Presidential Elections and Latin American Financial Markets:
The Implications of Two Round Voting Systems

By
Daniel Carnahan

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Chapter 1: Introduction

In October of 2018, far-right candidate Jair Bolsonaro maintained a significant lead in the polls proceeding into the first round of the Brazilian presidential election. His controversial platform as well as his history of homophobic and racist comments led many political pundits to discount his chances of making it any further. Still, Bolsonaro secured nearly 47% of the vote, almost doubling the percentage received by his closest challenger. He then proceeded to the runoff to take 55% of the vote winning the presidential office with a wide margin over the runner-up. How did financial investors in Latin America respond then to his surprising success during the first round? And how did their new expectations regarding his chances of winning alter their behavior during the second round?

The existing literature regarding elections and financial markets limits its inquiry to single-round elections in primarily OECD countries. These studies analyzed how financial investors respond to information related to the final election results or pre-election public opinion polls. This thesis seeks to explore how financial investors respond to the arrival of new political information in the two-round voting systems commonly associated with Latin American presidential elections. Following the first round of voting in these elections, each candidate receives an individual share of the vote. If no candidate receives the needed percentage to win, the election proceeds to a runoff ballot. The arrival of information during first round offers the opportunity to study how and when investors react to and to what extent the new information might impact future investor behavior and market conditions.

The study of political information during elections has both practical and academic implications. Studying election-induced market behavior could potentially inform the process of

market timing. By knowing how stock and bond index returns are related to election cycles, astute investors would able to determine optimal times to enter and exit the market. Short-term fluctuation in asset prices arising in response to new political information can create significant risk for financial investors as it can lead to lower valuations of their portfolios and more considerable losses from trading. Understanding the region-specific characteristics of the relationship between elections and financial markets could also assist in making decisions regard portfolio allocation across different markets.

I argue that the arrival of information following any round of voting during a presidential election would spark reactions from financial investors thereby creating more volatile index returns in the country's stock and bond markets. However, the second round or runoff will have substantially less volatility compared to the first. Financial investors likely update their expectations following the results of the first round, dampening their reactions to the final tally and the subsequent market volatility. I will provide further clarification for the relationship between information and market volatility in Chapter 2. Furthermore, I suspect the uncertainty associated with the outcome of an election to have a significant impact on this market volatility.

By taking fourteen years of returns from two regional stock and bond indices, I explore trading behavior on various dates surrounding presidential elections in a selection of Latin American countries. I can also determine the kinds of political information that may exacerbate or dampen the reactions of financial investors by investigating the uncertainty associated with the participation of an incumbent and the competitiveness of the election.

My findings suggest market volatility increases as a result of information provided during both the first round and the runoff of a presidential election. However, the volatility measured during the second round of voting was significantly higher compared to the first, this may imply

that while financial investors react to new political information, the type of information and the degree of uncertainty it resolves has a meaningful effect on their reactions and thus market volatility.

The paper will proceed as follows: Chapter 2 will discuss existing literature regarding elections and financial markets and explain what my research contributes to the current research, in Chapter 3, I will outline my hypotheses and the reasoning behind them, in Chapter 4, I will detail the data and methodology of my research design, in Chapter 5, I will provide the results and discussion of my empirical analysis, in Chapter 6 I will conclude with the implications of my study.

Chapter 2: Literature Review

This section of my thesis reviews the existing research regarding elections, information, and financial markets. The literature is divided into two general categories. The first examines how information and uncertainty within national elections can influence price changes in different financial assets as well as the theoretical mechanisms connecting political information to market volatility. The second category explores some of the specific characteristics of national elections that can mediate or exacerbate the movement of financial assets. I will conclude this section by discussing how my study expands the current research.

The arrival of new information related to the selection of a candidate during an election can spark immediate reactions from financial investors. The study conducted by Biakoskia, Gottschal & Wisniwski(2008), found in the week after a national election in 24 OECD countries, stock prices adjust rapidly in response to the conclusion of the election cycle and stock market volatility increases significantly. The final vote tally resolves any uncertainty investors had prior regarding who would be the winner and financial investors adjust prices accordingly. The authors also found that a change in the political orientation of the executive adds to the volatility of stock prices, as investors anticipate new directions in economic and redistribution policies. The empirical analysis conducted by Pantzalis, Stangeland, and Turtle(2000) found broader international evidence of the effect of electoral information on stock market returns. In a test of 33 countries from 1974 to 1995, positive abnormal stock returns correlated with the two weeks following an election date. Information supplied through the election of a candidate then had a lasting effect on stock market investors. In Latin America, Jensen and Schmith(2005) found additional supporting evidence with Lula's rise in the 2002 Brazilian presidential election having a positive impact on the volatility of stock returns. As information in the form of public opinion

polls arrived prior to the election, index returns from the Brazilian stock market became more volatile.

Existing theory in financial economics explains the process through which new information can create market volatility. Fama(1970) defines an asset market efficient if the price of an asset "fully reflects" all available information within the market, commonly referred to as the Efficient Market Hypothesis. Thus individual traders utilize all past and present information in the pricing of their assets, and only the arrival of new information can cause a change in the price of an asset. The finance literature offers explains why market volatility can result from new information. First, the arrival of unanticipated news induces agents to update beliefs. These new beliefs trigger portfolio rebalancing among investors and high periods of volatility correspond to agents dynamically solving for new asset prices. News-induced periods of high volatility, however, are generally short (often on the magnitude of days, if not hours). The arrival of political information leads financial investors to rapidly rebalance their portfolios in reaction to their new beliefs, creating shorts spikes in markets volatility during an election. The larger the reaction from investors, the higher the market volatility.

Elections create difficulties for financial investors in forecasting price movements due to the inherent uncertainty in their outcomes. This political uncertainty can influence market behavior both before the end of the election cycle as well as market behavior immediately following the election results. Bernhard and Leblang (2002) showed that the bias in the forward exchange rate, that is the price of the currency deliverable, increased due to the inherent political uncertainty surrounding the week before and after an election. The degree of this uncertainty can also influence market behavior. Freeman, Hays, and Stix(2000) found that volatility in the U.S., U.K. and Australian foreign exchange markets increased as investors become more uncertain

about a particular electoral outcome. The authors showed that exchange markets became more volatile when the probabilities of either party winning the election were close to the same. Some studies have examined the behavior of financial assets during uncertain or competitive elections based on the election results such as when the margin of victory was small(Sattler, 2013) or in well-documented cases such as the 2000 U.S. presidential election between George W. Bush and Al Gore (Bernhard & Leblang 2006). Both of these studies found more substantial reactions from financial investors when the results involved only a marginal victory for a particular candidate.

The second category of research describes the characteristics of elections and electoral systems that may influence the movements of financial assets. The presence of an incumbent has shown to have a significant impact on the behavior of financial investors. The incumbent represents a return to the status quo for financial investors and their role within an election cycle can influence market behavior. Evidence from the Australian federal election cycles suggests that increases in the likelihood of the incumbent parties' victory, whose economic policies are well known, reduce market uncertainty and leads to higher positive stock returns (Smales 2015). By the same token, the findings of Pantzalis, Stangeland, and Turtle(2000) regarding the variation in stock returns were conditional on the success of the incumbent in getting reelected.

The electoral system within democracies can also have a significant and mediating effect on the relationship between political processes and financial markets. From their analysis of foreign exchange markets, Freeman, Hays, and Stix (2000) showed that proportional representation systems reduced the effects of increased political uncertainty. The authors suggested that in majoritarian electoral systems, elections are more likely to produce significant changes in economic policy, which can make the impact of political uncertainty more

pronounced. If both the participating candidates and the electoral system of a country influence market behavior, it's a natural conclusion then that the electoral rules governing a particular election also play a role in the actions of financial investors.

Studying the significance of only single-round elections limits the current body of research into politics and financial market. Consequently, the arrival of political information during these elections has predominantly been assessed though either the final tally or pre-election public opinion polls. This thesis offers a region-specific study of the interaction between elections and financial markets. My study seeks to explore how political information disseminated during the first round of voting in Latin American presidential influence market behavior throughout the election cycle. I extend the current analysis outside of equity markets to include the effects of new political information on bond markets. And following previous studies, I investigate the role of the competitiveness of an election and incumbent participation on uncertainty during election cycles in Latin America and their impact on financial investors.

Chapter 3: Hypotheses and Theory

I predict that index return volatility in Latin American stock and bond market will be higher immediately after either round of voting during presidential election cycles. Following either round of voting, investors attain some information to update their beliefs and rebalance their portfolios. The vulnerability of Latin American financial markets to surprises and shocks creates the potential for the arrival of new political information to ignite strong reactions from financial investors.

While financial markets in Latin America like those in European economies feature time-varying volatility, in that periods of high and low volatility tend to cluster together and volatility shows high persistence over time. The volatility in Latin American markets is considerably higher than the volatility measured in developed markets (Santis and Imrohoroglu, 1994). The relative isolation of Latin American economies and their weak linkage to the international financial system also restricts public and private international borrowing. This restriction limits the smoothing of shocks over time or in some cases be the source of such shocks. The presence of such shocks has also been linked to the excessive volatility in Latin American markets(Aggarwal,Inclan,Leal 1999). Domestic financial markets in Latin America can also be characterized as underdeveloped due to their operation under limitations related to government overregulation, poorly enforced financial contracts, and direct government lending in competition with private firms. These imperfections prevent prompt reallocation and proper aggregation of capital resources, sparking contraction in vulnerable areas of the market affected by financial upheaval(Aggarwal,Inclan,Leal 1999). The sensitivity of Latin American financial markets suggest that new political information regardless of whether it completely resolves investor uncertainty in the election's outcome, will spark volatility in both financial markets.

I predict that volatility will also be higher during the first round of voting compared to the runoff. Runoff elections alter the process through which uncertainty is resolved and information disseminated. The arrival of information during the first round of voting provides financial investors some indication of how the following vote will proceed but does not confirm a winner. Two forms of political information can result from the first round that can lead investors to update their expectations. The first round of voting reduces the number of potential candidates from multiple to only two and thereby reduce the possible directions of future government policy. In the 2014 Brazilian presidential election, eleven candidates challenged the incumbent president Dilma Rousseff, although only two of them were considered strong rivals. Since none of the candidates obtained over 50% of the vote, a runoff between the two leading candidates followed. For financial investors, the procession from twelve potential candidates to only two likely resolved substantial uncertainty and information pertaining to the possible directions future policy could take. The second form of political information involves the vote share received during the first round, During the first round of the Brazilian election, Dilma Rousseff won by a sizable margin with 41.6% of the vote, ahead of her closest challenge with only 33.6%. For investors, the vote share indicate a candidate's chances of winning allowing them to rebalance their portfolios in advance of the final vote tally. I argue that the political information incorporated into investors' beliefs during the first round should create stronger reactions and thus higher market volatility as the majority of the uncertainty in the election's outcome will be resolved following the first round's vote tally.

Multi-party systems in Latin America create elections with a greater number of candidates compared to two-party systems. Among a crowded field, even just an incumbent's participation is likely to affect the expectations of financial investors. Similar to Smales (2015)

findings regarding the probability of an incumbent's party winning an election, a presidential incumbent participating in the election should reduce the uncertainty associated with the possible directions government policy could take. I argue that the reduction in uncertainty associated with the participation of an incumbent should reduce the volatility in stock and bond indices.

Alternatively, I argue a more competitive election creates more uncertainty thereby raising market volatility during the election cycle. When both candidates have roughly equal chances of winning, investors will find it more difficult to predict the composition of future governments and the policies they will undertake. This higher electoral uncertainty should bring about strong reactions from investors to the arrival of information during the election and thus higher market volatility.

- **Hypothesis 1: Volatility in Latin American stock and bond indices will be higher immediately after a round of voting during presidential election cycles.**

- **Hypothesis 2: Volatility will be higher during the first round of voting compared to the runoff.**

- **Hypothesis 3: The presence of an incumbent in an election reduces volatility in the period surrounding either round of voting.**

- **Hypothesis 4: Volatility in stock and bond indices will be higher during a more competitive round of voting.**

Chapter 4: Research Design

Data.

To study how financial investors respond to new political information during Latin American presidential elections, I sourced fourteen years of daily total returns from two regional financial indices from Thomson's Financial Datastream. Beginning on January 1st 2005 to January 1st 2019, daily total returns were collected from the MSCI Emerging Market Stock Latin America Index and the JP Morgan's EMBI Latin America Bond Index. In order to identify whether any financial movements could be attributed to a particular voting period, comparisons between the two indices and a risk-free rate were needed. Thus I collected fourteen years of total returns from U.S treasury bills. These returns served as a proxy for a risk free rate as is standard in the financial literature.

The MSCI Emerging Market Stock Latin America Index follows a comprehensive approach for index construction that allows for meaningful global views and cross-country comparisons across different market capitalization sizes and sectors. It captures large and mid cap representation across six countries in Latin America. With 107 constituents, the index covers approximately 85% of the free float-adjusted market capitalization within each country. The individual countries are weighted separately with Brazil accounting for 62.1% of the constituents, Chile 8.92%, Colombia 3.65%, and Peru with 3.5%. The constituents cover the key industrial sectors of each Latin American economy with representation from the financial, manufacturing, consumer, agricultural and energy sectors. Relative to the broader MSCI Global index, the constituents within the Latin American index are characterized by Morgan Stanley as rising stocks with lower risk and sound balance sheets. The diversification and low-risk state of this index adds to the validity of any observed abnormal volatility found in my study.

The EMBI is JP Morgan's index of dollar-denominated sovereign bonds issued by a selection of emerging market countries. It is the most widely used and comprehensive emerging market sovereign debt benchmark to measure the performance of an asset class. There are three different EMBI indices produced by JP Morgan, the EMBI+, EMBI Global and the EMBI Global Diversified. The selection of components for each index follows specific liquidity, maturity, and structural constraints. The EMBI Global index consists of loans and Brady bonds; it also covers more available debt instruments and countries than the other two EMBI indices. The more expansive coverage results from the EMBI Global index's relaxed constraints on secondary market trading liquidity and its broader definition of Emerging Market countries. The EMBI Latin American Index consists of sovereign bonds from Argentina, Brazil, Colombia, Chile, Mexico, and Peru within the EMBI Global index. It tracks total returns for traded debt instruments for the six Latin American countries.

Within the fourteen years of asset returns, the dataset captured nineteen presidential elections in six countries between 2005 and 2019. The first election cycle occurred in April 2006 in Peru, and the last occurred in October 2018 in Brazil. Each of the six countries had at least three presidential elections with only Brazil conducting a fourth. With the exception of the three Mexican presidential elections and two Argentinian presidential elections, fourteen of the elections proceeded to a runoff. The elections include 161with an average 8 of per election. Of the nineteen elections, five involved an incumbent participating in at least the first round of voting. I included a summary of the candidates and election dates listed in Figure 1.1

Information from public opinion polls during the election cycle provided an indication of the public expectation regarding of the competitiveness of an election. Polling data was collected from reputable firms on the date closest to the actual election date as possible to study how the

competitiveness of an election influences the behavior of financial markets and investor

decisions. The polling numbers regarding the percent of the vote each candidate was expected to

receive were collected at the time closest to the election to measure existing expectations during

the actual voting. I listed the firms and dates of the polls release in Figure 1.2.

Figure 1.1

Country	Election Date	Number of Candidates	Incumbent	Two Rounds
Argentina	10/28/07	14	No	No
Argentina	10/23/11	7	Yes	No
Argentina	10/25/15	6	No	Yes
Argentina	11/22/15	2	No	Yes
Brazil	10/1/06	8	Yes	Yes
Brazil	10/29/06	2	Yes	Yes
Brazil	10/3/10	9	No	Yes
Brazil	10/31/10	2	No	Yes
Brazil	10/5/14	12	Yes	Yes
Brazil	10/26/14	2	Yes	Yes
Brazil	10/7/18	13	No	Yes
Brazil	10/28/18	2	No	Yes
Chile	12/13/09	4	No	Yes
Chile	1/17/10	2	No	Yes
Chile	11/17/13	9	No	Yes
Chile	12/15/13	2	No	Yes
Chile	11/19/17	6	No	Yes
Chile	12/17/17	2	No	Yes
Colombia	5/30/10	10	No	Yes
Colombia	6/20/10	2	No	Yes
Colombia	5/25/14	6	Yes	Yes
Colombia	6/15/14	2	Yes	Yes
Colombia	5/27/18	6	No	Yes
Colombia	6/17/18	2	No	Yes
Mexico	7/2/06	3	No	No
Mexico	7/1/12	4	No	No
Mexico	7/1/18	4	No	No
Peru	4/9/06	20	No	Yes
Peru	6/4/06	2	No	Yes
Peru	4/10/11	10	No	Yes
Peru	6/5/11	2	No	Yes
Peru	4/8/16	10	No	Yes
Peru	6/3/16	2	No	Yes

Figure 1.2

Country	Election Date	Polling Firm	Release Date
Argentina	10/28/07	Management & Fit	Oct. 21st
Argentina	10/23/11	Equis	Oct. 7th
Argentina	10/25/15	Ipsos-Mora y Araujo	Oct. 18th
Argentina	11/22/15	Management & Fit	Nov. 8th
Brazil	10/1/06	Datafolha	Sept. 29
Brazil	10/29/06	Datafolha	Oct. 25th
Brazil	10/3/10	Ibope	Oct. 1st
Brazil	10/31/10	Datafolha	Oct. 29th
Brazil	10/5/14	Datafolha	Oct. 3rd
Brazil	10/26/14	Ibope	Oct. 22nd
Brazil	10/7/18	Ibope	Oct. 6th
Brazil	10/28/18	Datafolha	Oct. 27th
Chile	12/13/09	El Mercurio-Opina	Dec. 9th
Chile	1/17/10	El Mercurio-Opina	Jan. 9th
Chile	11/17/13	Ipsos	Oct. 31st
Chile	12/15/13	Ipsos-Usach	Dec 2nd
Chile	11/19/17	Cadem	Nov. 17th
Chile	12/17/17	Cadem	De. 15th
Colombia	5/30/10	Ipsos Napoleón Franco	May 22nd
Colombia	6/20/10	Invamer Gallup	June 10th
Colombia	5/25/14	Ipsos-Napoleon Franco	May 17th
Colombia	6/15/14	Ipsos-Napoleon Franco	June 6th
Colombia	5/27/18	Invamer	May 19th
Colombia	6/17/18	Invamer	June 6th
Mexico	7/2/06	Reforma	June 23rd
Mexico	7/1/12	Berumen y Asociados	June 12th
Mexico	7/1/18	El Financero	June 23rd
Peru	4/9/06	Universidad de Lima	April 5th
Peru	6/4/06	Universidad de Lima	June 2nd
Peru	4/10/11	Datum	April 8th
Peru	6/5/11	Datum	June 3rd
Peru	4/8/16	CPI	April 1st
Peru	6/3/16	CPI	May 27th

Elections in the six countries captured in the financial data exclusively occur on weekends when no financial trading occurs. Therefore, an event window composed of the three days before(Wednesday, Thursday, Friday) and the three days after (Monday, Tuesday, Wednesday) the voting was constructed to study the arrival of political information and market behavior. Asset prices react to political events very quickly and since the precise day of the vote is known, a narrow event window of six days around the event is sufficiently long enough. Similar event studies involving high frequency financial data and election have used larger event windows consisting of the two weeks surrounding the election date. However, because a major political event or development is unlikely to precede or immediately follow an election, by limiting the event window to only a few days the test remains independent of any other political information unrelated to the election. The event window remains free from contaminating information or economic shocks that might otherwise confound estimates in wider event windows.

I constructed the dependent variable in the study as the estimated daily variance calculated from the total returns in either the stock or bond index. The variance of total index returns is a standard measure of market volatility. More volatile financial markets are associated with stronger reactions to new information and the resolution of investor uncertainty whereas less volatile markets exist when the price of a financial asset reflect all existing information and only minor variations occur.

To explore the factors that influence market volatility during an election, I constructed a series of explanatory variables. These variables are meant to provide insight into how the arrival of political information and political uncertainty impact the behavior of financial investors and thereby market volatility. More specifically, the following explanatory variables are considered:

- *Election*(dummy variable): The three days after a round of voting were coded within the event window in comparisons to the three days before. This is to capture how the arrival of information resulting from a round of voting affects market volatility.

- *Round(dummy variable):* For the national elections that had two rounds, the second round's event window was coded for comparison against the first round's event window. This is to capture if the information released during the first round had any effect on financial market behavior in the second.

- *Has_Two_Rounds (dummy variable)*: This variable is coded to include only elections in which two round of voting were included. This controls for the elections in Mexico examination as well as two elections in Argentina.

- *Competitiveness*:: This variable measures how competitive the public expected a particular round of voting to be. Election polls are a standard measure of the expected competitiveness of an election. If the difference between the polls of the two leading candidates is large, the public expects the outcome of the election to be relatively certain. Conversely, if the difference between the polls of the leading candidates is small, the public expect the election to be competitive. Percentages were taking from polling numbers released closest to the election. It was calculated as such:

$$\frac{1}{|(Poll\ of\ Leading\ Candidate\ A - Polling\ of\ Leading\ Candidate\ B)|}$$

- *Incumbent* (dummy variable): This included elections in which an incumbent participated either in the first or second round if possible.

- *Asset_Type (*dummy variable): This variable was coded for whether the measured volatility in the estimation windows developed from total returns from the MSCI stock index (1) or the EMBI bond index(0).

Methodology.

The total returns from the MSCI Latin American stock index and EMBI Latin American bond index consist of the summed daily total returns for each component within the two indices. These aggregated returns can be subdivided into six sets of summed total returns for each individual country composed of only components listed for that country. By having both a set of regional aggregated total returns as well national total returns, comparisons can be made between changes in the regional level and changes at the national level.

The first step then in my empirical analysis was then to isolate changes in the total returns of the national components of the index to occurrences within that country. Financial markets respond to a variety of different stimuli. The price of particular stock in Argentina may plummet in response to the announcement of tariffs in the United States. Or the bond prices of every Latin American country may rise in response to China's announcement of the region as a new investment priority. In order to remove any changes in the total returns that can be attributed to events or developments within the broader global economy, standard practice in the financial literature suggest that any change in the daily returns of the regional or national components be compared against a risk-free rate. The fourteen years of regional total returns and country-specific total returns for each day were then differenced from the total returns of U.S. Treasury bills on the same day to prevent information unrelated to Latin America from creating alternative explanations for the variation. This process creates a set of abnormal total returns for the components aggregated at a regional level as well as six sets of components aggregated at each national level. Accounting then for variations in the daily total returns that could be attributed to

political or economic change at the regional level was accomplished by the following regression

for each set of total returns with country i at time t with asset type s:

Equation 2.1: (Return of Country$_{its}$ – Return of Treasury Bill$_t$ = β_o + β(Return of Region – Return of Treasury Bill$_t$)

Regressing the abnormal total returns for the entirety of the Latin American components

on the abnormal returns of each set of national components provided a method for determining

the unexplained variance in the financial asset at time t for country index i that can only be

attributed to developments within each country. I then estimated the daily volatility in each

country's financial market through a GARCH model with the residuals of this regression

representing the country-specific variance of total index returns.

GARCH stands for Generalized Autoregressive Conditional Heteroscedasticity; it is a

rich and flexible technique for the analysis and modeling of financial volatility. The GARCH

setup provides a method for modeling the conditional volatility of asset returns. Conditional

refers to the assumption that the volatility of next period's return is a function of a set of

information available today. Volatility is then estimated on the basis of publicly available

information on the day before being examined. The GARCH model bases its estimates on two

predictable changes in volatility, volatility clustering and heteroscedasticity. Volatility clustering

refers to the observation that large swings in prices tend to be followed by large swings of

random direction, whereas small price changes are followed by small shifts. Heteroscedasticity

refers to the irregular pattern of variations in the residuals in that the residuals do not conform to

a linear pattern.

The GARCH model follows the equation:

$$r_{t-1} = c + \varepsilon_{t+1}, \text{ with } \sigma^2_{t+1} = \omega + \alpha\varepsilon_t + \beta\sigma^2_t$$

Returns over the period(day to day) from t to t+1 are denoted as r_{t-1}. The mean equation specifies

returns simply as a constant, c, plus an error term ε_{t+1}. Therefore the expected return is constant.

σ^2_{t+1} is the conditional volatility(the one-period forward expect variance based on past information). It depends on a mean ω, last period's squared forecast error ε_t and last period squared forecast variance σ^2_t . Both of the terms are included with a one-day lag, thus a GARCH(1,1) specification for the conditional variance. The graphs demonstrates the estimation results for a simple GARCH(1,1) specification applied to Brazilian stock returns.

Volatility
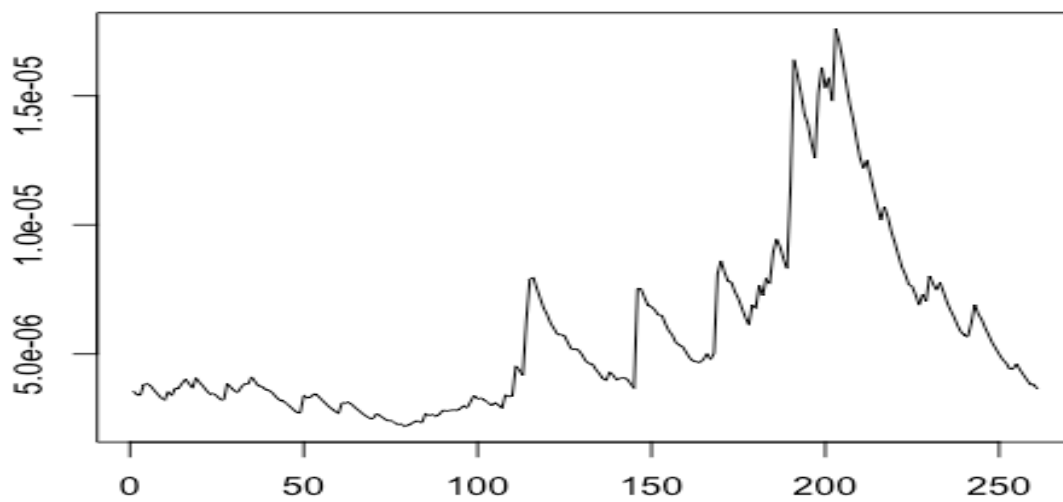
Total Returns
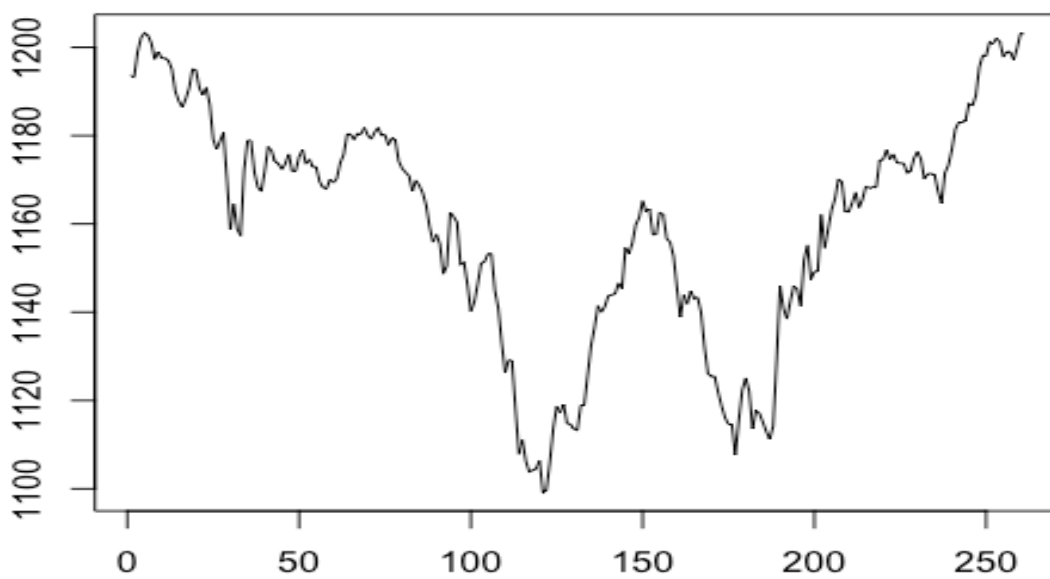
The GARCH(1,1) specification is applied to the variance resulting from Equation 2.1 to produce a conditional volatility estimate for each date between January 1st, 2005 to January 1st, 2019. I formatted the estimates for the six dates surround each round of voting into the event windows described in the data section. This process created a list of 396 conditional volatility estimates, with 198 estimates for stock volatility and 198 estimates for bond volatility. I then coded the event windows according to the explanatory variables listed in the Data section. The variables are summarized in Figure 2.2.

Figure 2.2

Variable	Mean	Standard Dev.	Max	Min
Volatility	0.166	0.326	2.920	0.003
Election	0.500	0.500	1	0
Round	0.424	0.494	1	0
Competitiveness	0.158	0.203	1	0.025
Incumbent	0.212	0.409	1	0

My inquiry then proceeds to examine how the political information during an election cycle influenced volatility through a series of OLS regression models with the estimated conditional volatility serving as the dependent variable. The first model includes the explanatory variables described in the Figure 2.2 and follows the equation:

$$Volatility = \beta_o + \beta(Election) + \beta(Round) + \beta(Competitiveness) + \beta(Incumbent) + \beta(Asset\_type)$$

The second model additionally controlled for elections which did not proceed to a runoff to prevent single-round elections from biasing the estimates through the inclusion of the *Only_Two_Rounds* variable. Mexico was thus excluded in this model entirely. The third model included the fixed effects for each country to ensure no individual country's abnormal volatility biased the other estimates. Dummy variables constructed to denote each country, with Peru being the excluded category, were included as fixed effects due to the inherent differences in the

components within each country's financial market. To account for a non-normal distribution of the dependent variable, as is expected with GARCH produced volatility estimates, the fourth and fifth models were developed to produce more reliable t-statistics. In the fourth model, considering potential skewness in the underlying data, a log normalization was applied to the volatility estimate. While the fifth model followed a generalized linear model approach to account for a non-normal distribution of the dependent variable.

Table 1: Results

	Dependent variable:				
	Volatility			log(Volatility)	Volatility
	OLS			OLS	normal
	(1)	(2)	(3)	(4)	(5)
Election	0.060**	0.060**	0.060**	0.116**	0.060**
	(0.029)	(0.029)	(0.025)	(0.058)	(0.025)
Round	0.057*	0.061*	0.090***	0.047	0.090***
	(0.029)	(0.032)	(0.027)	(0.062)	(0.027)
Competitiveness	0.178**	0.179**	0.292***	0.849***	0.292***
	(0.073)	(0.073)	(0.070)	(0.161)	(0.070)
Incumbent	−0.128***	−0.128***	−0.102***	−0.851***	−0.102***
	(0.036)	(0.036)	(0.037)	(0.085)	(0.037)
Asset_Type	0.276***	0.276***	0.276***	2.580***	0.276***
	(0.029)	(0.029)	(0.025)	(0.058)	(0.025)
Only_Two_Rounds		−0.015			
		(0.044)			
argentina			0.271***	1.483***	0.271***
			(0.049)	(0.113)	(0.049)
brazil			−0.166***	−0.806***	−0.166***
			(0.044)	(0.102)	(0.044)
chile			−0.141***	−0.707***	−0.141***
			(0.042)	(0.097)	(0.042)
colombia			−0.192***	−0.674***	−0.192***
			(0.044)	(0.100)	(0.044)
mexico			−0.165***	−0.877***	−0.165***
			(0.053)	(0.122)	(0.053)
peru					
Constant	−0.027	−0.016	0.019	−3.947***	0.019
	(0.031)	(0.044)	(0.040)	(0.091)	(0.040)
Observations	396	396	396	396	396
R^2	0.227	0.227	0.421	0.879	
Adjusted R^2	0.217	0.215	0.406	0.876	
Log Likelihood					−10.668
Akaike Inf. Crit.					43.337
Residual Std. Error	0.289 (df = 390)	0.289 (df = 389)	0.251 (df = 385)	0.576 (df = 385)	
F Statistic	22.872*** (df = 5; 390)	19.036*** (df = 6; 389)	27.954*** (df = 10; 385)	280.268*** (df = 10; 385)	

Note: *p<0.1; **p<0.05; ***p<0.01

Chapter 5: Results

`   The results of my empirical analysis described in the methodology section are described

in the Table 1. The three days following any round of voting denoted by the *Election* variable

had a positive effect on the conditional volatility estimates in comparison to the three days prior.

The effect retained significance when accounting for elections without two rounds in Model 2 as

well as the differences between national components in Model 3. Additionally, the robustness of

the estimate remained when assuming a non-normal distribution of the dependent variable in

Models 4 and 5. The second round of voting similarly had a positive effect on the conditional

volatility estimates in comparison to the first round of voting. The effect had a consistent

significance in each of the first three OLS models(Models 1:3) as well as under the generalized

linear model (Model 5).

        The statistical evidence supports my first hypothesis regarding the arrival of new political

information during either round of voting. The three days immediately following a voting period

were more volatile compared to the three days prior. The arrival of new political information

following either the first round or the runoff sparked reactions from financial investors creating

more volatile financial markets. The investors react then to the process of voting regardless of

whether its result completely resolves their uncertainty in the future composition of the

government leadership and direction of future policy. The electoral rules of Latin American

presidential election thus creates two separate periods of election-induced volatility as a result of

the use of plurality runoff systems.

        The empirical evidence contradicts my second hypothesis regarding the effect of having

two rounds of voting during an election cycle. My expectation had been that information

supplied during the first round should have dampened investor reactions and tempered market

volatility during the runoff. However, my analysis suggests that the second round of voting features higher volatility compared to the first round. This suggests that financial investors derive substantially less information from the results of the first round and that the majority of uncertainty is only resolved when a candidate has won outright. My findings imply that is not simply the arrival of political information during elections that influences investor reactions but also the degree of uncertainty it resolves. Nonetheless, the two-round voting system in Latin America create separate periods of election-induced market volatility with comparatively different degrees of volatility.

Expectations of a more competitive election denoted by the *Competitiveness* variable in Table 1 had a positive and significant effect on the volatility estimates. The effect of a more competitive election on the volatility in Latin American financial markets is consistently significance across each of the five models. The more competitive an election is considered to be by the public prior to a round of voting, the higher the volatility in the event window surrounding a round of voting. Financial investors likely hold greater degrees of uncertainty regarding the direction of government policy when the outcome of an election is unknown. In a more competitive elections, financial investors have stronger reactions to the arrival of political information due to higher level of political uncertainty during a round of voting thus creating more volatile financial markets.

Moreover, the presence of an incumbent during an election cycle denoted by the *Incumbent* variable had a negative and significant effect on the volatility estimates surrounding an election date. The observed effect maintained its significance when controlling both for non-runoff elections as well as controlling for country-specific effects. An incumbent participating in a presidential election then reflected a reduction in the market volatility during an event window.

Investors, possibly having prior experience with how an incumbent governs, have increased confidence in the direction future government policy could take when they participate in a presidential cycle. The incumbent serves then to reduce investor uncertainty dampening their reactions to new information, and reducing market volatility during an election.

Another interesting result of my empirical analysis suggests that different asset types may have different sensitivities to election-induced volatility. In Table 1, the *Asset_Type* variable had a significant and positive effect on the volatility estimates. This dummy variable had been coded for the volatility of stock returns suggesting comparative difference in their behavior within the event window. The evidence suggest that stock returns feature higher volatility during an election compared to bonds. The stock market may then be more sensitive to changes in the executive administration as regulatory changes tied to stock valuation are often linked to executive decision-making. This may have important implication for financial investors who may find bonds to be a less risky asset during a presidential election in Latin America.

Chapter 6: Conclusion

My thesis sought to understand the influence of two-round voting systems in Latin America on the behavior of financial investors. The arrival of new political information and the subsequent reactions of financial investors following either round of voting create higher volatility in both stock and bond markets. The information incorporated by investors during the first round, however, did not substantially temper their reactions during the runoff vote. My findings suggest that although financial investor react to election results, it is the complete resolution of political uncertainty that creates stronger reactions and thus higher market volatility. My empirical evidence contributes to existing theories of election-induced volatility by expanding the current body of research to include a regional assessment of Latin American presidential elections. The electoral rules within Latin American elections were shown to have a significant impact on market volatility with comparable differences during separate rounds of voting as well as in the performance of different asset classes.

My finding may, however, be limited due to the coverage of the two indices. Both only included six Latin American countries that Morgan Stanley and JP Morgan classified as emerging markets. My sample size was also relatively small with only nineteen presidential elections included in the sample. Consequently, this may limit any generalizations made to the entirety of Latin America. These indices, however, were considered low-risk diversified investment options in which volatility should have normally diffused without harm to its valuation. This makes the evidence of abnormal volatility in these indices even more surprising. Another limitation of this study stems from sector-specific differences in the components of the stock index. Particular sectors of each of the Latin American economies may be more sensitive

to the arrival of political information as well as the uncertainty associated with the election process and thus be responsible for the abnormal volatility. Future studies should attempt to account for this possibility as well as explore why certain sectors of an economy may be more closely related to the presidential elections and the arrival of political information

Future studies should also continue to explore the regional and national characteristics of the relationship between politics and financial market movements rather than rely on broad generalization from OECD countries. And existing theories drawn from these studies should also continue to be tested for their applicability in other economies and countries. A better understanding of how and what kinds of political information investors incorporate into the rebalancing of their portfolio is needed as well the extent to which that information influences market behavior.

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