpV for the Chamber of Deputies National Election in 2001, 2003, 2005, 2007 and 2009 for Argentina (Figures A2.1-4.4). The second set of four maps is the estimated revenue taxed away by the National Government during the year of the election and the year prior to the election for the major grains (soybeans, sunflower-seed, corn and wheat) and livestock (steers, light steers, bulls, heifers, cows, male calves and female calves) as described in Chapter 3 (Figures A2.5-4.8). The third set of four maps is the dummy variables employed in the different OLS models: urban versus rural, center versus periphery, agricultural versus non-agricultural, and high-income versus low-income, as described in Chapter 3 (Figures A2.9-4.12). The fourth set of four maps is the control variables employed in the different OLS models: housing quality, education attainment, age, and sex, as described in Chapter 3 (Figures A2.13-4.16). The fifth set of four maps is the difference in vote for the PJ-FpV for the Chamber of Deputies National Election in 2001, 2003, 2005, 2007 and 2009 for Buenos Aires province (Figures A2.17-4.20). The sixth set of four maps is the difference in vote for the PJ-FpV for the Legislature Provincial Election in 2001, 2003, 2005, 2007 and 2009 for Buenos Aires province (Figures A2.21-4.24). Finally, the seventh set of four maps is the difference in vote for the PJ-FpV for the Municipal Council...

Difference in the vote for the PJ-FpV party for the Chamber of Deputies National Election

The vote for the PJ-FpV party increased in the 2003 election compared to the 2001 election for the Chamber of Deputies on average 1.5% for the 512 departments, being 36% the highest gain and 41% the highest drop (Figure A2.1). There were 300 departments in which the change in vote for the PJ-FpV party was positive while there were 212 departments in which the change was negative. Major gains were observed in the provinces of Formosa (25.4%), Santa Cruz (17.7%), Jujuy (17%), Santa Fe (16.3%), San Luis (12.3%), Cordoba (11.2%), and La Rioja (10.4%) (Figure A2.1). Gains were also observed in the heavily populated urban departments of La Matanza (2.4%), Rosario (15.7%), La Plata (2.3%), Lomas de Zamora (1.6%), and General Pueyrredón (4.2%). Major losses were observed in the provinces of Santiago del Estero (-24%), Salta (-12.7%), Catamarca (-12.2%), Tucuman (-11.9%), Neuquén (-11.5%), and Misiones (-11%) (Figure A2.1). Finally, losses were also observed in the densely populated departments of Capital Federal (-11.7%), Cordoba capital (-1.7%), Tucuman capital (-12.1%) and Almirante Brown (-2.4%).

The vote for the PJ-FpV decreased on average 5% between the 2005 and 2003 election for the Chamber of Deputies for the 512 departments (Figure A2.2). The biggest gain was 56% and the biggest drop was 87% (Figure A2.2). There were 222 departments
in which the change in vote for the PJ-FpV was positive while there were 290 departments in which it was negative. Major gains occurred in the provinces of Tucumán (40.2%), Corrientes (34.1%), Neuquén (21.4%), Capital Federal (20.5%), Chubut (17.7%), Rio Negro (14%), and Neuquén (12.2%) (Figure A2.2). Gains were also observed in the heavily populated urban departments of Capital Federal (20.5%), Cordoba capital (3.8%), La Matanza (4.9%), La Plata (1.9%), General Pueyrredón (5.1%), Tucuman capital (40.3%), and Quilmes (5.6%). Major loses occurred in the provinces of San Luis (-68.5%), La Pampa (-51.3%), Salta (-38.8%), Santiago del Estero (-33.6%), Santa Fe (-18.7%), Santa Cruz (-17.3%), Chaco (-14.4%), and Mendoza (-14%) (Figure A2.2). Finally, losses were also observed in the densely populated departments of Rosario (-15.5%), Lomas de Zamora (-2.1%), Almirante Brown (-0.3%), Santa Fe capital (-25.7%), and Salta capital (-37.9%).

The vote for the PJ-FpV party did not change on average between the 2007 and 2005 election for the Chamber of Deputies for the 512 departments (Figure A2.3). There were 284 departments in which the change was positive, in 5 departments there was no change, and there were 223 departments in which the change was negative. Major gains occurred in the provinces of Salta (77.1%), Chaco (21.6%), La Rioja (15.9%), Santa Cruz (12.4%), and Formosa (10%). Gains were also observed in the heavily populated urban departments of Rosario (6.9%), Lomas de Zamora (6.8%), Almirante Brown (7.3%), Quilmes (3.6%), Santa Fe capital (0.5%), and Salta capital (71.8%). Major loses occurred in the provinces of Corrientes (-66.3%), Chubut (-56.4%), Cordoba (-25.4%), Mendoza (-23.3%), Tierra del Fuego (-16.3%), and Jujuy (-16%). Finally, losses were also observed
in the densely populated departments of Capital Federal (-7.7%), Cordoba capital (-12.6%), La Matanza (-2.6%), La Plata (-0.9%), General Pueyrredón (-1.8%), and Tucuman capital (-0.4%).

Between the 2009 and 2007 election for the Chamber of Deputies, the vote for the PJ-FpV party decreased 17% on average for the 512 departments (Figure A2.4). There were 105 departments in which the change was positive, in 15 departments there was no change, and there were 392 departments in which the change was negative. There were no changes in the 15 departments of Chubut province, given that the FpV party was left out of the PJ coalition in both the 2007 and 2009 elections for National Deputies. Major gains occurred in the province of Catamarca only (15.3%). There were no gains in the top 15 most heavily populated urban departments for the PJ-FpV party. Major loses occurred in the provinces of Salta (-87.1%), Entre Ríos (-48.4%), Jujuy (-45.4%), Rio Negro (-35.8%), Santa Fe (-30.1%), Santa Cruz (-25.8%), Neuquén (-23.4%), Buenos Aires (-20.5%), Córdoba (-15.1%), and La Rioja (-13.6%). Finally, losses were observed in all the densely populated departments within the top 15: Capital Federal (-1.1%), Cordoba capital (-13.2%), La Matanza (-19.9%), Rosario (-21.2%), La Plata (-32.7%), General Pueyrredón (-34.4%), Lomas de Zamora (-21.1%), Tucuman capital (-12.9%), Almirante Brown (-23.2%), Salta capital (-88.8%), Quilmes (-9.8%), Santa Fe capital (-28.7%), Merlo (-11.7%), Lanus (-21.3%), and Moreno (-30.2%).
Figure A2.1: Difference in the share of valid votes for PJ-FpV between the 2003 and 2001 national elections for the Chamber of Deputies in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.2: Difference in the share of valid votes for PJ-FpV between the 2005 and 2003 national elections for the Chamber of Deputies in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.3: Difference in the share of valid votes for PJ-FpV between the 2005 and 2007 national elections for the Chamber of Deputies in Argentina by department.

Figure A2.4: Difference in the share of valid votes for PJ-FpV between the 2007 and 2009 national elections for the Chamber of Deputies in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).
Total Agricultural Revenue Taxed Away

The departments that had very low or no agricultural revenue taxed away by the government were those located in areas that are not suitable for agricultural production, either for producing crops (soybeans, sunflower, corn, sorghum, and wheat) or for raising livestock (cow-calf or finishing), due to weather and soil constraints (Figures A2.5-5.8). These departments are located in the provinces of Patagonia (Tierra del Fuego, Santa Cruz, Chubut, Neuquén, and Rio Negro), Cuyo (Mendoza and San Juan), and the Northwest (La Rioja, Catamarca, and Jujuy). The departments within or close to the major metropolitan areas, such as Buenos Aires, Cordoba, and Rosario, for instance, had no agricultural revenue lost from taxation as well (Figures A2.5-5.8). The departments that had agricultural revenue taxed away by the government were those located in the Pampas (Buenos Aires, Entre Rios, Santa Fe, Cordoba, La Pampa and San Luis), the Northeast (Corrientes, Misiones, Chaco, and Formosa), and the Northwest (Santiago del Estero, Tucuman, and Salta) (Figures A2.5-5.8).

The agricultural revenue taxed away by the government for the 2002-2003 period averaged USD 492 per capita for the 512 departments (Figure A2.5). There were 146 departments that had the minimum value of USD 0 per capita and 366 departments with agricultural revenue taxed with a maximum of USD 9,358 per capita (Lihuel Calel, La Pampa province) (Figure A2.5). The highest taxed departments were located in departments were agricultural production was the most important economic activity and population was small. The ten most taxed departments were located in fringe areas of the
province of La Pampa (departments of Lihuel Calel, Limay Mahuida, Catrilo, and Caleu Caleu), and Buenos Aires (San Cayetano, Tordillo, Pila, Adolfo Gonzalez Chavez, Guamini, and General Guido) (Figure A2.5).

In the 2004-2005 period, the agricultural revenue taxed away by the governments averaged USD 473 per capita for the 512 departments which it is in line with the 2002-2003 period (Figure A2.6). There were 154 departments that had the minimum value of USD 0 per capita and 358 departments with agricultural revenue taxed with a maximum of USD 6,673 per capita (San Cayetano, Buenos Aires province) (Figure A2.6). The ten most taxed departments were located in fringe areas of the province of Buenos Aires (San Cayetano, Adolfo Gonzalez Chavez, Coronel Dorrego, Rivadavia, Guamini, and Loberia), La Pampa (departments of Catrilo and Lihuel Calel), Santiago del Estero (Belgrano), and Cordoba (Marcos Juarez) (Figure A2.6).

The agricultural revenue taxed away by the government for the 2006-2007 period increased to an average of USD 1,321 per capita for the 512 departments (Figure A2.7). There were 135 departments that had the minimum value of USD 0 per capita and 377 departments with agricultural revenue taxed with a maximum of USD 33,193 per capita (Lihuel Calel, La Pampa province) (Figure A2.7). The ten most taxed departments were located in fringe areas of the province of La Pampa (departments of Lihuel Calel, Limay Mahuida, Caleu Caleu and Curaco), Buenos Aires (Pila, General Guido,Tordillo, San Cayetano, and General Lavalle), and Chaco (Tapenaga) (Figure A2.7).

Finally, in the 2008-2009 period, the agricultural revenue taxed away by the governments increased again to an average of USD 2,591 per capita for the 512
departments (Figure A2.8). There were 127 departments that had the minimum value of USD 0 per capita and 387 departments with agricultural revenue taxed with a maximum of USD 98,697 per capita (Lihuel Calel, La Pampa province) (Figure A2.8). The ten most taxed departments were located in fringe areas of the province of La Pampa (departments of Lihuel Calel, Limay Mahuida, and Curaco), Buenos Aires (Tordillo, Pila, General Guido, General Lavalle, and Guarnini), Tapenaga (Chaco), and Cordoba (General Roca) (Figure A2.8).
Figure A2.5: Total agricultural revenue taxed away in USD per capita between 2002 and 2003 in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.6: Total agricultural revenue taxed away in USD per capita between 2004 and 2005 in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.7: Total agricultural revenue taxed away in USD per capita between 2006 and 2007 in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.8: Total agricultural revenue taxed away in USD per capita between 2008 and 2009 in Argentina by department.

Observation: data in the legend is arranged by quantiles (deciles).
Categorical or Dummy Variables

There were a total of four categorical or dummy variables employed in the research to account for the social cleavages described in Chapter 3. The first dummy variable was whether a department was considered urban or rural. The department is classified urban if 90 percent or more of the population living in the department is in an urban area, or rural otherwise. There were a total of 92 urban departments and 420 rural departments according to the classification employed (Figure A2.9). The urban and rural departments were distributed as follows: Buenos Aires (47-87), Capital Federal (1-0), Catamarca (2-14), Chaco (1-24), Chubut (3-12), Córdoba (2-24), Corrientes (1-24), Entre Ríos (1-16), Formosa (1-8), Jujuy (2-14), La Pampa (2-20), La Rioja (3-15), Mendoza (4-14), Misiones (2-15), Neuquén (1-15), Rio Negro (2-13), Salta (1-22), San Juan (5-14), San Luis (2-7), Santa Cruz (4-3), Santa Fe (3-16), Santiago del Estero (1-26), Tierra del Fuego (2-1), and Tucumán (2-15) (Figure A2.9).

The second dummy variable was whether a department was within the center or the periphery provinces. A department is classified within the center if it is located in Buenos Aires, Cordoba, Entre Ríos, La Pampa, San Luis or Santa Fe provinces (Figure A2.10). A department, on the other hand, is classified within the periphery if it is located in the remaining provinces of Tierra del Fuego, Santa Cruz, Chubut, Rio Negro, Neuquén, Mendoza, San Juan, La Rioja, Catamarca, Salta, Jujuy, Tucuman, Santiago del Estero, Chaco, Formosa, Misiones, and Corrientes. There were a total of 227 departments
in the center and 285 departments in the periphery according the classification employed (Figure A2.10).

The third dummy variable was whether a department was agricultural or non-agricultural. A department is classified as agricultural if the Total Agricultural Revenue Change is higher than 10 USD per capita in the two years to the election. There were a total of 311 agricultural departments, located mostly in the provinces of the Pampas, Northeast, and Northwest (Figure A2.11). The agricultural and non-agricultural departments were distributed as follows: Buenos Aires (100-34), Capital Federal (0-1), Catamarca (7-9), Chaco (25-0), Chubut (0-15), Córdoba (25-1), Corrientes (24-1), Entre Ríos (17-0), Formosa (7-2), Jujuy (2-14), La Pampa (22-0), La Rioja (2-16), Mendoza (0-18), Misiones (2-15), Neuquén (0-16), Rio Negro (6-7), Salta (14-9), San Juan (0-19), San Luis (9-0), Santa Cruz (7-0), Santa Fe (19-0), Santiago del Estero (25-2), Tierra del Fuego (0-3), and Tucumán (5-12) (Figure A2.11).

Finally, the fourth dummy variable separated departments into high income and low income. A department is defined as high income if the share of the top two job qualifications combined (professional and technical) is higher than 27 percent of the total job qualifications. There were a total of 267 high income departments, located mostly in the provinces of the Pampas and Patagonia (Figure A2.12). The high income and low income departments were distributed as follows: Buenos Aires (118-16), Capital Federal (1-0), Catamarca (3-13), Chaco (11-14), Chubut (5-10), Córdoba (17-9), Corrientes (2-23), Entre Ríos (13-4), Formosa (3-6), Jujuy (2-14), La Pampa (16-6), La Rioja (8-10), Mendoza (7-11), Misiones (2-15), Neuquén (8-8), Rio Negro (6-7), Salta (2-21), San
Juan (3-16), San Luis (3-6), Santa Cruz (7-0), Santa Fe (16-3), Santiago del Estero (3-24), Tierra del Fuego (3-0), and Tucumán (5-12) (Figure A2.12).
Figure A2.9: Urban and rural departments in Argentina as defined in the methodology.

Observation: rural: 0 / urban: 1

Figure A2.10: Center and periphery departments in Argentina as defined in the methodology.

Observation: periphery: 0 / center: 1
Figure A2.11: Agricultural and non-agricultural departments in Argentina as defined in the methodology.

Observation: non-agricultural: 0 / agricultural: 1

Figure A2.12: High income and low income departments in Argentina as defined in the methodology.

Observation: low-income: 0 / high-income: 1
Control Variables

There were a total of four control variables employed in the research to account for social differences as described in Chapter 3. The first control variable measures the share of the housing units within the department in a five category according to the quality of the materials employed in building the house: 1-excellent quality, 2-very good quality, 3-good quality, 4-poor quality; and 5-very poor quality. This variable measures the share of housing units in the department that are within the first and second quality index categories. The average quality of material index for the 512 departments was 67% of houses, while the minimum and maximum values were 1.5% and 100%, respectively (Figure A2.13). Departments with a higher share of houses with higher quality of materials were located in the Pampas and in Patagonia, with middle quality of materials in Cuyo and around the metropolitan area of Buenos Aires, and with lower quality of materials in the Northeast and Northwest regions (Figure A2.13).

The second control variable was education attainment and measures the share of the population within the department that has obtained at least a high school diploma. The average education attainment for the 512 departments was 8 percent while the minimum and maximum values were 0% and 35%, respectively (Figure A2.14). Departments with a higher share of educated population are located in the Pampas in general, in southern Patagonia, and in the urban metropolitan areas (Figure A2.14). Again, in the outskirts of the city of Buenos Aires, the education level differs markedly in
the western and southern departments as compared to city itself, and the northern departments (Figure A2.14).

The third control variable was age and is defined as the share of the population within the department older than 20 years old. The average value was 51% for the 512 departments, with a minimum and a maximum of 45% and 91, respectively (Figure A2.15). In the Pampas, there is higher share of older population, followed by Cuyo and Patagonia (Figure A2.15). The highest share of younger population is located in the Northeast and Northwest (Figure A2.15).

Finally, the fourth control variable was sex and measures the share of the population within the department that are males. The average value for the 512 departments was 50 percent, with a minimum and a maximum of 45 and 90 percent respectively (Figure A2.16). The highest share of males is located in the Northwest, Northeast, Cuyo, and Patagonia (Figure A2.16). The lowest share of males is located in the Pampas and in the urban centers (Figure A2.16).
Figure A2.13: Share of population living in houses built within the top two quality rankings of five in Argentina by department in 2001.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.14: Share of population with at least a high-school degree in Argentina by department in 2001.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.15: Share of population older than twenty years old in Argentina by department in 2001.

Figure A2.16: Share of populations that are males in Argentina by department in 2001.

Observation: data in the legend is arranged by quantiles (deciles).
Difference in the vote for the PJ-FpV party for the Chamber of Deputies National Election at Buenos Aires province.

The vote for the PJ-FpV party increased in the 2003 election on average 6% compared to the 2001 election for the Chamber of Deputies in the 134 departments of the province of Buenos Aires (Figure A2.17). The biggest gain was 28% (Carmen de Areco) while the biggest drop was 26% (General Lamadrid). There were 107 departments with a positive change in vote for the PJ-FpV party, 1 department with no change, and 26 departments with a negative change (Figure A2.17). The top 20 departments account for 63.8% of the population while the top 40 departments account for 83.9% of the population. On the contrary, the bottom 20 departments account for 1.1% of the population and the bottom 40 departments account for 3% of the population. In the top 20 departments by quantity of population, 15 of them had a positive change, while 5 had a negative change. In the bottom 20 departments by quantity of population, only 3 of them had a positive change while 17 had a negative change.

In the 2005 election, the vote for the PJ-FpV party decreased on average 3.5% compared to the 2003 election for the Chamber of Deputies in the 134 departments of the province of Buenos Aires (Figure A2.18). The biggest gain was 18.3% (Junin) while the biggest drop was 37% (Pellegrini). There were 57 departments with a positive change in vote for the PJ-FpV party and 77 departments with a negative change (Figure A2.18). In the top 20 departments by population, 14 of them had a positive change while 6 had a negative change. In the bottom 20 departments by population, only 4 had a positive change while 16 had a negative change.
The vote for the PJ-FpV party increased in the 2007 election on average 7% compared to the 2005 election for the Chamber of Deputies in the 134 departments of the province of Buenos Aires (Figure A2.19). The biggest gain was 44.4% (General Lamadrid) while the biggest drop was 12.3% (Tapalque). There were 96 departments with a positive change in vote for the PJ-FpV party and 38 departments with a negative change (Figure A2.19). In the top 20 departments by population, 11 of them had a positive change while 9 had a negative change. In the bottom 20 departments by population, it was split as 10 departments had a positive change and 10 departments had a negative change.

Finally, in the 2009 election, the vote for the PJ-FpV party decreased on average 20.5% compared to the 2007 election for the Chamber of Deputies in the 134 departments of the province of Buenos Aires (Figure A2.20). The smallest drop was 3.3% (Marcos Paz) while the biggest drop was 45.2% (Junín). All the departments had a negative change (Figure A2.20). In the top 20 departments by population, all of the departments had a negative change with an average of -21.8%. In the bottom 20 departments, all of the departments had a negative change as well, with an average of -20.5%.
Figure A2.17: Difference in the share of valid votes for PJ-FpV between the 2003 and 2001 national elections for the Chamber of Deputies in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.18: Difference in the share of valid votes for PJ-FpV between the 2003 and 2001 national elections for the Chamber of Deputies in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.19: Difference in the share of valid votes for PJ-FpV between the 2007 and 2005 national elections for the Chamber of Deputies in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.20: Difference in the share of valid votes for PJ-FpV between the 2009 and 2007 national elections for the Chamber of Deputies in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).
Difference in the vote for the PJ-FpV party for the Legislature Provincial Election at Buenos Aires province.

The vote for the PJ-FpV party increased in the 2003 election on average 6.4% compared to the 2001 election for the Legislature in the 134 departments of the province of Buenos Aires (Figure A2.21). The biggest gain was 32.3% (Carmen de Areco) while the biggest drop was 26.8% (General Lamadrid). There were 103 departments with a positive change in vote for the PJ-FpV party, 1 department with no change, and 30 departments with a negative change (Figure A2.21). In the top 20 departments by quantity of population, 12 of them had a positive change, while 8 had a negative change. In the bottom 20 departments by quantity of population, only 3 of them had a positive change while 17 had a negative change. The correlation coefficient between the vote for the provincial Legislature and the national Chamber for 2003-2001 for the 134 departments was 0.93 indicating that voters did not split their vote between legislators at the provincial and national levels.

In the 2005 election, the vote for the PJ-FpV party increased on average 14.6% compared to the 2003 election for the Legislature in the 134 departments of the province of Buenos Aires (Figure A2.22). The biggest gain was 37.8% (General Lamadrid) while the biggest drop was 8% (Puan). There were 125 departments with a positive change in vote for the PJ-FpV party and 9 departments with a negative change (Figure A2.22). In the top 20 departments by population, 19 of them had a positive change while 1 had a negative change. In the bottom 20 departments by population, 18 had a positive change and only 4 had a negative change. The correlation coefficient between the vote for the
provincial Legislature and the national Chamber for 2005-2003 for the 134 departments was 0.54 indicating that voters indeed split their vote between legislators at the provincial and national levels.

The vote for the PJ-FpV party decreased in the 2007 election on average 7.5% compared to the 2005 election for the Legislature in the 134 departments of the province of Buenos Aires (Figure A2.23). The biggest gain was 19.5% (Ramallo) while the biggest drop was 31.1% (Tapalque). There were 24 departments with a positive change in vote for the PJ-FpV party and 110 departments with a negative change (Figure A2.23). In the top 20 departments by population, 2 of them had a positive change while 18 had a negative change. In the bottom 20 departments by population, only 1 department had a positive change while 19 had a negative change. The correlation coefficient between the vote for the provincial Legislature and the national Chamber for 2007-2005 for the 134 departments was 0.50 indicating that voters split their vote between legislators at the provincial and national levels.

Finally, in the 2009 election, the vote for the PJ-FpV party decreased on average 21.1% compared to the 2007 election for the Legislature in the 134 departments of the province of Buenos Aires (Figure A2.24). The biggest gain was 2.6% (La Plata) while the biggest drop was 50.8% (San Antonio de Areco). All but one of the departments had a negative change (Figure A2.24). In the top 20 departments by population, all of the departments but one had a negative change with an average of -12.4%. In the bottom 20 departments, all of the departments had a negative change, with an average of -18.4%. The correlation coefficient between the vote for the provincial Legislature and the
national Chamber for 2009-2007 for the 134 departments was -0.09 indicating that voters split their vote between legislators at the provincial and national levels.
Figure A2.21: Difference in the share of valid votes for PJ-FpV between the 2003 and 2001 provincial elections for the Legislature in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.22: Difference in the share of valid votes for PJ-FpV between the 2005 and 2003 provincial elections for the Legislature in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.23: Difference in the share of valid votes for PJ-FpV between the 2007 and 2005 provincial elections for the Legislature in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.24: Difference in the share of valid votes for PJ-FpV between the 2009 and 2007 provincial elections for the Legislature in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).
The vote for the PJ-FpV party decreased in the 2003 election on average 5.4% compared to the 2001 election for the Department Councils in the 134 departments of the province of Buenos Aires (Figure A2.25). The biggest gain was 19.3% (Bahia Blanca) while the biggest drop was 35.6% (Punta Indio). There were 43 departments with a positive change in vote for the PJ-FpV party, 1 department with no change, and 90 departments with a negative change (Figure A2.25). In the top 20 departments by quantity of population, 6 of them had a positive change, while 14 had a negative change. In the bottom 20 departments by quantity of population, 9 of them had a positive change while 11 had a negative change. The correlation coefficient between the vote for the municipal Councils and the national Chamber for 2003-2001 for the 134 departments was 0.69 indicating that voters did not split their vote between legislators at the departmental and national levels.

In the 2005 election, the vote for the PJ-FpV party increased on average 14.9% compared to the 2003 election for the Legislature in the 134 departments of the province of Buenos Aires (Figure A2.26). The biggest gain was 40.6% (General Lamadrid) while the biggest drop was 13.8% (Carmen de Areco). There were 124 departments with a positive change in vote for the PJ-FpV party and 10 departments with a negative change (Figure A2.26). In the top 20 departments by population, all of them had a positive change. In the bottom 20 departments by population it was split between 10 with a positive change and 10 with a negative change. The correlation coefficient between the
vote for the provincial Legislature and the national Chamber for 2005-2003 for the 134 departments was 0.34 indicating that voters indeed split their vote between legislators at the departmental and national levels.

The vote for the PJ-FpV party decreased in the 2007 election on average 8.6% compared to the 2005 election for the municipal Councils in the 134 departments of the province of Buenos Aires (Figure A2.27). The biggest gain was 27.4% (Tornquist) while the biggest drop was -40.9% (Escobar). There were 33 departments with a positive change in vote for the PJ-FpV party, 1 department with no change, and 100 departments with a negative change (Figure A2.27). In the top 20 departments by population, 2 of them had a positive change while 18 had a negative change. In the bottom 20 departments by population, 3 of them had a positive change while 17 had a negative change. The correlation coefficient between the vote for the municipal Councils and the national Chamber for 2007-2005 for the 134 departments was 0.20 indicating that voters split their vote between legislators at the municipal and national levels.

Finally, in the 2009 election, the vote for the PJ-FpV party decreased on average 14.7% compared to the 2007 election for the municipal Councils in the 134 departments of the province of Buenos Aires (Figure A2.28). The biggest gain was 46.5% (Escobar) while the biggest drop was -61.6% (General Lavalle). There were 15 departments with a positive change in vote for the PJ-FpV party and 119 departments with a negative change (Figure A2.28). In the top 20 departments by population, 3 of them had a positive change while 17 had a negative change, with an average of -12.7%. In the bottom 20 departments, all of the departments but 2 had a negative change, with an average of -
15.8%. The correlation coefficient between the vote for the provincial Legislature and the national Chamber for 2009-2007 for the 134 departments was 0 indicating that there was no correlation between votes for legislators at the departmental and national levels.
Figure A2.25: Difference in the share of valid votes for PJ-FpV between the 2003 and 2001 local elections for the Municipal Council in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.26: Difference in the share of valid votes for PJ-FpV between the 2005 and 2003 local elections for the Municipal Council in Buenos Aires province by department.

Observation: data in the legend is arranged by quantiles (deciles).
Figure A2.27: Difference in the share of valid votes for PJ-FpV between the 2007 and 2005 local elections for the Municipal Council in Buenos Aires province by department

Observation: data in the legend is arranged by quantiles (deciles).

Figure A2.28: Difference in the share of valid votes for PJ-FpV between the 2009 and 2007 local elections for the Municipal Council in Buenos Aires province by department

Observation: data in the legend is arranged by quantiles (deciles).
REFERENCES


