The Real-Time Impact of Political Risk on Market Valuations: Evidence from Peru

Juan Pablo Micozzi* Patricio Navia† Pablo Pinto‡ Sebastian Saiegh§

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Abstract

We leverage Pedro Castillo's failed coup attempt in Peru on December 7th, 2022, to estimate the real-time impact of political risk on market valuations. Using high-frequency (minute-by-minute) price data of the country's broad stock market index we identify two structural breaks in the series. We then interpret these break points exploiting the incidents' precise timestamp based on media outlets' Twitter feeds. The first one corresponds to a big sell off triggered by Castillo's televised announcement that he was shutting down Congress. The timing of the second one coincides with the surge in share prices that took place when the news that Congress had convened to impeach Castillo's first broke. These findings indicate that political developments in Peru were incorporated into stock prices very quickly. They also suggest that accounts of liquid assets' responses to political risk should rely on high- rather than low-frequency data, as well as sudden rather than protracted political transformations.

*ITAM; juan.micozzi@itam.mx
†Universidad Diego Portales & New York University (NYU); patricio.navia@nyu.edu
‡University of Houston; ppinto@central.uh.edu
§UCSD; ssaiegh@ucsd.edu

Introduction

On 7 December 2022, Peru's President Pedro Castillo attempted to close Congress and establish a "government of exception." However, by the end of the day, he was ousted from power and subsequently arrested. These events had a significant impact on the Peruvian stock market. In contrast, the S&P 500 barely reacted to the violent protests in the United States on January 6, 2020, where pro-Trump rioters stormed the Capitol building. These two examples highlight the differing perceptions of political risk between Peru, a country historically prone to political upheaval, and the United States. While Castillo's failed coup was considered a significant source of political risk, financial markets did not view the attack on the Capitol as posing a genuine threat to the political stability of the United States.

The relationship between political risk and financial markets has received significant scholarly attention, with numerous studies investigating how policy uncertainty arising from political instability, such as wars, revolutions, and coups, can impact stock prices, exchange rates, bond yields, and investor behavior. Most of the existing research, however, uses low-frequency financial data as well as protracted political changes. While this conventional approach may provide valuable insights, it is ill-suited to capture the rapid incorporation of information into asset prices. In Peru, there was a significant sell-off the country's stock market index when Castillo initially threatened to dissolve Congress, followed by a substantial rally in response to news of his successful impeachment. However, by the end of the trading day, the index had converged close to the previous day's closing price, implying that intraday price movements, rather than inter-day changes, reflected the market's response to the political events that took place in Peru on December 7, 2022.

In this study, we leverage Pedro Castillo's failed coup attempt to estimate the real-time impact of political risk on market valuations using a combination of high-frequency (minute-by-minute) price data of Peru's broad stock market index with information on the day's

incidents' precise timestamp based on media outlets' Twitter feeds. This granular level of data allows us to analyze whether "structural" breaks in the time-series of the Peruvian stock market's index returns exist. We rely on the methodology proposed by Clemente et. al. (1998) which uses an endogenous selection procedure wherein the break dates are selected when the t-statistic for testing unit roots is minimized. The null hypothesis is that the series has a unit root with a change in its level. The alternative hypothesis is that the series is stationary with multiple structural breaks. The test assumes no a priori knowledge of major turning points, therefore it allows the data to "speak" for themselves.

Our results indicate that the presence of multiple breaks cannot be rejected. They also reveal that the first structural break in the stock market index corresponds to a significant sell-off triggered by Castillo's televised announcement of his intention to dissolve Congress. This event created a moment of heightened political uncertainty, leading to a negative reaction in the market. The second structural break aligns with the surge in share prices that occurred when the news that the Peruvian Congress had convened to impeach Castillo's first broke. This event signaled a shift in political dynamics and resulted in a positive market response. These findings reveal the rapid incorporation of political developments in Peru into stock prices. More broadly, by shedding light on the real-time impact of political risk on market valuations, our study contributes to the existing literature on the relationship between political events and financial markets. The use of high-frequency data and the incorporation of precise timing through Twitter feeds of media outlets provide valuable insights for understanding the dynamics of market responses to political shocks. These insights have practical implications for investors, policymakers, and market participants, highlighting the swift transmission of political events and the importance of utilizing high-frequency data when assessing the impact of political risk on financial markets.

The remainder of the paper is organized as follows. The first section discusses the relationship between regime change and asset prices. Next, we provide a brief account of the

events that took place in Peru on December 7, 2022. In Section 3, we describe our data. We discuss our estimation details and report our main empirical findings in Section 4. A final section concludes.

1 Regime Change and Asset Prices

Investors in financial markets face commercial and non-commercial risks associated with political events that can significantly impact the value of their assets. It is essential for investors to carefully consider their exposure to political risks and understand how these risks can affect asset prices. Political risks can originate from specific government actions, such as the implementation of new laws or regulations impacting industries or sectors. Additionally, political risks arises in periods of political instability, such as wars, abrupt changes in government leadership or institutional crises. These political events can introduce significant uncertainty into the market and have profound implications for asset prices.

Empirical evidence from earlier studies highlights the relationship between regime changes and asset prices. For instance, Girardi and Bowles (2018) observe a substantial increase in share values in the Santiago stock exchange immediately following the 1973 military coup against Salvador Allende. This finding suggests that political shocks can have both positive and negative impacts on asset prices, depending on the nature of the event and the market's perception of its economic and political consequences (Incerti and Incerti 2021). Dube et al. (2011) examine the timing of top-secret US covert operations aimed at overthrowing foreign governments authorizations and their effects on the share prices of exposed US firms. Their findings reveal a positive reaction in share prices following US-backed coups or coup authorizations, suggesting that these events can lead to significant changes in asset valuations. In fact, the average effect of a coup authorization event is estimated to be around 13 percent for companies with their entire capital stock at stake. Another illustrative example

is the movement of asset prices in Indonesia between 1995 and 1997. Fisman (2001) demonstrates that the Jakarta Composite Index (JCI) experienced consistent declines during this period whenever rumors about Suharto's health circulated. This evidence indicates that even rumors or uncertainty regarding the tenure of leading political figures can significantly influence market dynamics and asset prices.

Most of the existing work linking regime changes and asset prices, however, uses low-frequency financial data as well as protracted regime changes. For example, in their landmark study on democratization, Acemoglu and Robinson (2006) study how coups influence the value of asset prices. In their words, "... to the extent that democracy leads to redistribution and taxation of the assets of the rich (land and capital), we would expect the prices of these assets to fall with democracy and rise after a coup ..." (Acemoglu and Robinson 2006: 72). Their examination of the real value of the stock-market index in Chile between 1928 and 1978 indicate that stock prices declined continuously from the 1930's through the 1973 coup. Then, the real value of the stock-market index recovered thirty years of losses in just five years. The extended time frame under consideration as well as the vicissitudes of the Chilean stock market under different administrations, including the presidency of Eduardo Frei Montalva, a Christian Democratic leader, and Salvador Allende's socialist presidency, cast doubts on the identification of causal effects linking regime change and asset prices and the mechanisms underlying them. Indeed, even Girardi and Bowles (2018), who use daily data to examine how changes in stock market valuations responded to political shocks in Chile in the 1970s, admit that several ancillary factors, such as spikes in dividend payments prompted by anticipation effects may contaminate their analysis.

In another influential study, Dasgupta and Ziblatt (2015) used monthly data to investigate the relationship between the prices of British *Consols* (a fixed-interest perpetual government bond) and the Great Reform Act of 1832. This reform brought significant changes to the parliamentary representation of England. Their findings reveal a notable increase

in yields before the reform, followed by a return to the previous average after the reform's passage. As they point out, "... Yields are estimated to begin to decline approximately **ten months in advance of the reform**, plausibly due to rational expectations and anticipation of the reform's passage ..." (Dasgupta and Ziblatt 2015: 10; emphasis added). Their 49-month estimation window, however, overlaps with a period marked by substantial political and social changes. These changes included the fragmentation of the old Tory party following the Catholic Emancipation Act, the death of George IV, the July Revolution in France, the 1830 general election, a period of rural unrest known as the Swing Riots, and the fall of the Wellington Ministry. Furthermore, as Aidt and Franck (2015) note, the process that culminated in the Great Reform Act could have failed at a number of hurdles. Therefore, attributing the price changes in the Consol market to investors' expectations related the reform's passage seems far-fetched.

An important feature of financial market is their ability to quickly incorporate new information into asset prices (Ederington and Lee 1993; Fleming and Remolona 1999; Anderson et al. 2003). This rapid assimilation of information implies that prices adjust swiftly in response to political events. It also indicates that to credibly claim that markets respond to political events, it is imperative to show that such reaction is not driven by other confounders. For example, the release of another piece of unexpected news, such as a change in global real interest rates, a devaluation of the domestic currency, or some other market-related information disclosure. The potential presence of contaminating news is particularly problematic when the exact date of the event of interest is uncertain and/or when the window around the event is too broad (Dyckman, Philbrick and Stephan 1984).

In contrast, the assumption that the market quickly incorporates new information into asset prices, combined with the availability of precise event timing, allows researchers to define a narrow event window. This window captures the full effect of significant events while avoiding contamination from other economic and political shocks. Due to the plausibility of

this assumption and its ease of implementation, intra-day event studies have gained popularity in recent years. Building upon this approach, the main contribution of this study is to leverage Pedro Castillo's failed coup attempt in Peru on December 7th, 2022, to estimate the real-time impact of political risk on market valuations.

2 Castillo's Coup Attempt

Our identification strategy exploits the fact that Castillo's televised appearance announcing that he intended to shut down the Peruvian Congress came as a surprise, and that the timing of the coup's failure could not have been entirely anticipated. In this section we provide a brief review of the political crisis in Peru leading to Castillo's actions on December 7, 2020. The main goal of this narrative is to provide supporting evidence regarding investors' information before these events took place.

A rural schoolteacher and union activist who ran for a far-left party, Pedro Castillo was inaugurated as Peru's 63rd president on July 28, 2021. His tenure in office was marked by political instability. Despite having a presidential form of government, Cabinet changes in Peru need to be ratified by the country's unicameral Congress. In his first six months in office, Castillo went through three appointments for President of the Council of Ministers position. In February of 2022, Castillo appointed Aníbal Torres to the office. Torres, an experienced politician, remained in office for 9 months. However, there was a frequent turnover in other ministries, with one Minister being dismissed on average every three weeks. Castillo alleged that the fragmentation of Congress, where no party holds a majority and party switching is common, was the cause of relentless political instability. In an effort to strengthen his government's position over Congress, Castillo forced a confidence vote on Torres in March of 2022. According to the Peruvian constitution, when presidents fail to receive a confidence twice, they can dissolve the Congress and call for new elections. By threatening to dissolve

the Congress, Castillo aimed to exert pressure and gain political advantage. But the gambit failed when Torres survived the vote of confidence. As a result, Castillo did not significantly enhance his power position.

In November 25, 2022, Castillo made a new attempt to trigger a dissolution of the Peruvian Congress through constitutional means. This time, he sought to acquire two no confidence votes almost simultaneously. First, he dismissed Torres after the legislature refused to hold a no confidence vote, and then replaced him with Bessy Chávez, a 33-year-old legislator from Tacna. Chávez had been involved in various scandals during her short political career and was impeached by Congress in May 2022, a few months after being appointed as Minister of Labor. Castillo was gambling on the fact that Congress would not confirm Chávez, and as a result, he could claim that the legislature had given him a second consecutive vote of no confidence. This would have enabled him to order the dissolution of Congress and call for legislative elections, forcing incumbent legislators out of the new Congress because immediate re-election is prohibited in Peru. Facing such dire prospects, Peruvian legislators did not cave in. Instead, they announced that they would launch an impeachment motion against the president. This was certainly not the first time that Castillo faced a removal attempt. He had successfully survived two impeachment attempts in December 2021 and March 2022, with no major political consequences for him. This time was different. Most observers anticipated that instead of facing another stand-off with muted repercussions, Peru was bound for a constitutional crisis that would result in Castillo's removal from office. Thus, the prevailing view in the opening days of December 2022 was that Castillo's days were numbered and that his Vice-President Dina Boluarte –a 60-year old lawyer with an unimpressive career as a bureaucrat, who had served as his Minister of Development and Social Inclusion without meaningful accomplishments—would ascend to the presidency.

No one expected, however, that on December 7, 2022 –just hours before the Peruvian Congress was scheduled to vote on a third impeachment motion against him– Castillo would

go on national TV and announce the establishment of a "government of exceptional emergency." Indeed, as the president's former legal advisor, Benji Espinoza pointed out, the dissolution of Congress was never discussed during his six-hour long meeting with Castillo on December 6 to plan his legal defense strategy against the impeachment proceedings. Espinoza was also unaware of Castillo's plans on the morning on December 7. In a state of shock, Espinoza publicly denounced the president's actions and resigned his position of legal adviser shortly after Castillo's televised announcement.

The events following the coup attempt also took an unpredictable turn. In response to Castillo's speech, several ministers resigned, intensifying the political turmoil. The Constitutional Court denounced Castillo as an usurper, and the Armed Forces openly rejected his actions, calling for the restoration of the constitutional order. Simultaneously, the Peruvian Congress swiftly gathered and voted decisively to remove Castillo from office, with an overwhelming majority in favor. In addition, the vice-president, Dina Boluarte, who opposed Castillo's actions, was scheduled to take the presidential oath of office at 3:00 pm. While the Congress was in session, Castillo left the governmental palace and sought refuge at the Mexican embassy in Lima. Learning that his own officers were responsible for transporting Castillo, the chief of the Peruvian National Police (PNP) ordered them to apprehend him. Under the guise of an emergency detour, the PNP officers diverted Castillo to the Prefecture, where he was arrested *in flagrante delicto* on charges of rebellion.

The swift and tumultuous sequence of these events demonstrated the fluid nature of the situation and the uncertainties that accompanied it. Castillo's televised address, the resignation of the cabinet ministers, the Constitutional Court's condemnation, the Armed Forces' rejection, the Congress's decisive vote, and the subsequent arrest of Castillo all unfolded extremely rapidly in span of approximately 140 minutes, between 11:42AM and 2:02PM. These events provide an ideal setup for estimating the impact of political events on high frequency market returns: we expect that the effect on financial markets of the rapid

dissemination of the news about Castillo's announcement of the government of emergency, and of the restoration of the constitutional order and removal of Castillo from power would be reflected in high frequency intra-day market returns data. In the next we discuss our data and estimating strategy.

3 Data and Measurement

To estimate the real-time impact of Castillo's coup attempt on market valuations, we combine high-frequency data from the Lima Stock Exchange (Bolsa de Valores de Lima, BVL) with detailed information on the precise timing of the events described in the previous section. Regarding the financial data, we consider one-minute prices returns for the Morningstar Peru Index (MSPEUSDP). Launched on December of 2014, the index measures the performance of Peru's equity markets targeting the top 97% of stocks by market capitalization.

Between the first Sunday in November to the second Sunday of March, the BVL operates on Monday through Friday between 9:00 am to 4:00 pm Peru Standard Time (GMT-05:00). The trading phase ranges from 9:30am to 3:55pm, and the closing phase from 3:52pm to 4:00 pm. In addition, the constituents of the Morningstar Peru Index are listed on major global exchanges, implying that there are no stale quotes as market activity is not affected by local trading holidays. Hence, the index's returns offer an opportunity to assess the arguments linking regime change and asset prices using the information contained in intraday data.

Regarding the diffusion of information associated with the political events on the morning of December 7, 2022, it is crucial for our analysis to identify the incidents' precise timestamp. Investors have traditionally relied on multiple business media outlets to procure information on financial and commercial activities, such as Reuters, Bloomberg, and the Associated Press. These days they can also keep up with significant developments reported in real-time on social media (Agarwal, Kumar and Goel 2021; Yousaf, Youssef and Goodell 2022).

Consider Castillo's televised address on December 7, 2022. The broadcast started approximately at 11:42am Peru Standard Time (GMT-05:00). During the first few minutes, Castillo pleaded his case, but he did not explicitly state his intention to dissolve Congress. The announcement came at approximately 11:48:26; and it was only at that point that his intentions became clear, but not earlier. The news was reported almost immediately on Twitter by the newspaper Perú 21, at 11:49:11am, but it was only picked up by Reuters almost three minutes later, at 11:51:59am. Therefore, to obtain a precise measurement (down to the second) of when the news surrounding Castillo's actions as well as the events that took place in the aftermath of his announcement, we rely on Twitter rather than traditional business news providers. Specifically, we selected the top-5 local media outlets in Peru with major Twitter presence: the newspapers *La República*, *El Comercio*, *Perú 21*, and *Gestión*, as well as the radio and television broadcasting company *Radio Programas del Perú* (RPP).

Using the library *academictwitteR*, we scraped all the Tweets posted by the selected Peruvian media organizations' accounts on December 7, 2022. We recompiled the 1,363 tweets delivered throughout that day. Notably, a significant majority of these tweets were posted within six hours after Castillo's televised announcement. The information collected includes the precise timing of each message, its content, and supplementary details such as retweets, likes, and hashtags. Of particular importance is the fact that each tweet includes a timestamp in hours, minutes, and seconds, providing us with a highly accurate estimate of when specific news became publicly available. For instance, considering Castillo's televised speech, at 11:47:58 am, the Twitter account of Radio Programas del Perú (RPP) tweeted, "President Castillo Addresses the Nation." A mere thirteen seconds later, Perú 21 tweeted, "Pedro Castillo Dissolves Congress." As this example shows, we can use the data included in Twitter feeds to pinpoint the revelation of information associated with all the incidents sparked by Castillo's attempted coup, including the resignation of his cabinet ministers, the Constitutional Court's condemnation, the Armed Forces' rejection, the Congress's decisive

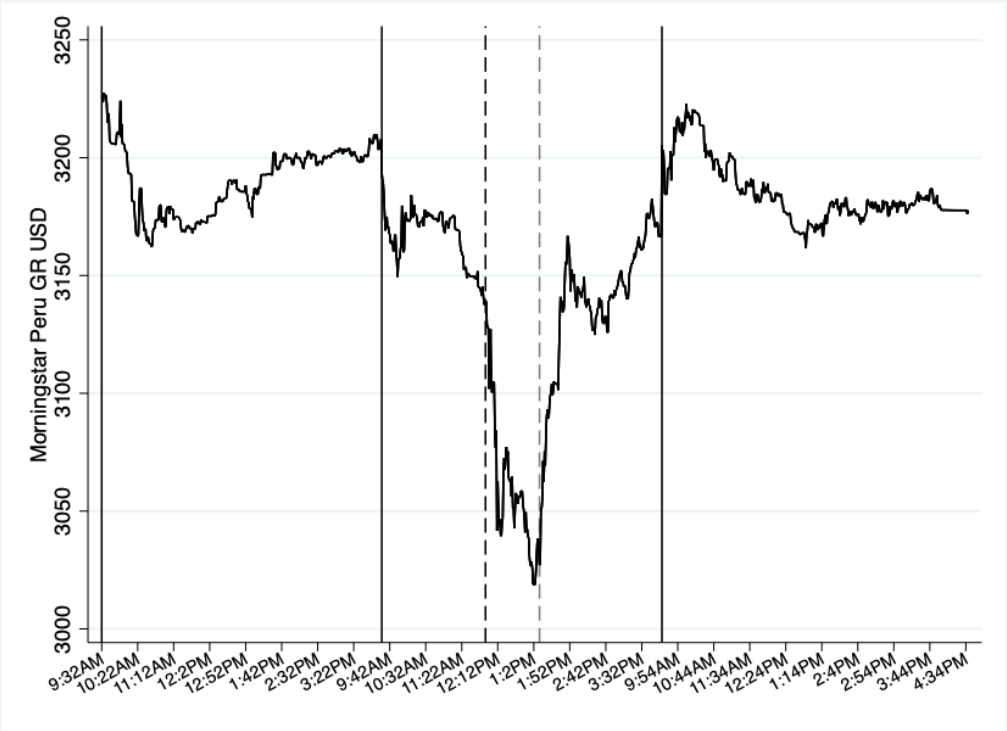
vote, and his subsequent arrest. We triage the information obtained from the Twitter accounts of the five different Peruvian media outlets and select the earliest news release as the most appropriate timestamp of each event.

4 Main Findings

The Morningstar Peru Index (MSPEUSDP) data were provided by Refinitiv and covers the period from its inception in December 2014 to the present. Each data record specifies the time, to the nearest minute, and the index price level in USD. We partitioned the series into 1-min intervals and computed continuously compounded returns based on the last quotation within each interval.

The daily data suggest that stock market valuations had been rising in the month leading up to Castillo's coup attempt. However, after his removal from office took effect, the valuations declined before experiencing a resurgence in mid-2023. They also indicate that there were no significant price changes on the very day of the coup attempt and ensuing events under consideration. Based on these patterns, one may erroneously conclude that there was no impact of political risk on market valuations, and that markets subsequently reacted negatively to Castillo's departure. The high-frequency (minute-by-minute) index series for the tree-day period of December 6-8, 2022, is displayed in Figure 1. The solid vertical black lines indicate each day's trading period, spanning from the beginning of the BVL's session until closing (i.e. from 9:30 am to 4:00 pm Peru Standard Time). This graph paints a very different picture from the daily data series.

Figure 1: Morningstar Peru Historical Performance (1-Min Data)



Source: Refinitiv.

It is clear from Figure 1 that the Peruvian stock market reacted negatively and significantly to the events surrounding Castillo's coup attempt. On December 7, 2020, when the market opened, the index prices were lower than those registered at the market close on the previous day. Then, they stabilized, but dropped significantly with Castillo's televised address, only to bounce back when news of his arrest became known. From peak to trough, between 11:40am and 1:02pm, the change in prices amounted to a 3.95% decline. Then, from trough to peak – between 1:03pm, and 1:58pm – the index rose by approximately 4.2%. To place these figures in perspective, the index return for the whole year in 2022 was 9.23%.

The visual patterns in 1 are quite striking. Nonetheless, to account for the possibility of multiple structural breaks in the return data more formally, we rely on the approach proposed by Clemente et. al. (1998), extending the Perron and Vogelsang (1992) strategy

to the case where a time series exhibits a double change in the mean with unknown break dates. The null hypothesis is that the series has a unit root with a change in its level. The alternative hypothesis is that the series is stationary and has a double structural break in the series. The test utilizes an endogenous selection procedure wherein the break date is selected when the t-statistic for testing unit roots is minimized. The results indicate that for the innovational outlier (IO) model, the null hypothesis can be rejected at conventional levels (with a t-statistic of -6.95 relative to the 5% critical value, -5.49). This finding suggests that the series is stationary with two structural breaks. More importantly, the distinctive break points are associated with the timing of the political events described above. The test endogenously selects the one-minute interval ending at 11:55am as the first break point (shown in a vertical black dashed line in Figure 3), which corresponds to the selloff triggered by Castillo's televised announcement that he was shutting down Congress. The second structural break, at the one-minute interval ending at 1:10pm (shown in a vertical gray dashed line in Figure 3), coincides with the surge in share prices that took place when the news that the Peruvian Congress had convened to impeach Castillo's first broke.

4.1 Potential Threats to Inference

Our analysis takes advantage of the unexpected nature of the Castillo coup attempt. By dividing the price data into 1-minute intervals, we ensure that our estimation window is narrow enough to capture the impact of the event while minimizing the influence of other economic and political shocks. However, it is important to note that the changes in stock market valuations we examine may not fully reflect the underlying effects of interest if Castillo's actions were somehow anticipated or if the timing of his announcement coincided with the release of other news that could impact stock market valuations.

Table 1 presents a comprehensive list of messages tweeted by the top 5 local media outlets in Peru within a 10-minute window surrounding the specific time when Castillo

Table 1: Messages Tweeted by Peru's Top Media Outlets

Media Outlet	Time Stamp	Tweet
El Comercio	11:46:16	Developing world faces a USD2.5 billion debt schock
Peru 21	11:46:16	Sergio Ramos discusses Spain's Qatar Worls Cup elimination
RPP	11:46:19	Army's Chief Commander, Walter Cordova, resigns
Peru 21	11:46:35	President Pedro Castillo addresses the Nation in anticipation of his impreachment process
RPP	11:47:19	President Castillo addresses the Nation
Gestion	11:47:22	Zelensky chosen as perosn of the year by Time magazine
La Republica	11:47:30	President Pedro Castillo addresses the Nation in anticipation of his impreachment process
RPP	11:47:58	President Castillo addresses the Nation
Peru 21	**11:49:11**	**President Pedro Castillo dissolves Congress**
La Republica	11:49:13	President Castillo dissolves Congress
RPP	11:49:31	Lionel Messi steps over a Mexican jersey in lockeroom's floor
RPP	11:50:3	President Pedro Castillo dissolves Congress
Peru 21	11:50:23	Army's Chief Commander resigns
RPP	11:50:44	President Castillo dissolves Congress
Gestion	11:51:42	Microsoft will offer its game Call of Duty for Nintendo users.
La Republica	11:53:16	President Pedro Castillo dissolves Congress
El Comercio	11:53:22	Army's Chief Commander, Walter Cordova, resigns
Gestion	11:53:39	Microsoft will offer its game Call of Duty for Nintendo users.
Peru 21	11:54:14	President Castillo dissolves Congress and announces a new Constitution. Also instates curfew.
Peru 21	11:54:22	President Pedro Castillo dissolves Congress
Gestion	11:54:40	Miraflores' beaches will reopen today
Peru 21	11:56:3	The avatars are available on WhatsApp
El Comercio	11:56:26	President Pedro Castillo dissolves Congress
RPP	11:56:30	President Pedro Castillo dissolves Congress

Source: Twitter. All the tweets were posted in Spanish. The translation is our own.

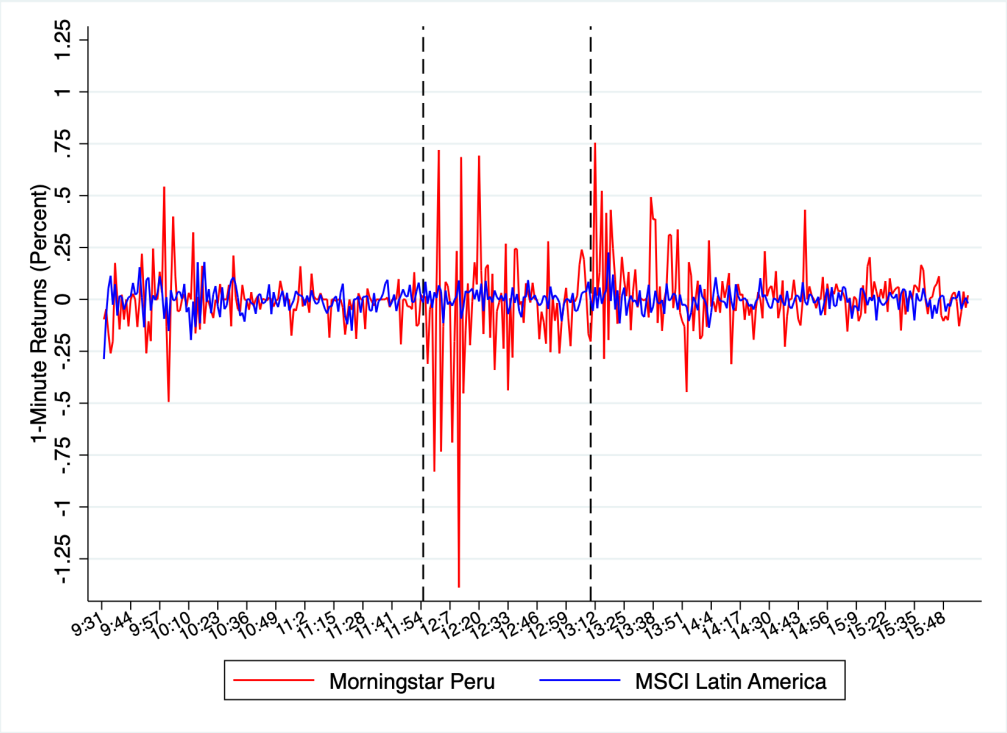
explicitly declared his intention to dissolve Congress. As noted above, the news initially broke on Twitter among these accounts precisely at 11:49:11 am, when Perú 21 tweeted, "Pedro Castillo Dissolves Congress." The eight preceding tweets, posted between 11:46:16 am and 11:47:58 am, either mentioned that Castillo was delivering a televised speech without specifically referring to the dissolution of Congress, or discussed topics that did not appear to be of concern to market participants. Similarly, among the fifteen tweets posted between 11:49:13 am and 11:56:30 am, eight focus on the dissolution of Congress, while the remaining seven discuss unrelated topics that are unlikely to have any significant impact on market valuations. These include discussions about Argentina's Lionel Messi allegedly disrespecting Mexican football and Microsoft's decision to release the videogame Call of Duty for Nintendo platforms. Therefore, based on the evidence in Table 1 , it would be very hard to argue that accounted confounders are driving our results.

In the current era of integrated financial markets, it is essential to consider that volatility in the Peruvian stock market could be influenced by investor reactions to foreign rather than domestic risks. Therefore, an additional potential confounder that needs to be addressed is the role of financial spillovers resulting from cross-market linkages. If global factors were the cause of the observed movements in the Peruvian stock market, then it should be possible to predict the changes in the Morningstar Peru Index using a broader Latin America index. Conversely, if local price changes were driven by idiosyncratic risk, specifically associated with Castillo's coup attempt, then the event should have only affected a specific set of assets, in this case, Peruvian firms.

To consider the impact of external factors on Peruvian market valuation, we utilize the Morgan Stanley Capital International (MSCI) Emerging Market Stock Latin America Index. Launched on May 31, 1990, this index encompasses large and mid-cap companies in Brazil, Chile, Colombia, Mexico, and Peru, representing around 85% of their free float-adjusted market capitalization. In Figure 2, we illustrate the relationship between the 1-minute return series of the intraday MSPEUSDP index data (marked in red) and those of the MSCI benchmark index (marked in blue). The two structural breaks in the MSPEUSDP series identified above are indicated by the vertical black dashed lines.

The two series are negatively correlated during the crisis period (i.e. between the two structural breaks). Furthermore, the price fluctuations in the Peruvian index between 11:55am and 1:10pm are significantly larger than those observed at other times throughout the trading day as well as the Latin American index. Therefore, we can confidently reject the idea that fluctuations in the prices of Peruvian assets were primarily influenced by investors' responses to foreign risks rather than domestic ones.

Figure 2: One-Minute Returns: Morningstar Peru and MSCI Latin America



Source: Refinitiv.

One final issue is whether whether the increased volatility observed on December 7, 2022, exceeded the typical fluctuations experienced in the Peruvian stock market on other days. To address this matter, we utilize the True Range (TR), a well-established technical analysis indicator. The measure provides an estimate of the expected price fluctuations for a security/index on a daily basis. The TR for a given day is determined as the largest of the following three values: (1) the difference between the day's high and the day's low; (2) the absolute value of the day's high minus the previous day's closing price; or (3) the absolute value of the day's low minus the previous day's closing price. The True Range (TR) calculated using the Morningstar Peru Index is, however, reported as an absolute dollar value. Following Forman (2006), we normalize the TR by expressing it as a percentage of the index's closing price. This adjustment, known as the Normalized True Range (NTR),

facilitates a straightforward comparison of volatility across different time periods. A low NTR value signifies a period with narrow price ranges, corresponding to relatively calm days. Conversely, a high NTR value indicates a day of substantial market volatility.

Figure 3: Normalized True Range (NTR) Values - Morgngistar Peru

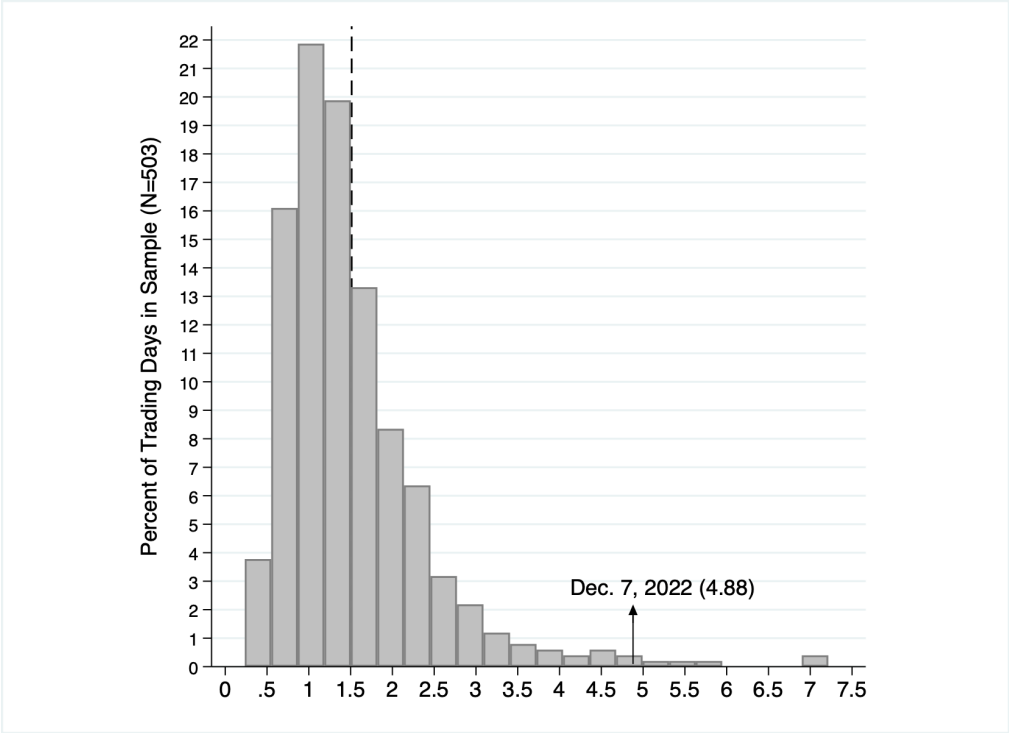


Figure 3 shows a histogram with the distribution of the NTR values calculated using the prices of the Morningstar Peru Index for a two-year period around Castillo's presidency; namely, between September 7, 2021 and September 6, 2023 (503 trading days). The average value of the NTR (indicated by the vertical dashed line) is 1.51, with a minimum of 0.23 and a maximum of 7.21. The NTR corresponding to December 7, 2022 – explicitly shown in the graph – was 4.89 and lies in the 99% percentile of the NTR distribution.[1] Therefore, the evidence indicates that the events associated with Castillo's coup attempt caused an unusually high level of intra-day volatility.

[1]There are only five other trading days that exhibit a higher NTR during this period.

5 Conclusion

In this study, we exploited Pedro Castillo's failed coup attempt to estimate the real-time impact of political risk on market valuations. Using high-frequency data we are able to capture the precise timing and magnitude of the market responses. Our analysis reveals significant market reactions, with a pronounced sell-off upon Castillo's announcement to dissolve Congress, followed by a subsequent rally upon news of his impeachment.

These findings are consistent with previous research in the field. For example, Carnahan and Saiegh (2021) offer evidence indicating that stock market volatility in the Buenos Aires exchange (Argentina) between 1967 and 2020 saw substantial increases in the days following irregular government turnovers. Their main emphasis is on the second moment of the return distribution, rather than the returns themselves. It is important to note that most government interventions tend to have distributional effects across various sectors of the economy. However, assessing the impact of regime changes on signed, not absolute, returns is more challenging. Baker, Bloom, and Terry (2020) posit that revolutions typically involve left-wing groups overthrowing military or right-wing governments, resulting in heightened uncertainty and substantial decreases in returns (first moments). On the other hand, irregular government changes, where right-wing military officers seize power from left-wing leaders, are expected to be associated with increased volatility and positive changes in returns. In a similar vein, Incerti and Incerti (2022) contend that the immediate impact of political instability on asset prices depends on the type of regime change and its anticipated effect on future economic growth. According to their perspective, coups can elicit positive market reactions if the coup instigators exhibit more democratic or pro-market tendencies compared to the regime they replace.

The empirical evidence supporting these arguments, however, is mixed. The main challenge lies in disentangling the distinct impacts of an irregular government turnover and the

ideological leanings of their leaders. The Peruvian case examined in this study provides an opportunity to address this issue. Firstly, Castillo orchestrated a self-coup, meaning that the incumbent government and the coup instigator remained unchanged throughout the crisis. Secondly, both Castillo and his successor, Dina Boluarte, espoused left-wing ideologies. Consequently, our findings indicate that investors responded negatively to the democratic breakdown and positively to the restoration of institutional order, irrespective of the alleged intentions of the individuals involved.

By contributing to the existing literature on the relationship between political events and financial markets, our study enhances our understanding of the political dynamics at play. For academics, our study highlights the importance of considering the real-time impact of political risk on market valuations and underscores the need to rely on high-frequency data to capture the effect of politics. Policymakers can benefit from understanding the potential market reactions to political risk and tailor their actions accordingly. Market participants, armed with the knowledge of the swift market response to political events, can make more informed decisions in managing their portfolios and assessing the associated risks.

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