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Seeking Golden Opportunities

A study of Gold Mining Companies in Colombia

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Master Thesis in Economics and Business Administration

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Abstract

In this thesis, we examine the Colombian gold mining industry from 2010 to 2023 in the context of the country's ongoing conflict. We apply an event study methodology to analyze how conflict-related events, law enforcement actions, and regulatory changes impact investors' reactions and company returns. Events escalating the conflict do not result in significant abnormal returns, while de-escalating events, on average, lead to significant positive abnormal returns. Further, increased law enforcement and increased regulations lead to positive abnormal returns. Events reducing law enforcement do not result in abnormal returns, while events reducing the ability to regulate result in negative abnormal returns. The results contribute to understanding how sector-specific companies are affected by a low-intensity conflict.

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1. Introduction

The growth in the Colombian gold mining has made the country the fourth-largest gold exporter in Latin America, where gold has becoming Colombia's third-largest trading commodity (Statista, 2023). However, the economic potential has been limited by the country's prolonged armed conflict. The conflict, involving the government and leftist guerrilla groups alongside drug cartels, has led to widespread violence and human rights abuses (HRW, 2023). The consequences of the conflict have spread to the gold mining sector, where illegal armed groups have intensified their presence in illegal mining. The Colombian government's response to ease the conflict and limit illegal mining has increased over the last decade (Rochlin, 2021), but the conflict remains unresolved.

In our thesis, we investigate if companies can benefit from conflict, focusing on the gold mining industry in Colombia and South America from 2010 to 2023. We examine the benefit for companies by analyzing abnormal returns following events impacting conflict intensity, law enforcement, and regulatory changes.

Over the three last decades, there has been a global trend of conflicts becoming more fragmented, less deadly, and increasingly common in resource-rich countries (United Nations, 2020). The trend in conflict types raises critical questions about how companies operating in such environments are impacted. We thereby find Colombia as an ideal setting for our event study as the conflict aligns with the trend of violent conflicts (Statista, 2023).

Our study extends existing literature by Schneider & Troeger (2006) and Abadie & Gardeazabal (2003), who explore companies' reactions in different conflicts, including the Basque conflict. Like the Basque conflict, we focus on an internal conflict with low intensity and cultural-nationalistic elements. However, the Colombian conflict differs from the Basque conflict due to the significant influence of drug trafficking and criminal gangs. Further, we build on the work of DellaVigna & La Ferrara (2010) and Guidolin & La Ferrara (2007), who document how diamond companies profited from conflict in Angola and how arms dealers profited from trade during embargo. Our research relates by focusing on a specific sector and how companies potentially profit from conflict but goes further by classifying events based on their impact on the business environment.

We design four predictions based on previous literature and knowledge about the Colombian conflict. Firstly, we predict that an escalation of the conflict leads to positive returns for legal companies, as it enables illegal activities and cooperation with illegal miners. Secondly, we predict that the impact of conflict-related events in Colombia on companies vary based on country of operations due to the frictions from borders. For the third and fourth predictions, we are inspired by Guidolin & La Ferrara (2007) and classify the events based on their impact on the business environment to better understand why gold mining companies could benefit from the conflict. For the third prediction, we predict that events positively illustrating the Colombian government's ability to enforce the law yield negative returns for legal companies, as it targets illegal activities legal companies benefit from. Lastly, we predict that events illustrating effective governmental regulation yield negative returns for legal companies, as it prevents legal companies from engaging in illegal activities.

We conduct an event study to examine our predictions by analyzing shareholders' reactions following events. Investors' reactions are evident in fluctuations in the stock price and evaluated based on abnormal returns in the event period. We choose events according to their relevance, importance, and degree of unpredictability. Further, we classify each event based on its impact on the business environment. The sampled companies must have operated gold mines in South America during our time frame and been listed on a stock exchange. Finally, we analyze our results under the premise that investors are generally aware of the potential for companies to benefit from conflict.

The results from the event study show that events escalating the conflict had no significant effect on the sampled companies. Possible explanations for insignificant effect are conflict fatigue among investors and a non-confrontational approach by illegal groups. Interestingly, de-escalating events led to positive returns, which might reflect investor optimism in the face of a more stable business environment with reduced operational risk. We also observe no significant difference in returns between companies based in Colombia and elsewhere in South America, possibly due to a well-integrated gold market and transnational efforts against illegal activities and illegal mining. In summary, the findings related to conflict intensity do not support our initial prediction.

Further, increased law enforcement in Colombia led to positive abnormal returns. The positive abnormal returns further indicates that legal companies do not cooperate with illegal miners and that illegal miners are seen as competitors. Therefore, actions against illegal mining can

be viewed as actions reducing competition. The result for events on reduced law enforcement is insignificant. The result for events positively illustrating an ability to regulate effectively are positive and significant, indicating a preference for a stable, transparent, and fair business environment. However, the result is not robust to classification and must be interpreted carefully. Conversely, the lack of ability to regulate is generally seen negatively, as it implies an unstable and unpredictable market, despite some positive responses to specific regulatory changes favoring mining companies. Overall, the results from aspects of the business environment do not support our predictions.

The thesis provides important insights into how companies are affected by a low-intensity conflict. We find no implications that companies profit from the conflict in Colombia. Instead, we explore the reasons behind the adverse effects on legal companies. In the following two sections, we present a review of relevant literature and the background of the conflict, which forms the backdrop for the thesis. We then move on to our predictions, the data, and the methodology before we present our results. Finally, we discuss the robustness of our results and offer our conclusion.

2. Literature Review

Research on the link between conflict and financial markets has received attention with studies showing both positive and negative reactions following increased conflict intensity. This section will examine the existing literature, discuss their results, and show how our paper relates to and contributes to the topic.

The two papers by Schneider & Troeger (Schneider & Troeger, 2006) and Abadie & Gardeazabal (Abadie & Gardeazabal, 2003) both demonstrate the impact of conflict-related events on abnormal returns. Schneider & Troeger use a threefold case study on the Israel-Palestine conflict, the U.S. - Iraq war, and Ex-Yugoslavia illustrating the corresponding negative abnormal returns following conflict escalating events. Abadie & Gardeazabal show how the increased credibility of the ceasefire in the Basque conflict resulted in abnormal positive returns. The papers demonstrate the intuitive reaction of the financial markets where increased conflict intensity, increase risk, and leads to negative abnormal returns, and vice versa.

Our paper relates to these two papers as they investigate how conflict affects listed companies. Adding to Schneider & Troeger and Abadie & Gardeazabal's papers, which emphasize Western countries, our research focuses on a Latin American country presenting a different context for the conflict. Unlike the high-profiled and geopolitically driven conflicts of Israel-Palestine, the U.S.-Iraq war, and Ex-Yugoslavia, the Colombian conflict is primarily internal, rooted in social and economic disparities. However, like the Basque conflict, there are elements of cultural and nationalistic movements in Colombia, along with a lower intensity¹ of the conflict. Nevertheless, Colombia's struggle is more complex, with issues including drug trafficking and a rural-urban divide. These aspects present socio-economic challenges beyond the usual issues of national independence or territorial control. Our study, therefore, adds to understanding conflict's impact on companies by studying a conflict differing in context and characteristics.

Schneider & Troeger and Abadie & Gardeazabal both observe positive reactions following a de-escalation of the conflict. Contrary to these results, the paper by Guidolin & La Ferrara

¹ *Low intensity conflict is defined as a military conflict, usually between state and non-state groups with an intensity below the conventional war (Parashar, 2020).*

(Guidolin & La Ferrara, 2007) shows how companies profited from conflict as conflict-escalating events resulted in positive abnormal returns. Their paper observes how diamond mining companies in Angola saw advantages during the civil war and where investors saw the end of the war as unfavorable. The perception of the end of the war as negative led to negative abnormal returns for incumbent diamond companies. To explain why companies seemed to profit from conflict, they point at three main variables. Firstly, conflict increases barriers to entry, which reduces competition. Secondly, conflict reduces transparency, facilitating unethical activities. Thirdly, conflict decreases the government's bargaining power, making it easier to negotiate better deals. Further, the paper "Detecting Illegal Arms Trade" (DellaVigna & La Ferrara, 2010) finds similar results when studying embargo trade. The paper shows how arms dealers in countries with high corruption experienced positive abnormal returns when the conflict intensity increased in countries with an arms embargo.

Our study relates to the research by DellaVigna & La Ferrara (2010) and Guidolin & La Ferrara (2007) as we further investigate the potential positive impact of conflict, where companies profit from increased conflict intensity. We likewise narrow our scope to a specific sector operating in an uncertain business environment. We also use an event study approach to detect unethical reactions. The approach helps deepen our understanding of how varying levels of instability can affect business outcomes. Differently, our classification of events, in terms of law enforcement and regulations, expands the previous literature. By distinguishing and quantifying event types, we seek to understand better the circumstances affecting the abnormal returns. The detailed categorization provides valuable insights for investors in assessing risk, policymakers in targeted and effective strategies, and researchers in providing a structured analytical framework to understand conflict dynamics.

3. Background

Colombia's significant gold reserves make it the fourth-largest gold exporter in Latin America (Statista, 2023). The mineral's contribution to the GDP has surged by 150% in the last five years and gold has become one of Colombia's top three export products (OEC, 2023). Unfortunately, the Colombian gold mining industry has been heavily impacted by the enduring conflict between the Colombian government, rebel groups, and criminal gangs.

Since the mid-1960s, the Colombian armed conflict has involved the government, Marxist guerrilla organizations such as the Revolutionary Armed Forces of Colombia (FARC) the National Liberation Army (ELN), and the criminal gangs of *Bandas Criminales* (BACRIM). The conflict, rooted in socio-economic inequalities and political exclusion, is sustained by the lucrative illegal drug trade, fueling violence and instability. Over the years, the complex conflict has resulted in human rights abuses, internal displacement of millions, and profound impacts on Colombia's social and economic development (OECD, 2017).

There have been attempts to negotiate peace agreements to ease the conflict, especially with FARC, which, until its demobilization, was one of the country's largest and most militant guerrilla groups (García-Godos, 2023). The peace process with FARC began as early as the 1980s but has experienced numerous setbacks. A new effort to make peace was initiated after the death of the FARC leader Alfonso Cano in 2011, where the new leader started negotiations with the Colombian government in 2012. The negotiations resulted in the signing of a historic peace agreement between the Colombian government and FARC in 2016. However, the 2016 agreement did not fully end the conflict with FARC. Hundreds of FARC soldiers refused to lay down their weapons and formed FARC dissidents' groups (Government.no, 2022). Further, the agreement included only one party in the conflict, resulting in the other actors continuing their activities as usual.

In late 2022 and early 2023, a renewed attempt was made to ease the conflict. In November 2022, the ELN reached an agreement with the government, followed by the signing of an agreement in January 2023 between the government and several other actors involved in the conflict, including FARC dissident factions and criminal gangs (WOLA, 2023). Despite including several key actors in the conflict, neither of these agreements managed to end the conflict fully. Continues efforts are made to resolve the conflict, but the process remains challenging, marked by continued violence and political complexities (HRW, 2023).

Following the prolonged conflict, the gold mining industry has become increasingly complex. The government's inability to formalize mining operations and an increased involvement from illegal groups has resulted in a large portion of the mining industry remaining informal. As of 2016, 80% of the gold on the market in Colombia was extracted by illegal armed groups and informal miners (Alsema, Colombia Reports, 2016), where illegal mining alone is estimated to generate up to USD 3 billion annually (OECD, 2017). The influence of groups like FARC, ELN, and BACRIM is evident through their presence in nearly 40% of the municipalities with illegal mining activities (OECD, 2017). They often exert control over or target mining areas, creating a fragmented market with a mix of formal, large-scale operations and numerous informal or illegal small-scale miners.

Traditionally, the illegal groups had confrontational approaches with artisanal and small-scale miners, but their tactics have shifted (OECD, 2017). Instead of confrontations or extortions, they have adopted 'mafia peace' strategies. One notable tactic is their recruitment of artisanal miners and even the establishment of local mining associations to give a sense of legitimacy. However, a more covert strategy has come to light, where large mining companies, in exchange for relative peace, are alleged to turn a blind eye to illegal mining activities within their concessions. Moreover, there is evidence suggesting that some established companies may be involved in laundering gold from these illegal operations (Massé & Le Billon, 2017).

The formal mining landscape in Colombia is influenced by major companies like Continental Gold, Newmont Mining, and Zijin Mining. Operating under state concessions, they adhere to the Colombian Mining Code (Law No. 685 of 2001) and the 1991 Political Constitution of Colombia, which forms the core legal framework for mining in Colombia. These laws emphasize transparency in operations and finance, along with environmental considerations. The regulatory requirements include reporting on environmental impacts and mitigation measures and disclosing financial operations and community engagement activities. These requirements starkly contrast with the unregulated, small-scale mining operations, which do not adhere to the same regulatory structure (Dentons, 2023). Generally, the organization of formal mining in Colombia has been based on companies purchasing developed mines and operating them independently. However, joint ventures have also increased where companies cooperated in operations (Mayer Brown, 2020) (Agnico Eagle, 2020). Joint ventures are favorable as they reduce risk by spreading financial burdens and pooling diverse expertise. Joint ventures are especially beneficial in mining, as projects are long-term and capital-intensive.

Another aspect of the gold mining industry which increases the complexity is the supply chain. The supply chain of gold is like those of other raw materials which includes stages of remelting and resale. The structure makes it challenging to trace the origin of the gold, advantageous for criminal actors involved in gold laundering (OECD, 2017). A typical gold laundering process can begin with the extraction of gold by artisanal miners, potentially within larger companies' concessions. The gold is then sold to aggregators, where it may be mixed with legally sourced gold. The refining stage further obscures the gold's origin, a point where larger companies might be involved through refineries lacking stringent source checks. Finally, illegal gold enters the global market in the export and trading phase, with possible involvement or oversight negligence by major mining companies (OECD, 2017).

Further, the international supply chain also has extensive possibilities to smuggle illegal gold. The process often involves illegal miners who sell their extracted gold to aggregators or foremen. These foremen, in turn, deal with financial centers which use a combination of forged documents and shell companies to facilitate the transportation of gold, typically to international destinations such as Brazil and Bolivia. The method effectively masks gold's illicit origins. Smuggling often occurs via air transport, though many instances of smuggling by foot have also been recorded, particularly along the Colombia-Venezuela border. The process not only avoids taxes and regulations but also complicates the tracking of legal versus illegal gold, thereby significantly impacting Colombia's economy and the legitimate global gold market (Pardo-Herrera, 2022).

The Colombian government has acted regarding illegal mining due to the severe consequences, both in terms of lost revenue and the empowerment of armed groups. The government's strategy has included policy measures, legal reforms, and on-ground operations. Inter-agency cooperation has been emphasized, with various initiatives like the establishment of the Unit Against Criminal Mining (UNIMIC) in 2014 and specialized police and army. There has also been a focus on international cooperation in South America to combat organized crime, as organized crime and illegal mining are problems across much of South America. The establishment of the Latin American Committee on Internal Security (CLASI) exemplifies the effort. It represents a collaborative initiative involving several of South America's major countries aiming at tackling international crime (EU, 2022). As a result, the Colombian state has made notable progress in its work against illegal mining with arrests, confiscated gold, and seizure of machinery. However, the struggle continues with illegal miners still affect a significant part of the mining sector (Rochlin, 2021).

The resource curse is often cited to explain why some countries rich in natural resources struggle with conflict and unrest. It is a phenomenon where a country fails to capitalize on its natural resources, falling instead into a spiral of conflict and turmoil which prevents potential gains for economic and social development (Auty, 1993). In such cases, several examples of large international companies have exploited the situation, often involving illicit activities and a state with low bargaining power. The conflict in Colombia differs from many of these cases as access to natural resources has not primarily been one of the drivers of the conflict. However, like states victim of the resource curse, Colombia has been affected by decades of conflict and unrest. The country is characterized by high corruption and weak institutions, and some even define it as a failed state (Alsema, Colombia Reports, 2021). Further, the conflict considerably impacts a sector utilizing a natural resource. With Colombia being a country where the resource curse is less relevant, it raises the question of whether there are observable similarities with companies operating in other conflict-ridden areas.

3.1 Predictions

The conflict in Colombia has resulted in a gold mining industry characterized by a fragmented market influenced by rebel groups and criminal gangs. A complex value chain combined with gold being a commodity difficult to trace adds to the government's challenge to govern the mining industry effectively. We argue that the lack of public oversight paves the way for cooperation between legal companies and illegal miners. Legal companies are motivated by access to cheap, illegally mined gold and access to smuggling routes operated by rebel groups and criminal gangs. Therefore, we argue that events increasing conflict intensity can be seen as events increasing the opportunity to engage in illegal activities boosting profits. Our **first** prediction is thus:

Events increasing (decreasing) the intensity of conflict lead to positive (negative) abnormal returns.

The long-standing drug trafficking from South America to the USA has led to fragile borders between many South American countries (OECD, 2017). Rebel groups and criminal gangs, once involved in drug smuggling, are now using these routes for gold smuggling. Additionally, the value chain of gold requires even legal gold to cross several borders before finally reaching the international market. Given the numerous ways gold can be transported across borders, it is likely not just companies with operations in Colombia which can benefit from the conflict, but also companies with gold mining operations elsewhere in South America. However, smuggling across borders does not occur without friction. There will be a cost to smuggle goods across borders and a risk that the goods may not reach their destination. Therefore, we argue that while companies in other South American countries can benefit from the conflict in Colombia, the benefit will be lower than for companies with operations in Colombia. Our **second** prediction is thus:

Reactions following conflict-related events differ between companies based on their country of operations.

In discussing why companies in some cases can profit from conflict, Guidioliin & LaFerrara (2007) highlight aspects of the business environment as explanatory factors. Similarly, we find it interesting to study aspects of the business environment to explain why companies may profit from conflict. However, as Guidioliin & LaFerrara (2007) focus on the business environment for incumbent firm, we focus on the business environment for illegal miners and

the potential cooperation between legal companies and illegal miners. The aspects of focus are how conflict changes the government's ability to enforce the law and the government's ability to effectively regulate the gold mining industry.

A prolonged and resource-intensive conflict, such as in Colombia, prevents the establishment of reliable public institutions, weakening the police and the military. Weak public institutions, in turn, will undermine the authorities' ability to enforce the law (The World Bank, 2011). The authorities' inability to enforce the law is, for instance, evident through attacks on civilians by criminal gangs and terrorist attacks. The weakened ability to enforce the law facilitates illegal miners, as they can operate without interruptions from the government. The opportunity for illegal miners to work uninterrupted will result in increased benefits for legal companies cooperating with illegal miners. We therefore argue that events demonstrating the authorities' ability to enforce the law are perceived negatively by investors. Our **third** prediction is thus:

Events positively (negatively) reflecting the Colombian government's ability to enforce law lead to negative (positive) abnormal returns.

Weak public institutions have reduced not only the ability to enforce the law but also the authorities' ability to regulate and implement laws effectively. The lacking ability has been evident through widespread corruption and failed attempts to enact laws (Ramos & Cordoba, 2023). The lack of ability to regulate and enact laws makes it easier for legal mining companies to collaborate with rebel groups and criminal gangs, as it reduces transparency. An example is the lack of legislation for thorough reporting on the gold's origin, which facilitates gold laundering (Rochlin, 2021). We argue that events demonstrating the authorities' ability to regulate effectively are negative for legal companies, as they limit the opportunities to engage in profit-boosting illicit activities. Our **fourth** prediction is thus:

Events positively (negatively) reflecting the Colombian government's ability to regulate lead to negative (positive) abnormal returns.

4. Data

This section will present how companies and events were selected and on what criteria. Both companies and events are selected based on the timespan of this study from January 2010 to the end of August 2023.

4.1 Company selection

The company selection is based on two overall criteria: The companies had 1) at least one gold mining operation in South America, and 2) they must have been listed on an exchange and traded for a minimum of one year during their operational timeline in South America.

The company selection adopts a top-down approach, starting with an initial pool of companies identified using the Global Industry Classification Standard (GICS) for gold producers. To ensure no relevant companies are overlooked, we cross-reference the list with the North American Industry Classification System (NAICS), resulting in a preliminary pool of 607 companies. To optimize the process, we first filter out all non-listed companies as they are irrelevant to the study. The filtering is done by gathering stock data with Compustat and Bloomberg. Each company has to be manually verified to identify companies operating in South America, as no complete official registers were available. The verification is done by searching available registers, locating mine sites with operating companies, and searching all company websites to identify if they had gold mining operations in South America during our timeframe.

After identifying all relevant companies, we filter out stocks defined as penny stocks for more than 80% of the time of the study. The omitting of penny stocks is due to penny stocks' high volatility and low liquidity, which may cause non-relevant extreme observations (The Economic Times, 2023). Five companies were identified as penny stocks, resulting in a final list compiled by 25 companies, each meeting both criteria of mining operations and publicly listing, in addition to not being defined as a penny stock.

Figure 1 illustrates the performance of the sampled companies over the relevant period, showing the average cumulative return for the 25 companies, the S&P 500, and the cumulative return of the FTSE Gold Mines Index. The sampled companies have performed weakly compared to the S&P 500 over the last decade, with a total average cumulative return of -17

% compared to the S&P 500's 298%. However, the sampled companies exhibit the same trends as the FTSE Gold Mines Index, a global index for gold mining companies (FTSE Russell, 2023). The gold mining sector is closely correlated to the price of gold, a commodity considered a counter-cyclical safe-haven asset favored by investors in uncertain times with rising inflation (Sebastian, 2023). The counter-cyclical nature is reflected in the performance of gold mining companies exhibiting some of the same counter-cyclical nature to the S&P 500, visible following the strengthening of the economy after the financial crisis in 2009 and the economic downturn after the COVID-19 outbreak.

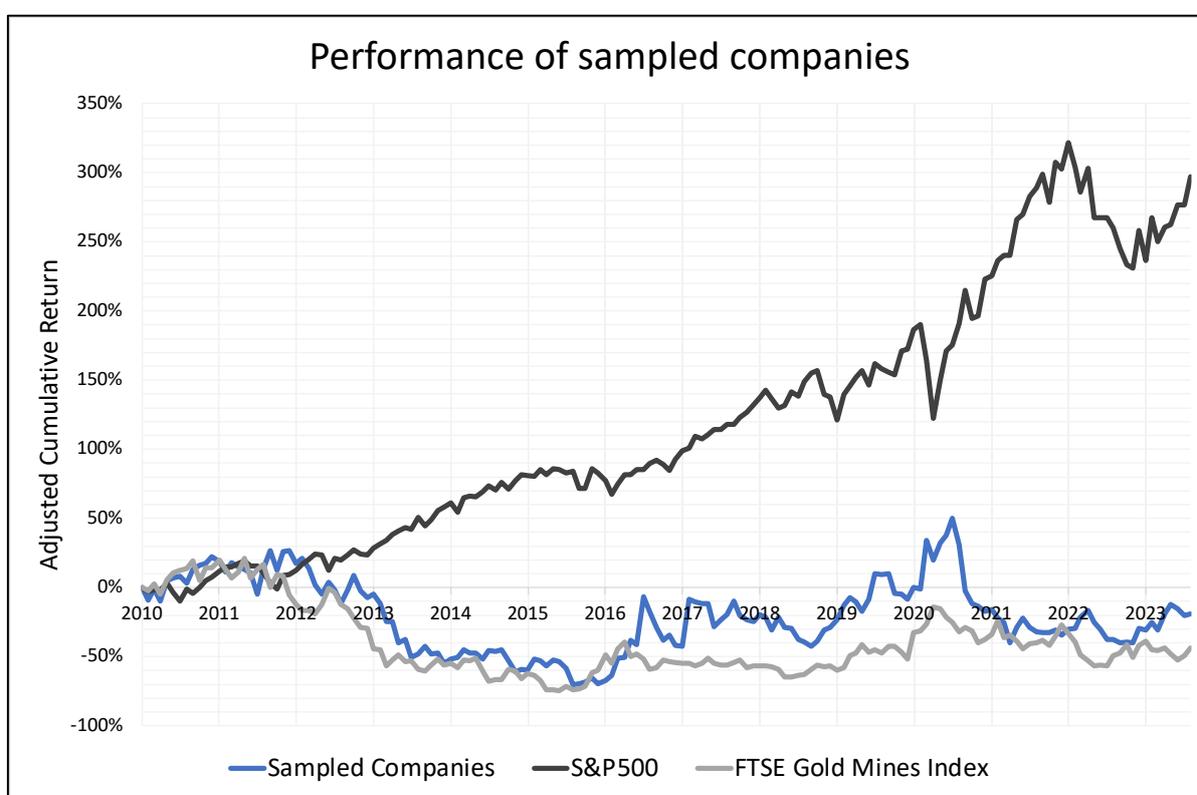


Figure 1 - Weighted average cumulative return for the 25 companies in the sample, the S&P500 and the FTSE Gold Mines Index

Notes: Cumulative return is adjusted to the start of the study. Average cumulative return of companies is weighted based on market cap.

4.2 Event selection

An overall qualitative approach is used to identify relevant events most likely of interest to investors. The events are selected on their relevance for the conflict in Colombia and the following three criteria: 1) The event had to be related to the intensity of the conflict, 2) the event had to be significant enough to attract investors' attention, and 3) the event had to be unexpected.

Conflict-related events are identified by reading literature on Colombian history and mining, using Nexis Uni to access relevant news articles, and ACLED to access data on the conflict. The qualitative identifications of events through Nexis Uni and ACLED are made by filtering on the relevant period and searching relevant keywords, such as “attacks,” “demonstrations,” and “killed”. Then, each event’s relevance and classification are qualitatively assessed. Including both escalating and de-escalating events enables a two-way analysis of investors’ reactions, increasing the study's power. In total, 110 events were identified following the first criteria of relevance.

To assess if an event was important enough to attract investors' attention, we use Nexis Uni to estimate the media coverage. The media coverage is estimated by mapping the number of articles on the event and the following day. The media coverage for each event needs to be significant enough to attract investors' attention to ensure investors could react according to the event. After filtering on the importance of events, the event pool was reduced to 71 events.

To determine if an event was unexpected by investors, we use a qualitative assessment where each event is assessed to determine if it was part of a chain of consecutive events. Consecutive events perceived as less surprising could impede reactions from investors. Therefore, only the day considered most influential is included. An example is consecutive protests, where we only include the outbreak of the protests and not the following days. The third criterion eliminated five events, resulting in a final event pool of 66 events fulfilling all three criteria. A timeline of the most significant events can be found in Figure 2.

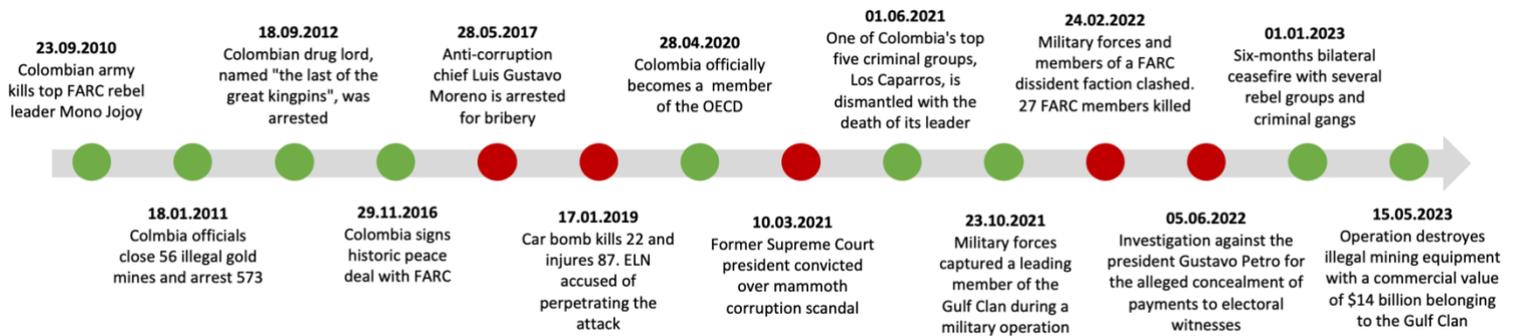


Figure 2 - Timeline with some of the most important events.

Notes: Full event list can be found in Appendix A2.

4.2.1 Event classification

We use a qualitative approach to classify all events based on how they affected each of the three factors: conflict intensity, the government's ability to enforce the law, and the government's ability to regulate. For conflict intensity, each event is classified based on whether they increased, decreased, or were neutral in terms of conflict intensity. Similarly, for the classification of the government's ability to enforce the law and regulate, each event is classified based on whether they were positive, negative, or neutral, illustrating the government's ability.

To classify events' impact on conflict intensity, we base our approach on the premise that violent events are perceived to increase conflict intensity, whereas peaceful events decrease conflict intensity. Events increasing conflict intensity typically include violent confrontations between authorities and rebel groups, conflicts among different rebel groups, and attacks by rebel groups on civilians. Events decreasing conflict intensity typically involve ceasefires and agreements between the various actors involved in the conflict. There are some exceptions to the premise of violence and its escalating effect. These are typically events of a violent nature, but which overall contribute to de-escalating the conflict. An example is the assassination of the top FARC leader, Mono Jojoy, which ultimately stagnated the mobilization of FARC (BBC, 2010), and is thereby classified as a de-escalating event.

To classify events reflecting the government's ability to enforce the law, we base our approach on assessing whether the event positively or negatively illustrates the authorities' capacity to act through physical operations, including crackdowns on the activities of rebel groups and

criminal gangs. Arrests of criminal leaders, shutdowns of mines, and seizure of mining equipment are typical events positively illustrating the authorities' ability to enforce the law. Conversely, violent clashes between rebel groups, riots, and terrorist attacks are typical events negatively illustrating the authorities' ability to enforce the law. A typical example of such an event is the riot which broke out on May 28, 2021, with 13 fatalities and 34 wounded, including demonstrators, police, Mobile Anti-Riot Squad (ESMAD) officers, and unidentified armed men (France24, 2021). The event clearly illustrates the government's inability to suppress uprisings and criminal groups and protect the lives of civilians.

To classify events reflecting the government's ability to regulate, we base our approach on assessing whether events positively or negatively illustrate the authorities' ability to effectively regulate, with a focus on the mining industry. Events typically classified as positive concern new regulations and agreements preventing illegal activities or improving the business environment. An example is the establishment of the Unit Against Criminal Mining (UNIMIC) in 2014, a special combat unit created to combat illegal mining (Bencosme, 2014). Events typically classified as negative are corruption scandals, such as the arrest of Luis Gustavo Moreno Rivera, a top official in charge of fighting corruption who was accused of bribery in 2017 (Finance Colombia, 2017). Our event distribution can be found in Figure 3.

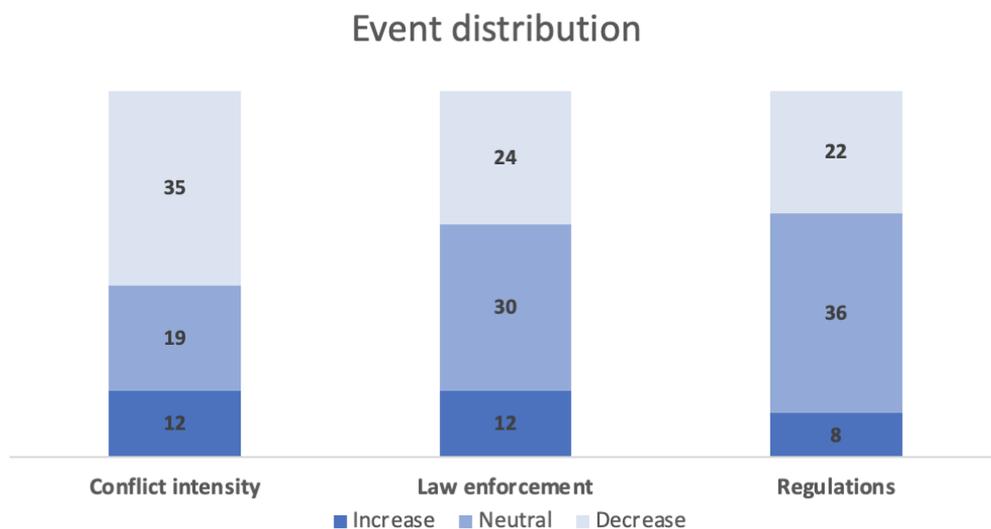


Figure 3 - Distribution of the 66 events

5. Methodology

Our thesis uses an event study methodology to analyze the impact of conflict-related events in Colombia on companies operating gold mines in South America. The event study methodology builds on the framework by MacKinley (MacKinlay, 1997), using the Fama-French three-factor model to estimate abnormal returns following conflict-related events. We use the abnormal returns to assess events' impact on companies under the assumption that investors are rational and well-informed.

The study of each event is structured based on an estimation window used to predict returns the event window, which is the period around the event. The estimation window spans 120 trading days, starting 140 days before the event. We integrate a 10-day buffer between the estimation window and the event window to avoid the influence of the event on the estimation window through information leakage, rumors, and market microstructure noise (Hinz et al., 2015), (Shaikh, 2018). The methodology uses a 21-day event window, with ten trading days before and after the event, to avoid potential influence from confounding events. Figure 4 illustrates the timeline of our event study, where the event occurs at t_0 .

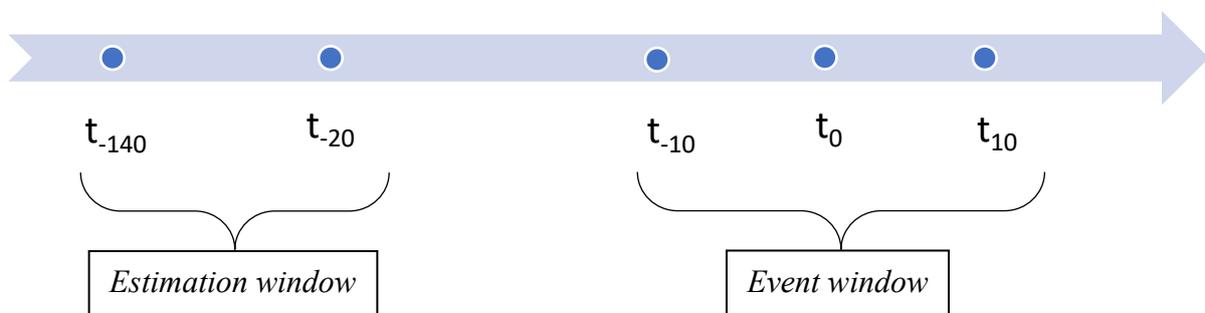


Figure 4 - Event study timeline

The first step in the event study is to regress the excess returns of a company on the Fama-French three-factor model. The regression is used to get estimates of each explanatory variable. The estimates and available Fama-French are used to predict the expected returns for each day in the 21-day event window. The excess return in the Fama-French model is given by Equation 1:

Equation 1

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1(R_{Mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \epsilon_{it}$$

Where:

R_{it} is the cumulative return for stock i at time t .

R_{ft} is the risk-free rate of return at time t .

$R_{it} - R_{ft}$ is the excess return.

α_{it} is the intercept.

$\beta_{1,2,3}$ is the factor coefficients.

R_{Mt} is the total market return at time t .

$R_{Mt} - R_{ft}$ is the excess return of the market portfolio.

SMB_t is the size premium given by Fama-French for time t .

HML_t is the value premium given by Fama-French for time t .

ϵ_{it} is the error term corresponding to company i at time t .

The Fama-French three-factor model is used for prediction as it more robust than other market forecasting models due to its multifactor approach, with size premium and value premium (Ahern, 2008). To improve estimates and predictions further, we differentiate the geographical presence of each company. The geographical differentiation is done by assigning each company to a geographical region based on the country of headquarters and then use region-specific Fama-French values for each region. The differentiation resulted in three regions with region-specific values, namely Asia Pacific ex. Japan, North America and Developed countries ex. U.S.

The second step is to calculate abnormal returns (AR) for each company. To calculate the AR, expected returns are subtracted from the actual return, as shown in Equation 2. The abnormal return will quantify the impact of an event on a company.

Equation 2

$$AR_{it} = R_{it} - (R_{it}|X_t) + \epsilon_{it}$$

$$AR_{it} = \epsilon_{it}$$

Where:

AR_{it} is the abnormal return for the company i at time t .

R_{it} is the actual return for company i at time t .

$(R_{it}|X_t)$ is the expected return for the company i in time t , based on the Fama-French estimates.

ϵ_{it} is the error term for company i at time t .

Assuming expected return equals actual return, the error term in Equation 2 represents abnormal return. Abnormal returns result from a stock price deviating from the expected price, which comes from unanticipated profits or losses by investors (CFI, 2023). An unanticipated profit will increase investors' willingness to pay for the stock, increasing stock price and leading to abnormal positive returns. On the contrary, an unanticipated loss will decrease investors' willingness to pay for the stock, decreasing the price and leading to abnormal negative returns.

After calculating abnormal returns for the event window, we calculate cumulative abnormal return (CAR) for the event (MacKinlay, 1997). The CAR is calculated by aggregating the abnormal return for the event day plus the day prior and after the event, resulting in a three-day cumulative abnormal return for each company for each event. Including one day at each side of the event is done to include the possible effect of information leakage prior to the event and to capture the effect of events occurring after stock markets have closed. Equation 3 illustrates the calculation of CAR:

Equation 3

$$CAR_i(t_{-1}, t_1) = \sum_{t=t_{-1}}^{t_1} AR_{it}$$

Where:

$CAR_i(t_{-1}, t_1)$ is the cumulative abnormal return for stock i from time t_{-1} to t_1 .

t_{-1}, t_1 are the day prior and after the event.

AR_{it} is the abnormal return for company i at time t .

We also calculate an average CAR for each event classification to study the predictions. The average CAR for each event classification represent the average reaction from for all events within that classification. For the first and second predictions, an average CAR is calculated for events increasing and decreasing conflict intensity. Similarly, for predictions 3 and 4, we calculate an average CAR for events positively or negatively illustrating the ability to enforce the law and the ability to regulate. Moreover, as our event study observes each company's CAR for each event, we calculate a Cumulative Average Abnormal Return (CAAR) for each event. The CAAR of each event is used to assess the average effect an event has on the companies' returns and is used for a more detailed analysis of how each event affects the companies. The calculation of the CAAR is given in Equation 4:

Equation 4

$$CAAR_i = \frac{1}{N} \sum_{i=1}^N CAR_i(t_{-1}, t_1)$$

Where:

$CAAR_i$ is the cumulative average abnormal return for event i .

N is the number of companies observed on event i .

$CAR_i(t_{-1}, t_1)$ is the cumulative abnormal return for stock i from time t_{-1} to t_1 .

t_{-1}, t_1 is the day prior and after the event.

We also want to test whether there is a statistical significance between days with and without events to draw inferences from our results. We estimate the CAR for each day in the investigated period to test the significance. Equation 5 shows the regression estimating the CAR for company i at time t .

Equation 5

$$CAR_{i,t} = \alpha + \beta_1 * D_1 + \epsilon_{i,t}$$

Where:

$CAR_{i,t}$ is the cumulative abnormal return for company i at time t .

α is the average effect on a company's CAR in absence of an event.

β_1 is the average effect on a company's CAR from an event.

D_1 is a factor variable taking the value 0 in absence of an event, otherwise -1 or 1 dependent on the characteristics of the event.

$\epsilon_{i,t}$ is the error term for company i at time t .

The regression let us check if it is a significant difference between days with and without events. The factor variable D_1 let us check the significance of both increasing and decreasing events for each event type. For events on conflict intensity, D_1 takes the value 1 if an event increases conflict intensity, 0 in the absence of an event, and -1 if an event decreases conflict intensity. A rejection of the null hypothesis indicates that the event type significantly affects the average CAR of companies operating in South America. We run the regression on conflict intensity, law enforcement, and regulations, which results in three regressions on our main findings.

We cluster the standard errors by company to account for any random correlation in returns over time for each company. We also conduct a 90% winsorization to avoid the effect of spurious outliers. The null hypothesis is rejected at a 5% significance level using a 95% confidence interval.

6. Results and discussion

In this section, we will present and discuss the empirical findings from our event study. Section 6.1 provides an overview of our findings, showcasing descriptive statistics of all company-event pairs and the significance of each event. Section 6.2 focuses on the first and second predictions on how changes in conflict intensity have impacted the companies in our sample. Sections 6.3 and 6.4 will delve into predictions three and four on how different events have impacted different aspects of the business environment, namely the government's ability to enforce the law and the government's ability to regulate. Finally, this section will present a series of robustness tests to validate our results.

6.1 Results from the event study

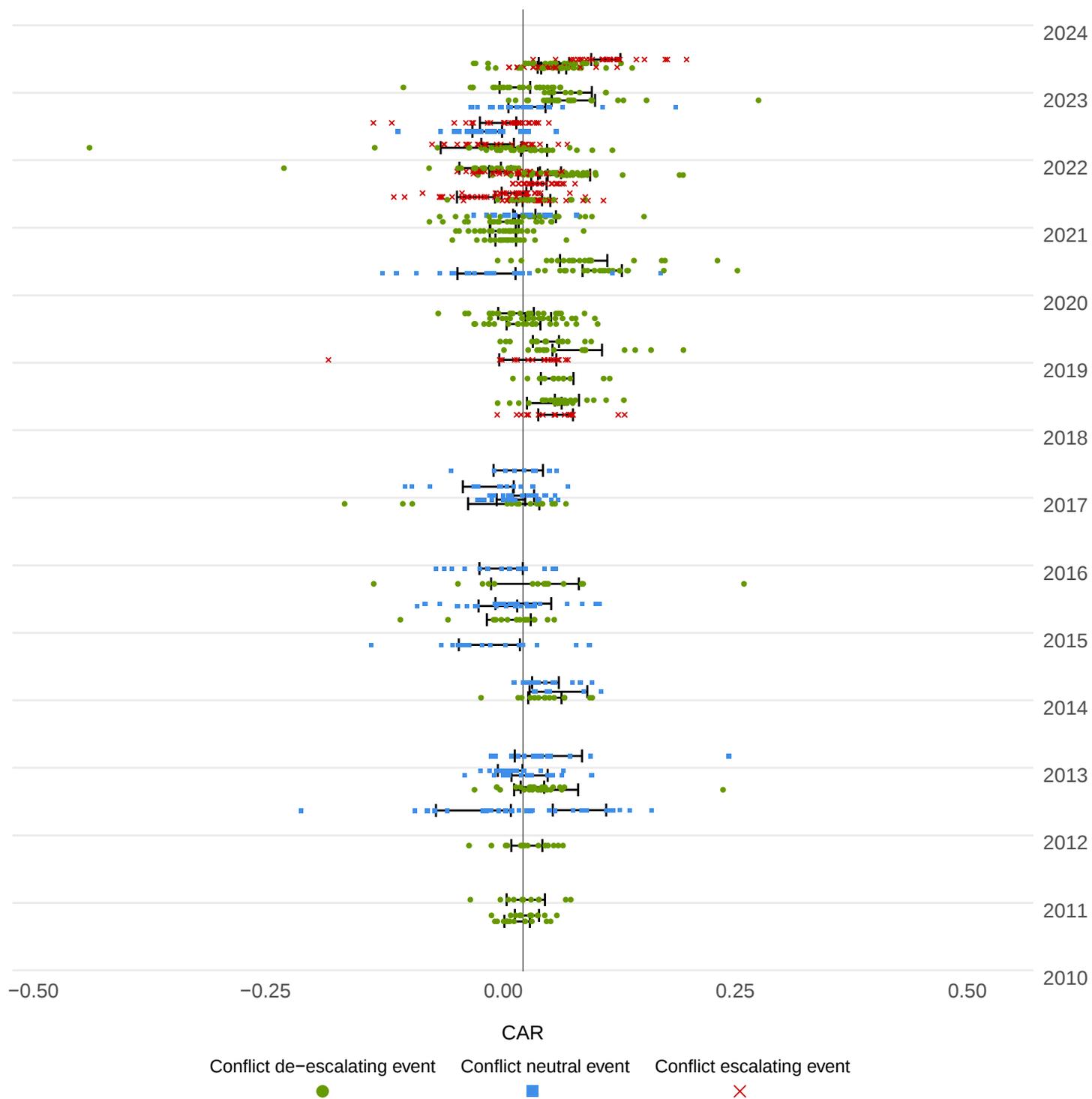


Figure 5 - Cumulative abnormal returns for all company-event pairs

Notes: The figure plots the three-day cumulative abnormal return (CAR) for each company-event pair. The plot shows the stock reaction for each company for each event. The black error bars showcase the 95% confidence interval for each event's cumulative average abnormal return (CAAR).

Figure 5 exhibit all the company-event pairs from 2010 to 2023, plotting the cumulative abnormal return (CAR) for each company in response to each event. The plot visualizes how companies' CAR are affected by events categorized as conflict de-escalating, neutral, and conflict escalating. The results are derived from 25 firms, 66 events, and 1198 company-event pairs. Out of the 66 events, 35 are defined as conflict de-escalating, 19 as conflict neutral, and 12 as conflict escalating. The figure also exhibits the average response to each event through the cumulative average abnormal return (CAAR), included by a 95% confidence interval for the averages.

The CAAR is calculated to assess the average reaction and the significance of the reaction following each event. To determine whether these reactions align with our initial predictions, we categorize the CAAR as symmetric or asymmetric. The CAAR is defined as symmetric if it is in line with the first prediction. Conversely, the CAAR for an event is defined as asymmetric if it deviates from the first prediction. For instance, a negative CAAR following a conflict de-escalating event is considered symmetric, while a positive CAAR following a conflict de-escalating event is considered asymmetric. Figure 6 exhibits the distribution of CAAR for events either increasing or decreasing conflict intensity.



Figure 6 - Distribution of average event returns following conflict-related events

Out of the 47 events affecting conflict intensity, 17 exhibit symmetric returns, while 30 exhibit asymmetric returns. Out of the 35 conflict de-escalating events, 25 events have asymmetric returns, implying companies, on average, tend to experience positive abnormal returns when the conflict intensity decreases. In total, 30 out of 47 events exhibit asymmetric returns,

implying an average response to conflict-related events contrary to the anticipated outcome outlined in the first prediction.

Before analyzing the average reaction to each event type, it is helpful to study trends in the event-company pairs. Possible trends help to understand better investors' reactions and the broader patterns in the conflict. From 2010 to early 2021 we observe two conflict-escalating events. Moreover, we observe a further reduction in events from 2016 to early 2018. The trend of few conflict-related events from 2010 to 2021, with a further decline in 2016, coincides with the extensive peace process between the Colombian government and FARC. We cannot conclude with a specific trend in investor responses to conflict-related events in this period. However, there are some events exhibiting specific reactions from investors. Up until 2016, there were primarily conflict de-escalating and neutral events. For the de-escalating events, few resulted in significant CAAR. Few significant CAARs indicate that investors viewed the de-escalating events during this period as lacking credibility due to the history of numerous failed agreements. The lack of credibility might have reduced investors' belief in the effectiveness of de-escalating efforts. Conversely, we observe several significant reactions to conflict de-escalating events following the 2016 agreement. Several significant reactions suggest that the agreement between the Colombian authorities and FARC in 2016 has lent credibility to peace-making efforts, leading to significant reactions from investors.

From early 2021 to the end of 2022, we observe an increase in conflict-escalating events. The conflict-escalating events are primarily incidents where military forces clash with rebel groups or rebel groups clash with each other. The underlying cause of the increase in conflict-escalating events was a combination of increased activity from FARC dissident groups and increased disputes over control of areas in rural Colombia (AP, 2023). We observe few significant reactions following conflict escalating events with clashes between the government and rebel groups. Few significant reactions from investors to clashes can be seen in relation to the restructuring of FARC after 2016. Unlike the unified FARC before 2016, the dissident groups are smaller and less organized. Consequently, events involving dissident groups tend to have less impact on the conflict, leading to reduced reactions from investors.

Despite few significant events on clashes, we observe in the same period significant negative reactions to conflict-escalating events directly related to the mining, such as clashes with illegal miners. The significant negative reactions imply investors are more sensitive to mining-related events than peripheral ones, which is reasonable as those events likely have more effect

on the sampled mining companies. Moreover, the results also suggest investors responded, on average, negatively to increased conflict intensity during this period, contrary to our first prediction.

Towards the end of the observed period, the agreements reached between Colombian authorities and key actors led to significant positive CAAR. A reason for observing more extreme CAAR for events on peace agreements could be the belief that more comprehensive agreements will change the conflict permanently. Further, the positive reactions to conflict de-escalating events are like other de-escalating events, being positive and contrary to our initial prediction.

From the analysis of company-event pairs and the CAAR for each event, we observe trends for various events. We also observe that the reactions from investors tend to deviate from our initial prediction. However, we cannot draw inferences based on all events, as they vary significantly in characteristics. In the following sections, we will more systematically assess how different types of events affect the companies in the sample, focusing on conflict intensity and the authorities' ability to enforce the law and regulate.

6.2 Results from conflict intensity

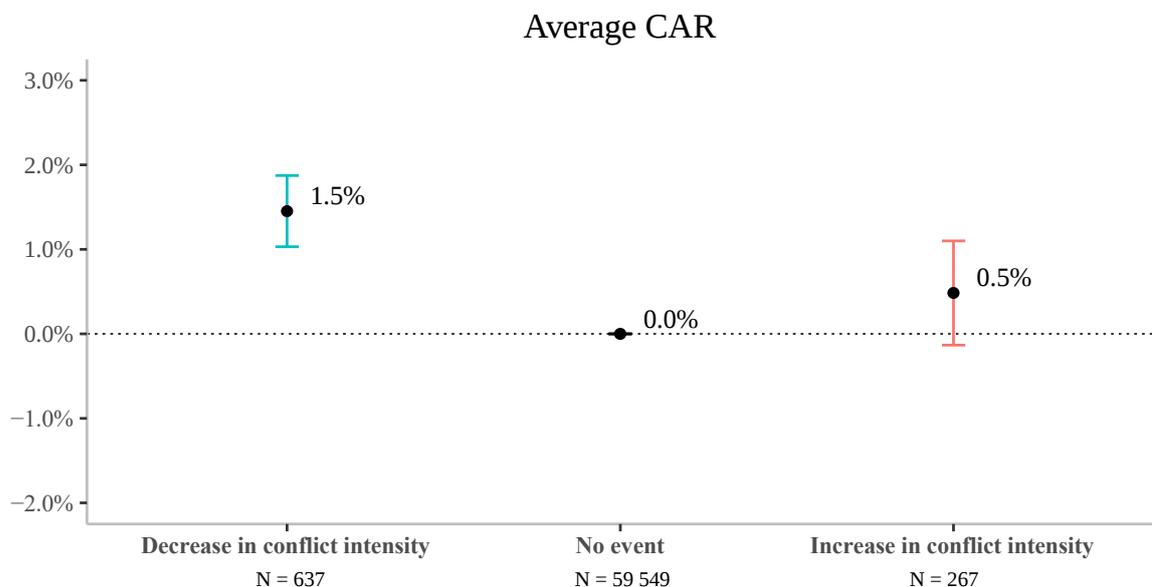


Figure 7 - Average cumulative abnormal returns for events increasing/decreasing conflict intensity.

Notes: The confidence interval is set to 95% and visualized by the error bars. N gives us total observation count for each event type. One observation is given by a trading day between 2010 and 2023.

We observe a significant average CAR of 1.5% for events decreasing conflict intensity when calculating the average CAR for all events on conflict intensity. The result indicates that gold-mining companies in South America on average benefit from a de-escalation of the conflict in Colombia. We observe a positive average CAR of 0.5% for events increasing conflict intensity. However, the CAR is insignificant. The insignificant result indicates that the sampled companies, on average, do not have significant reactions following an escalation of the conflict. The results are supported by the regression on the main findings, which can be found in Appendix A4. The regression shows a significantly positive average CAR of 1.8% for conflict-decreasing events and an insignificant average CAR for conflict-escalating events of 0.4%. We will now discuss possible explanations for the observed results and summarize by looking at how the results align with our first prediction.

6.2.1 Conflict escalating events

We observed no significant average reaction in response to conflict-escalating events. The result is contrary to our first prediction, where we expected a positive average CAR. The result can be seen in relation to the characteristics of the conflict in Colombia. Unlike the conflicts studied by DellaVigna & La Ferrara (2010) and Guidolin & La Ferrara (2007), the conflict in Colombia differs in its longevity and low intensity.

As pointed out in the background, the conflict in Colombia already started in 1948 with a period of civil war known as "La Violencia" or "The violence." The prolonged conflict between the state and armed groups in Colombia may have generated a sense of conflict fatigue among investors. Conflict fatigue refers to a scenario where a long-standing and continuous conflict in a region results in investors considering conflict-related events as normal when pricing assets (Jones & Scheer, Reuters, 2023). Conflict fatigue could be prevalent for some of the continuous events involving FARC, ELN, and other armed groups active since the mid-1960s. For instance, we observe insignificant results for 13 of our events relating to mass killings, large arrests, and protests (see Appendix A2). It is reasonable to assume such events would have generated significant reactions in countries without a prolonged conflict and with stronger institutions (Jones & Scheer, REUTERS, 2023). Therefore, the lack of significant reactions following these events may indicate a conflict fatigue amongst investors.

Another possible explanation for the lack of reactions to escalating events is the conflict's low intensity. In high-intensity conflicts, such as the Angolan civil war studied by Guidolin & La Ferrara, many events can overwhelm and distort communication channels, making it easier to conceal illegal activities. On the contrary, the reduced frequency of incidents in a low-intensity conflict allows for more accurate and timely data which increases transparency. The adoption of a less confrontational strategy by illegal groups in Colombia has resulted in fewer confrontations among actors contributing to a low-intensity conflict. The low-intensity conflict with increased transparency could thus make it increasingly difficult for legal companies to engage in illicit activities.

6.2.2 Conflict de-escalating events

The de-escalating events, on the other hand, show an average positive abnormal return contrary to our first prediction. The positive reaction can be viewed in line with the enhanced feasibility of gold exploration, particularly in terms of geological sampling and analysis. The improved security situation allows for more comprehensive field surveys in areas which were previously considered high-risk (Bergen, 2017). An example is the area around the municipality of Buriticá in Antioquia. Previously limited by the presence of armed groups like the FARC, this region has witnessed a surge in legal gold mining activities after the group's dissolution, highlighted by Continental Gold's project in the region. The project led to the discovery of two major vein systems with an estimated value of 1.26 billion dollars in gold (Bergen, 2017).

Furthermore, the reduced conflict intensity has allowed for reduced security-related operational costs. The threats of extortion and direct attacks from rebel groups and criminal gangs have resulted in many companies depending on an extensive in-house security apparatus (Price, 2018). Like what Abadie and Gardeazabal (2003) observed for companies in the Basque region, the required security measures are reduced when the conflict de-escalates, reducing security-related costs. Reduced costs increase profitability and are perceived as positive by investors.

The significant improvements in infrastructure and logistics in Colombia could also be attributed to the decrease in conflict intensity. As highlighted by the World Bank's Logistics Performance Index (LPI), Colombia has made remarkable progress, climbing from 94th in 2012 to 66th by 2022 (Worldbank, 2023). The increased stability allows for safer and more

efficient construction projects, attracting domestic and international investments critical for large-scale infrastructure improvements. Additionally, a lower intensity of conflict means financial and human resources can be redirected from security and defense to infrastructure and logistics, further boosting development efforts.

An example of the synergistic benefits for mining companies from improved infrastructure is the combination of Colombia's 4G infrastructure program and Zijin's private investments in roads. The 4G program includes a \$13 billion investment in improving roads, ports, and logistics significantly reduces operational costs and delays in transportation for mining companies (Long, 2020). Further, Zijin has made investments in private roads connected to the 4G network, which facilitates access to remote mining sites, catalyzing new exploration- and extraction opportunities (Chiappe, 2020). These improvements in infrastructure create a more efficient and reliable supply chain from mine to market, benefitting the gold mining industry in Colombia.

To summarize, the results on conflict intensity do not support our prediction that companies benefit from an increased conflict intensity through engaging in illegal activities and collaboration with illegal miners. Overall, the positive aspects of a more stable business environment appear to outweigh the potential benefits of engaging in illegal activities.

6.2.3 Difference in reactions based on country of operations

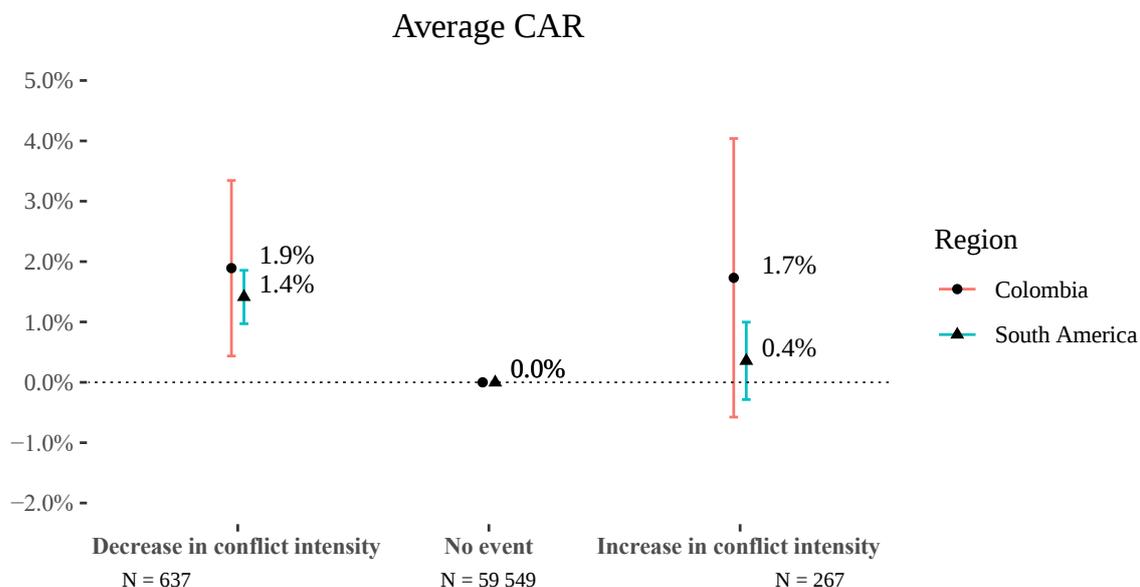


Figure 8 - Average abnormal returns for companies with operations in Colombia versus South America

Notes: The confidence interval is set to 95% and visualized by the error bars. N gives us total observation count for each event type. One observation is given by a trading day between 2010 and 2023.

Figure 8 illustrates the average CAR for events affecting conflict intensity when filtering on country of operations. We observe the same overall results for conflict intensity when differing on country of operations. Regardless of whether they have operations in Colombia, companies can expect, on average, positive returns in case of reduced conflict intensity and no abnormal return following an increase in conflict intensity. Companies with operations in Colombia experience a higher abnormal return for both an increase and decrease in conflict intensity. However, the difference is insignificant, indicating no difference in CAR based on the country of operations.

In prediction two, we argued for a differentiation based on the country of operation due to the cost and risk of smuggling gold across borders. The results might suggest smuggling involves no frictions due to no significant difference in CAR. However, the result should be interpreted in the context of the overall findings on conflict intensity. The results for conflict intensity do not indicate that legal companies are involved in gold smuggling in the first place and the outcome must be interpreted differently. Events reducing conflict intensity in Colombia can benefit companies outside Colombia by lowering the risk in the South American gold market. As described in the background, the gold market in South America is well-integrated across borders. Therefore, reduced uncertainty in Colombia can have a spillover effect, reducing the

risk of companies in other countries in South America. Although the difference is not significant, it is reasonable that companies with operations in Colombia to benefit more from reduced conflict intensity than other companies, as their operations are more directly affected by the conflict.

Furthermore, the international organization of crime and illegal mining across borders can help explain the insignificant difference between companies with operations in or outside Colombia. As previously described, illegal mining is a problem in South American countries in general. Illegal operations in one country can have cross-border consequences as rebel groups and criminal gangs are international organized. Additionally, the international collaboration in combating illegal mining means that efforts to combat it in Colombia can be seen as part of a larger international effort against illegal mining. The effort thus also affects rebel groups and criminal gangs across borders. An example of the international effort is the ongoing cooperation between Colombia and Brazil to crack down on illegal mining in the Amazon (Mining Technology, 2023). Overall, the international cooperation in crime and combat contributes to no significant difference being observed based on the country of operations.

The result for escalating events when filtering on country of operations follows the reasoning for increased conflict intensity. However, there is greater uncertainty in the average reaction for companies in Colombia, as evidenced by the large confidence interval. The large confidence interval could suggest some companies benefit from increased conflict intensity, but we cannot conclude this at a general level. In summary, the results indicate no significant difference between companies based on the country of operations. The indifference in reactions cannot be explained by frictionless smuggling but rather by a closely integrated legal gold market in South America.

6.3 Results from changes in business environment

We will discuss predictions three and four in the following section, as we break down how events affect different aspects of the business environment, focusing on how events illustrating the government's ability to enforce the law and regulate. We seek to further understand investors' reactions following conflict-related events by looking at how different events affect different aspects of the business environment.

6.3.1 Government's ability to enforce the law

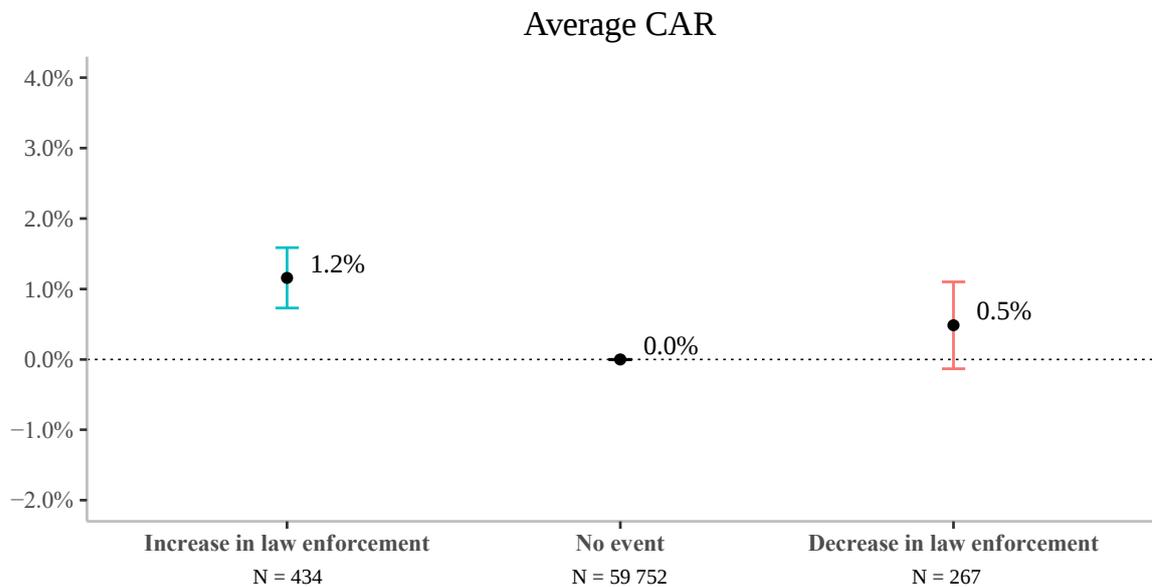


Figure 9 - Average cumulative abnormal return for events increasing/decreasing law enforcement

Notes: The confidence interval is set to 95% and visualized by the error bars. *N* gives us total observation count for each event type. One observation is given by a trading day between 2010 and 2023.

We observe a positive CAR of 1.2% associated with events positively illustrating the government's ability to enforce the law, which contradicts our third prediction. The result indicates that companies, on average, can expect a positive CAR following events illustrating the government's ability to enforce the law. We observe a positive return of 0.5% for events illustrating the government's lack of ability to enforce the law. However, the result is not significant. The regression on the main findings shows a significant positive average CAR of 1.5% for events increasing law enforcement and an insignificant average CAR of 0.4% for events decreasing law enforcement (see Appendix A4).

The positive abnormal return observed for increased law enforcement aligns with the result on conflict intensity, indicating no cooperation between legal and illegal miners. Without

cooperation, legal companies compete with illegal miners over access to mining areas. As a result, enhanced law enforcement against illegal mining reduces the competition for legal mining companies. Thus, law enforcement crackdowns may create a more profitable landscape for legally operating mining firms.

On the other hand, a challenging business environment leads to fewer companies willing to enter the market due to a lack of competence in managing gold mining operations in a high-risk environment (Guidolin & La Ferrara, 2007). Effective law enforcement reduces the risk in the industry and increases the number of companies willing to enter the market. However, based on the results, the benefit from a reduced threat of illegal miners appears to outweighs the potentially negative impact of increased competition from other legal companies. The case of Gran Colombia Gold in Marmato further illustrates these findings. Gran Colombia Gold filed a lawsuit against the Colombian government centred around the state's failure to evict illegal miners, which the company argued violated their investment rights and security (financialpost.com, 2017).

Further, the result for events increasing law enforcement is anticipated based on the reactions following conflict de-escalating events, as there is a natural correlation between the event types. The correlation is evident in events such as seizure of equipment, arrests, and closure of illegal mines, which decrease conflict intensity and illustrate the ability to enforce the law. Therefore, the rationale for the positive average CAR for conflict de-escalating events applies to the positive average CAR for events increasing law enforcement.

For events illustrating the government's lack of ability to enforce the law, the result is an average CAR of 0.5%, but it is insignificant. A possible explanation for the insignificant response is the type of events in the classification. For events positively illustrating the government's ability to enforce the law, there are more events directly targeting illegal mining. For the opposite events, there are more general attacks, not specifically targeted at a particular sector. The lack of a significant reactions to these events can thus be partly explained by these being more peripheral events. Peripheral events appear to be less important for gold mining companies, as discussed in the company-event pair section.

However, there have been certain events involving direct attacks on legal companies which have resulted in a significant negative average CAR. For instance, Zijin Mining had to suspend operations after a bombing attack at one of their sites in 2023, killing two and injuring 14

(Mining Technology, 2023). For Zijin Mining's operations, it halted production in 60% of the underground complex and increased security measures. The disruption in production and additional costs for enhanced security significantly affected the company's operational stability and financial health (Acosta, 2023). The event, indicative of an inability to enforce the law, was perceived as negative by investors, resulting in a negative CAAR for the event.

To summarize, the events positively illustrating the government's ability to enforce the law leads to positive abnormal returns. Events negatively illustrating the government's ability to enforce the law exhibit an insignificant reaction suggesting investors are less concerned about these events. The results are in line with the results for conflict intensity, and do not support our third prediction.

6.3.2 Government's ability to regulate

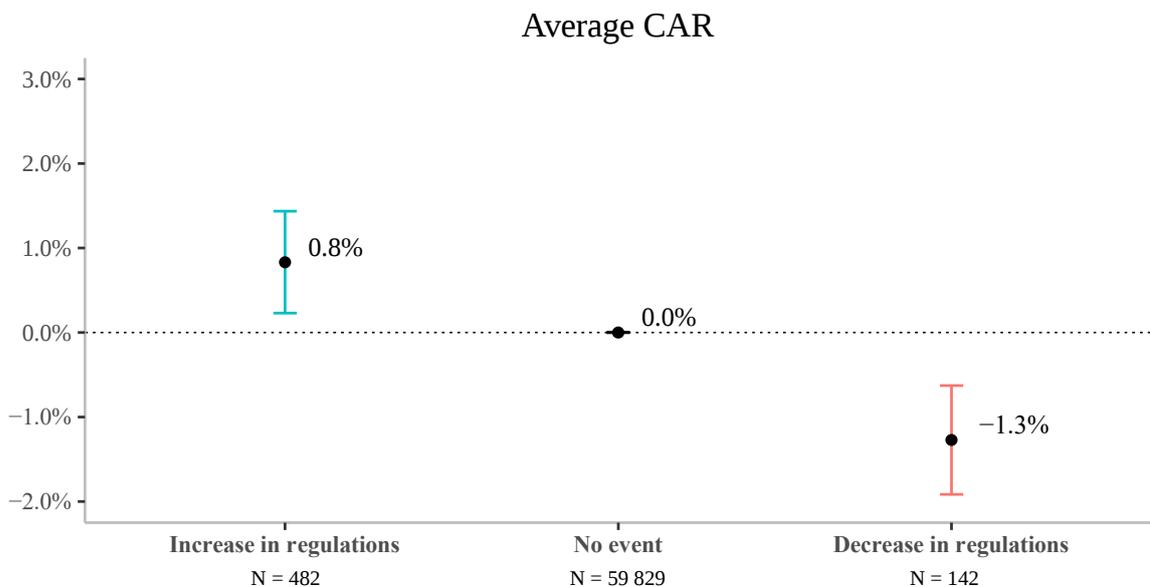


Figure 10 - Average abnormal returns for events decreasing/increasing the government's ability to regulate

Notes: The confidence interval is set to 95%, and N gives us total observation count for each event type. One observation is then given by a trading day between 2011 and 2023.

We observe a significant positive CAR of 0.8% for events positively illustrating the government's ability to regulate. The results indicate that investors, on average, perceive increased regulations as positive. For events illustrating the government's lack of ability to regulate, we observe a significant negative average return of -1.3%. The result indicates that investors, on average, perceive the lack of ability to regulate as negative. The regression on the main findings shows a significant positive average CAR of 0.8% for events increasing

regulations and a significant average CAR of -1.3% for events decreasing regulations (see Appendix A4).

The reason for observing a significant positive average CAR for events increasing the government's ability to regulate is multifaceted. On the one hand, an increase in regulations increases compliance costs and reduces the opportunity to secure beneficial deals on unfair terms. The isolated effect of a reduces opportunity secure beneficial deals is reasonable to assume is negative. On the other hand, increased regulations in the mining industry result in higher demands for reporting and transparency. Larger publicly listed companies, like those in this study, are more responsible for avoiding corruption and bribery. In a country like Colombia, with a high degree of corruption, listed mining companies may lose out in competition against actors who can take greater risks regarding unethical behavior. The advantages of increased regulations thus become evident through fairer competition and a more stable business environment for publicly listed companies. The results may, therefore, reflect that investors perceive increased regulations as strengthening for the market position of the legal companies. An example of a regulation contributing to fairer terms is the Colombian government's strategy of publishing detailed information on all mining licenses and transfer processes. The regulation makes it more challenging to obtain mining licenses outside public processes (EITI, 2023). Overall, the result suggests that the positive aspects of increased regulation outweigh the negatives.

Furthermore, events illustrating the government's ability to regulate include agreements and legislation contributing to economic cooperation and development. For instance, in 2020 became Colombia the 37th member of the OECD, an organization aimed at promoting economic growth in its member countries (OECD, 2023). Establishing such cooperative agreements and similar legislation contributes to a more stable and efficient business environment by adopting international best practices and policy harmonization. Further, agreements and regulations increase investment attractiveness in the mining industry. As described in the background, there is an increasing trend in joint ventures among mining companies. Increased investment attractiveness enhances the possibility of finding a compatible partner. Therefore, increased regulations can also contribute to the rising trend in joint ventures favored by mining companies.

The negative result for events illustrating the government's inability to regulate can be viewed as a reaction to events undermining the benefits of increased regulations. Moreover, events

illustrating a lack of ability to regulate often involve public corruption. Our fourth prediction assume legal companies engage in illegal activities, implying that corruption would be viewed positively. However, the negative reaction suggests that legal companies are not involved in public corruption. Consequently, the legal companies only experience the negative consequences of corruption, which include unfair competition and increased costs (UNODC, 2023).

The reason for companies seemingly not engaging in corrupt practices despite the possible advantages indicates a too high cost-benefit ratio. On the one hand, companies might get opportunities to avoid taxes, obtain licenses, or disregard environmental concerns through corruption. On the other hand, companies risk reputational damage, fines, and other repercussions if caught engaging in illegal activities. Despite high corruption in Colombia and South America compared to many Western countries, the authorities have demonstrated decisiveness in their efforts against corruption. One example is the Odebrecht scandal, where a construction conglomerate confessed to massive corruption across South America, Colombia included. The consequences for Odebrecht were significant, including \$2.6 billion in fines (Gallas, 2019).

Further, the result for events illustrating a lack of ability to regulate is an average reaction to all events within this classification. Therefore, there are individual events with an opposite reaction. An example is the event where the Colombian government began a process of a state formalization of mining but ended up withdrawing the commitment in a decree in 2014. Instead, the government indicated that transnational corporations (TNCs) would perform the process (Rochlin, 2021). The event with the decree resulted in a positive CAAR, implying a positive response from investors. The result suggests that a general lack of ability to regulate is perceived as negative. However, the lack of ability to regulate in favor of mining companies may be perceived as positive.

In summary, the results do not support our fourth prediction and the reasoning from Guidolin & La Ferrara (2007). Legal companies benefit from a government which manages to effectively regulate, thereby creating a stable and predictable business environment. While some aspects of the inability to regulate may be favorable for legal companies, overall, the advantages of effective regulation outweigh the negatives. We will now describe how the robustness of the results is tested before we end with a conclusion.

7. Robustness

In this section, we will assess the robustness of our results through various validity tests. First, we will check the influence of the classification of events on our results. The check is done by randomly classify events to determine whether our results deviate from what would be expected by chance. Second, we will assess the influence of our research method on the results by testing alternative durations for the estimation- and event window.

7.1 Event classification

One of the main limitations of our study is the qualitative event classification. The subjective approach may introduce biases and potential misclassification of events, which in turn may affect the validity of the study. We conduct a robustness test with a random classification of events to evaluate the effect of our classification approach on the results. The test involves calculating results for 100 iterations with a random event categorization and comparing the distribution from the 100 iterations to our actual results. The comparison will reveal if the actual results reflect a significant effect unrelated to randomness.

For the events on conflict intensity, the actual result for de-escalating events significantly differs from the result from the random classification. The significant difference suggests a significant effect of de-escalating events beyond random variation. However, the random classification exhibits a positive average CAR, implying that the isolated impact of de-escalating events might be lower than initially estimated. The actual results for events increasing conflict intensity overlap with the results from the random classification. The overlap indicates that the results from these events do not capture a significant effect, which is in line with our actual results.

The actual result for events increasing law enforcement significantly differs from the randomly classified result. However, the result from the random classification for events increasing law enforcement is positive. The positive result implies that the isolated impact of increasing events might be slightly less pronounced than previously discussed. The result from the random classification for events illustrating a lack of ability to enforce the law overlaps with the actual results. The overlap indicates an insignificant effect from events reducing regulations. Overall, the result from the robustness test for events on law enforcement indicate that the actual result is robust to the event classification.

The actual result for events increasing the government's ability to regulate is significant at 0.8%. However, the actual result overlaps with the random result from the robustness test. The overlap indicates that the actual result is not significantly different from what would be expected by chance. The actual result should, therefore, be interpreted carefully as it potentially can be a false positive. The actual result for events decreasing regulations is negative and significantly different from the random classification. The result from the random classification is positive at 0.7%. The result from the robustness test indicates that events decreasing regulations are robust to classification and that the average CAR is potentially slightly more pronounced than previously estimated.

Overall, the results for conflict intensity and ability to enforce law are robust to the event classification based on the random classification robustness test. Events decreasing regulations are robust, but events on increasing regulations are not robust and sensitive to the classification. The sensitivity to classification implies that the result from increased regulations should be interpreted carefully as it potentially is a result of randomness. The robustness test with random classification of events can be found in Appendices A8, A9 and A10.

7.2 Research method

The following section will assess the robustness of our results to changes in the research methodology, in terms of the length of the estimation- and event window. The robustness tests on the research methodology can be found in Appendices A11 and A12.

7.2.1 Estimation window

We want to test the robustness of the estimation window as a longer estimation window can reduce the potential impact of other events during the estimation window. Reduced impact from other events will give more precise estimates for the event window (Kothari & Warner, 1997). We expand the estimation window from 120 to 200 days to test if the estimation window is sensitive to random events during the estimation window. We test the robustness by running the regression on the main findings with the increased estimation window. Based on the regression, an extended estimation does not change the significance of the results. Further, only minor coefficient differences are observed compared to the regression with the

120-day estimation window. Thus, the initial results seem robust to the length of the estimation window.

7.2.2 Event window

We want to test the robustness of the event window by reducing the length, as a long event window can increase the return variability. Increased return variability in the event period can be triggered by the event itself or another uncertainty-increasing factor correlating with the event (Khotari & Warner, 2006). The potential consequence of increased return variability is an overstatement of the abnormal returns, leading to false positive events (Brown & Warner, 1985). We reduce the event window from 21 days to 11 days to test if the event window's length significantly impacts our results. When running the regression on the main findings with the reduced event window, the results are changed minimally, except for events increasing regulations. In the actual results, the coefficient was 0.08% and significant at a 5% level. After reducing the length of the event window, the coefficient is reduced to 0.02% and insignificant. The lack of robustness for events increasing regulation supports the result from the robustness test on classification and indicates that the result of events increasing regulations should be interpreted carefully, potentially being insignificant.

8. Conclusion

Colombia has been affected by an ongoing armed conflict for decades, impacting social and economic growth (HRW, 2023). In this study, we focus on the gold mining industry in Colombia and predict that companies profit from the conflict as it facilitates illegal activities. We use an event study methodology to analyze investor reactions to conflict-related events to understand the dynamics of the gold mining industry amidst conflict and regulatory shifts.

First, our study analyzes how gold mining companies in Colombia responded to events which either escalated or de-escalated the conflict intensity. We observe that companies, on average, exhibit positive cumulative abnormal returns (CAR) in response to a de-escalation of the conflict. On the contrary, we observe no significant average reaction to events increasing the conflict intensity. The insignificant result suggests that the benefits of a decreased conflict intensity with a more stable business environment outweigh the potential advantages of a increased conflict intensity. Further, we test for differences in reaction between companies based on the country of operations. The result indicates no significant difference in reactions, explained by international cooperation in crime and combat. However, despite being insignificant, the results indicate that companies with operations in Colombia experienced stronger reactions following events in Colombia.

Second, we assess how companies reacted to events which changed the business environment, with a focus on the government's ability to enforce the law and regulate. We find that events illustrating stronger law enforcement capabilities led to positive abnormal returns. The result indicate that illegal miners are seen as competitors rather than cooperators by legal companies. We observe a slightly positive response to events increasing regulations. However, the results are sensitive to the classification and methodology and should be interpreted carefully.

We argue in our first prediction, which creates the foundation for the subsequent ones, that legal companies benefit from conflict through cooperation with rebel groups and illegal miners. The motivation is access to cheap, illegally mined gold and smuggling routes. The results from the event study do not indicate that this is the reality. On the contrary, the results indicate that legal companies benefit from a stable business environment as it reduces risk and contributes to fair competition.

The robustness of the results is evaluated with tests on event classification and research methodology. The impact of the classification is tested by comparing the actual results to a distribution of results from 100 iterations with random classifications. The results are robust to classification, except for events increasing regulations. The result from events increasing regulations is not significantly different from the result from the random classification. We adjust the length of the estimation- and event window to test the robustness of the methodology. The test yields the same result as for event classification, where the test on events for increasing regulations results in an insignificant average CAR. The tests emphasize the need for careful event selection and methodological precision. Overall, our main results demonstrated robustness to event classification and methodology.

This study contributes to existing literature by focusing on a conflict differing from what previously studied in terms of intensity and fragmentation. The Colombian conflict represents a prolonged conflict with different actors with different interests, including government forces, guerrilla groups, and cartels (HRW, 2023). Further, the analysis is particularly relevant in the current global landscape, where conflicts increasingly share the same characteristics as the conflict in Colombia (United Nations, 2020). Our findings offer valuable insights into the impact of such conflicts on companies operating in these environments.

A limitation of our study is the omitting of penny stocks. We omit penny stocks to avoid noise in the data as penny stocks are recognized by their high volatility, low liquidity, and often insufficient data. However, it is important to acknowledge this limitation of our study. Penny stocks are subject to minimal regulatory oversight, often offering little information to the public and, thereby, low transparency (Scott, Moskowitz, & Rathburn, 2023). These factors make such firms more prone to engaging in illicit activities as it is harder to monitor their actions effectively. The exclusion of penny stocks might have led to biased company selection, affecting our results.

Additionally, it is difficult to get a complete overview of companies operating in South America during our timeframe. The region lacks a centralized register or database compiling information on active firms, leading us to gather data from various sources. The lack of a centralized database might make us bypass companies which could have played a significant role in our event study. Identifying companies is particularly challenging for companies which operated only during parts of the time frame, and which now no longer have operations in South America.

9. Appendix

A1. Mining Companies in The Sample

Company name	Number of observations	Country of headquarter	Entry date in South America
ANGLOGOLD ASHANTI PLC	3563	USA	31/12/1996
ARIS MINING CORP	230	Canada	31/09/2022
AURA MINERALS INC	2445	USA	31/06/2013
BARRICK GOLD CORP	3438	Canada	01/01/1990
DYNACOR GROUP INC	1672	Canada	31/12/2016
ELDORADO GOLD CORP	1029	Canada	31/07/2019
ELEMENTAL ALTUS ROYALTS CORP	774	Canada	31/07/2018
EQUINOX GOLD CORP	1025	Canada	31/07/2019
GOLD FIELDS LTD	3563	South-Africa	31/12/2008
GOLD RESERVE INC	3175	USA	01/01/2011
GOLDMINING INC	668	Canada	31/12/2020
HOCHSCHILD MINING PLC	3303	Great Britain	01/01/2011
IAMGOLD CORP	3438	Canada	31/12/2008
JAGUAR MINING INC	3428	Canada	31/01/2007
KINROSS GOLD CORP	3438	Canada	01/01/1987
LUNDIN GOLD INC	1171	Canada	01/01/2019
MCEWEN MINING INC	3186	Canada	01/01/2011
MINAS BUENAVENTURA SA	3563	Peru	31/12/1975
MINEROS SA	3563	Colombia	31/12/1974
NEWMONT CORP	3438	USA	01/01/1993
PAN AFRICAN RESOURCES PLC	3564	Great Britain	31/12/1999
ROYAL GOLD INC	3438	USA	01/01/2007
SANDSTORM GOLD LTD	1171	Canada	01/01/2019
SHANDONG GOLD MINING CO LTD	1736	China	04/01/2017
ZIJIN MINING GROUP CO LTD	434	China	31/12/2021

Table A1: List of all companies included in the event study

A2. Full Event List

Date	Notes	Conflict intensity	Law enforcement	Regulations
23/09/2010	Colombian army kills top FARC rebel leader Mono Jojoy	Decrease	Increase	No effect
25/10/2010	Colombia officials shut down 18 illegal gold mines	Decrease	Increase	No effect
18/01/2011	Colombia officials close 56 illegal gold mines and arrest 573	Decrease	Increase	No effect
05/11/2011	Top FARC rebel leader Alfonso Cano killed in Colombia	Decrease	Increase	No effect
15/05/2012	The United States—Colombia Trade Promotion Agreement (TPA) enters into force	No effect	No effect	Increase
17/05/2012	Colombian government establishes the General Royalties System, which determines how royalties from the exploitation of non-renewable natural resources are to be distributed and used	No effect	No effect	Increase
04/09/2012	Colombian President Juan Manuel Santos publicly announces the start of peace talks with FARC	Decrease	No effect	Increase
18/09/2012	Colombian drug lord Daniel Barrera Barrera, named "the last of the great kingpins", was arrested	Decrease	Increase	No effect
21/11/2012	Decree 2235 is issued, dealing with measures related to the destruction of machinery, equipment, and other elements used in illegal mining activities in Colombia	No effect	No effect	Increase
17/12/2012	The Single Register of Mineral Marketers is established, requiring all the gold sold by marketers to come from miners who hold title and comply with environmental standards	No effect	No effect	Increase
06/03/2013	Radical legislation is introduced whereby the government essentially withdrew any commitment of a State formalization process of smaller mines and instead indicated that TNCs would perform this important job	No effect	No effect	Increase
15/01/2014	Colombian government creates special unit to combat illegal mining	Decrease	No effect	Increase
17/02/2014	An investigation into extrajudicial killings exposed high-level corruption in Colombia's military and raised questions over a commander's human rights record	No effect	No effect	Decrease
06/04/2014	Colombian President Juan Manuel Santos signs the country's first Transparency and Access to Public Information Law	No effect	No effect	Increase
28/10/2014	Colombian politician sentenced to 14 years for corruption	No effect	No effect	Decrease
13/03/2015	Colombian authorities arrest 11 people, including two navy personnel, and destroyed 20 heavy machines in an operation against illegal mining	Decrease	Increase	No effect
26/05/2015	Decree 1076 is signed, outlining the requirements and procedures for environmental licensing and management practices that must be adhered to by the mining industry	No effect	No effect	Increase
08/06/2015	Colombian president declares "war" on criminal mining	No effect	No effect	Increase
23/09/2015	A major breakthrough is announced with an agreement on transitional justice between the Colombian Government and FARC	Decrease	No effect	Increase
15/12/2015	Corruption scandal at the heart of the Integrated Public Transport System tender in Bogota	No effect	No effect	Decrease
29/11/2016	Colombia signs historic peace deal with FARC	Decrease	No effect	Increase
21/12/2016	One of the largest corruption scandals in South America unfolds, revealing that Odebrecht paid approximately \$788 million in bribes in 12 countries, including \$11 million in Colombia	No effect	No effect	Decrease
12/01/2017	A former vice-minister of transport is sentenced to five years and two months in prison after admitted to taking millions of dollars in bribes	No effect	No effect	Decrease
02/03/2017	Canadian mining company Gran Colombia Gold sues Colombia over suspension of Marmato project and losses	No effect	No effect	Increase
28/05/2017	Anti-corruption chief Luis Gustavo Moreno is arrested for bribery	No effect	No effect	Decrease
26/03/2018	Three Ecuadorian journalists kidnapped and murdered by FARC dissidents	Increase	Decrease	No effect
28/05/2018	Colombian military directs an airstrike against a FARC dissident group. Eleven people were killed, including two civilians.	Decrease	Increase	No effect

Date	Notes	Conflict intensity	Law enforcement	Regulations
13/06/2018	Colombian National Army conducts a bombardment against FARC dissidents. At least 16 FARC dissidents killed	Decrease	Increase	No effect
08/10/2018	Military Forces and police forces arrests the leader of one front of the Clan del Golfo	Decrease	Increase	No effect
17/01/2019	A car bomb exploded inside the police academy in Bogota. 22 people killed and 87 injured. ELN accused of perpetrating the attack	Increase	Decrease	No effect
11/03/2019	Military forces of Colombia confiscates illegal mining equipment valued more than 1 million USD with connections to Clan del Golfo, Los Caparrapos and ELN	Decrease	Increase	No effect
26/04/2019	Police reported the arrest of 41 members of the Clan del Golfo	Decrease	Increase	No effect
30/07/2019	The military forces of Colombia arrested 143 members of illegal armed organizations, including ELN and EPL. Five drug production compounds were destroyed and more 26 tonnes of contraband good seized	Decrease	Increase	No effect
29/08/2019	The government military forces carried out an air raid against dissident members of the FARC, killing a total of 17 people	Decrease	Increase	No effect
25/09/2019	The ministry of defense reports the arrest of 206 people, during a two-week operation carried against illegal armed organizations	Decrease	Increase	No effect
28/04/2020	Colombia officially becomes a member of the OECD	No effect	No effect	Increase
14/05/2020	Soldiers and police officers bombed an area, killing at least 20 members of the ELN	Decrease	Increase	No effect
07/07/2020	Members of the ELN proposes to the government of Colombia a bilateral ceasefire for three months in view of the coronavirus pandemic	Decrease	No effect	No effect
26/10/2020	Government representatives held a meeting with 20 leaders of former FARC fighters to agree on important demands in order to fulfill the Peace Agreement of 2016	Decrease	No effect	Increase
12/12/2020	Police forces carried out the 'Neptuno' operation which resulted in the arrest of at least 43 active members of the Gulf Clan	Decrease	Increase	No effect
02/02/2021	Police forces reported the arrest of 229 members of several armed organizations across the country, including members of the Gulf Clan and La Terraza gang	Decrease	Increase	No effect
02/03/2021	Security forces bombed a camp of a FARC dissident front and subsequently used land units to search the area. 12 dissidents were killed and three others were arrested	Decrease	Increase	No effect
10/03/2021	Colombia's former Supreme Court president convicted over mammoth corruption scandal	No effect	No effect	Decrease
28/05/2021	Several clashes reported during anti-government demonstrations. 34 wounded, 13 fatalities.	Increase	Decrease	No effect
01/06/2021	One of Colombia's top five criminal groups, Los Caparros, is dismantled with the death of its leader	Decrease	Increase	No effect
16/06/2021	Car bomb explosion at Colombia military base injures 36	Increase	Decrease	No effect
07/07/2021	Clashes between Frontier Command and a FARC dissident front. At least 18 fighters of both groups have been killed in the clashes	Increase	Decrease	No effect
27/08/2021	Riots broke out during a seizing operation in illegal mining areas. At least 300 miners, and their families, clashed against ESMAD police officers and military soldiers. One person killed and three more injured	Increase	Decrease	No effect
13/10/2021	Sen. Cruz introduces bill to disrupt illicit metals mining and trafficking	Decrease	No effect	Increase
20/10/2021	Members of a FARC dissident faction, ELN members and military forces clashed. Several civilians were caught in the crossfire and 400 people were displaced. 10 ELN and FARC members killed in the clash	Increase	Decrease	No effect
23/10/2021	Military forces captured the leading member, Ontoniel, of the Gulf Clan during a military operation	Decrease	Increase	No effect
30/10/2021	Military and police forces arrested 45 miners who worked for the Edwing Roman Gulf Clan front and seized equipment used to excavate a mine	Increase	Decrease	No effect
19/11/2021	Military and police forces reported the arrests of 90 Gulf Clan members during government operations against the armed group	Decrease	Increase	No effect
24/02/2022	Military forces and members of a FARC dissident faction clashed, resulting in 27 FARC members being killed and four more injured	Decrease	Increase	No effect
10/03/2022	The ELN declared a temporary unilateral ceasefire in the frame of the legislative elections	Decrease	No effect	No effect
28/03/2022	At least 11 people were killed during a military operation in the El Remanso vereda. Initially reported the incident as an armed confrontation against an armed group, multiple social organizations denied this and stated that the victims are all residents, including farmers, Quechua indigenous people, and active social leaders	Increase	Decrease	No effect

Date	Notes	Conflict intensity	Law enforcement	Regulations
05/06/2022	The National Electoral Council opened an investigation against the presidential campaign of the current president of Colombia, Gustavo Petro, for the alleged concealment of payments to electoral witnesses	No effect	No effect	Decrease
22/07/2022	Military forces carried out an operation against illegal mining in the Angosturas sector. Miners started to clash with the soldiers in an attempt to take away their weapons and avoid the operation. One miner killed	Increase	Decrease	No effect
16/10/2022	U.S. bill seeks to curb illegal mining in Latin America	No effect	No effect	Increase
21/11/2022	The Petro Administration reinitiated talks with the ELN	Decrease	No effect	No effect
01/01/2023	The national government agreed on a six-months bilateral ceasefire, verified by UN among others, with several FARC dissident groups, the Gulf Clan, and the Self-Defense Conquerors of Sierra Nevada	Decrease	No effect	No effect
28/01/2023	ELN members clashed with navy forces in the rural area of Buenaventura, leaving nine ELN members and one navy official killed. 479 residents around the Mayorquin River were confined inside their homes because of the clash	Decrease	Increase	No effect
15/05/2023	Gulf Clan's Illegal Mining Business hit during a operation destroying and seizing mechanized elements with a commercial value of \$13,939,835,000	Decrease	Increase	No effect
19/05/2023	Zijin suspends operations at Colombia mine following bombing. Two people killed	Increase	Decrease	No effect
09/06/2023	The national government reached a temporary ceasefire agreement with the ELN in all the Colombian territory	Decrease	No effect	No effect
30/06/2023	Riots broke out in Choco when police carried out an operation against illegal mining. The rioters held 22 to 23 officers involved in the operation captive for several hours	Increase	Decrease	No effect

Table A2: List of all events included in the event study

A3. Normality Test of Data

	Shapiro-Wilk normality test
W	0,95674
p-value	2,2e ⁻¹⁶
Alternative hypothesis	The data is normally distributed

Table A3: Shapiro-Wilk normality test of data

A4. Regression on Main Findings

	Dependent variable:		
	3-day cumulative abnormal return (CAR)		
	(1)	(2)	(3)
Decrease in conflict intensity	0.018*** (0.002)		
No event	0.000 (0.000)		
Increase in conflict intensity	0.004 (0.002)		
Increase in law enforcement		0.015*** (0.002)	
No event		-0.000 (0.000)	
Decrease in law enforcement		0.004 (0.002)	
Increase in regulations			0.008** (0.003)
No event			-0.000 (0.000)
Decrease in regulations			-0.013*** (0.003)
SE clustered by company	Yes	Yes	Yes
Observations	63,967	63,717	63,262
Adjusted R2	0.082	0.061	0.028

Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Each observation is a trading day for one of the 25 companies from 2010 to 2023. The dependent variable is the three-day cumulative abnormal return. The variable Increase in conflict intensity, law enforcement, and regulations takes the value 1 if an event increases the factor on day t and 0 otherwise. The variable Decrease in conflict intensity, law enforcement, and regulations takes the value 1 if an event decreases the factor on day t , and 0 otherwise. The variable No Event is the constant, indicating the average effect on three-day abnormal returns without events. Robust standard errors clustered by company in the parentheses.

Table A4: Regression for main results

A5. T-test of Difference in Means for Conflict intensity

	t
Test statistics	-2,54
df	526
p-value	0,0111
Alternative hypothesis	True difference in mean is not equal to 0

Notes: Paired t-test for events increasing and decreasing conflict intensity. H_0 of equal means rejected.

Table A5: T-test of difference in means for conflict intensity.

A6. T-test of Difference in Means for Law Enforcement

	t
Test statistics	-3,32
df	513
p-value	0,002
Alternative hypothesis	True difference in mean is not equal to 0

Notes: Paired t-test for events increasing and decreasing law enforcement. H_0 of equal means rejected.

Table A6: T-test of difference in means for law enforcement..

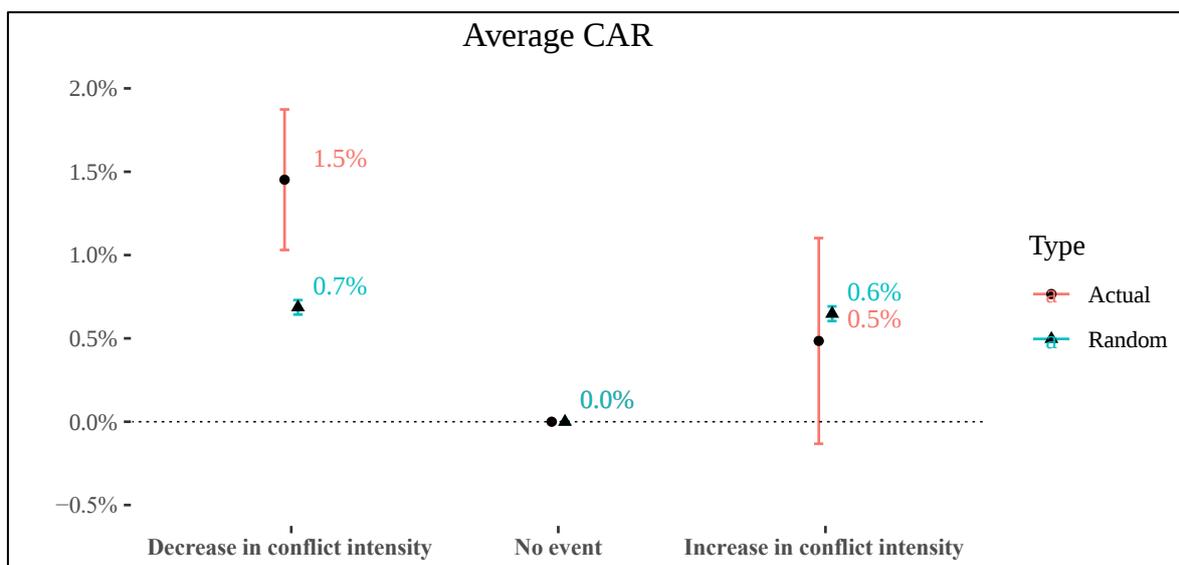
A7. T-test of Difference in Means for Regulations

	t
Test statistics	4.23
df	405
p-value	2,86E-05
Alternative hypothesis	True difference in mean is not equal to 0

Notes: Paired t-test for events increasing and decreasing regulations. H_0 of equal means rejected.

Table A7: T-test of difference in means for regulations.

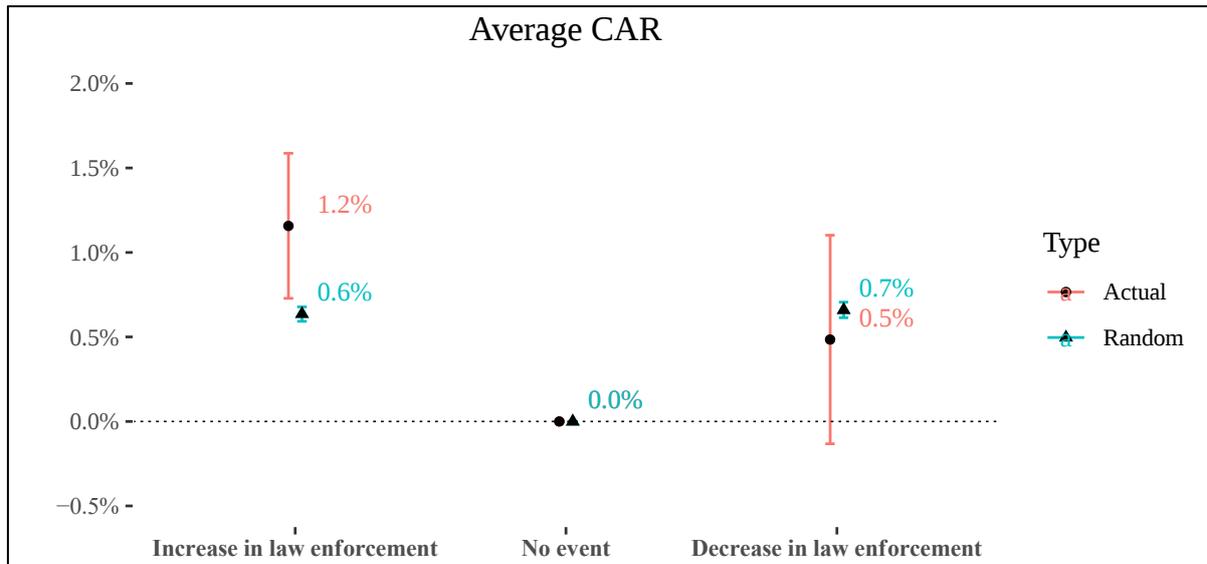
A8. Robustness Test for Conflict Intensity



Notes: The table shows a comparison of means from the actual results and the means of the distributions from 100 iterations with random classification of events on conflict intensity. The error bar represents the 95% confidence interval of the mean. Non-overlapping confidence intervals imply a significant difference between means.

Table A8: Robustness test for the classification of conflict intensity

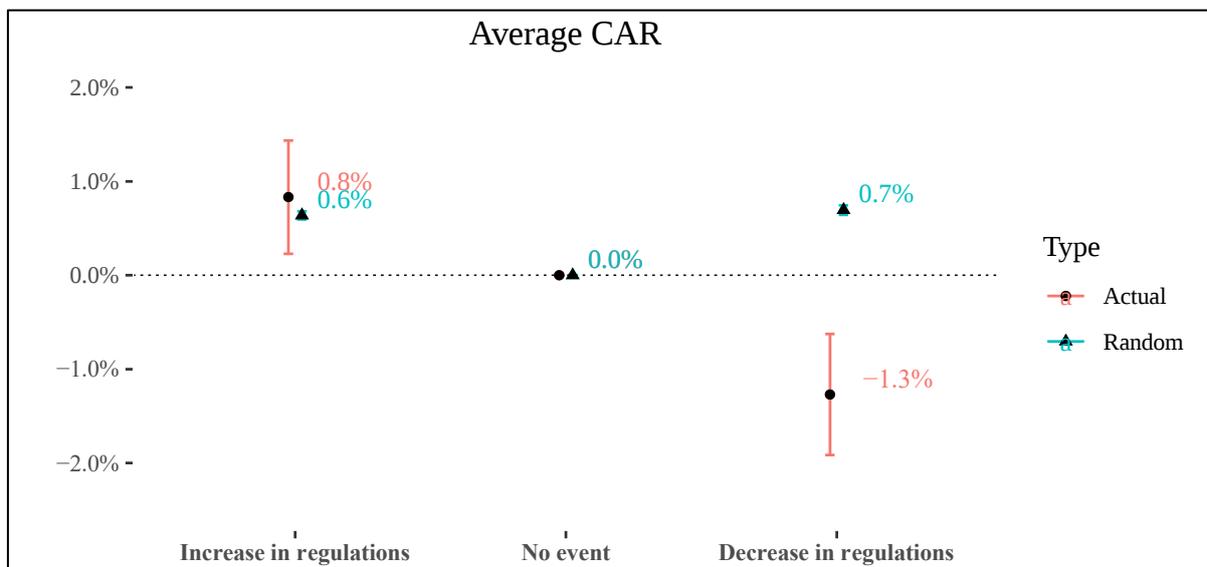
A9. Robustness Test for Law Enforcement



Notes: The table shows a comparison of means from the actual results and the means of the distributions from 100 iterations with random classification of events on law enforcement. The error bar represents the 95% confidence interval of the mean. Non-overlapping confidence intervals imply a significant difference between means.

Table A9: Robustness test for the classification of law enforcement

A10. Robustness Test for Regulations



Notes: The table shows a comparison of means from the actual results and the means of the distributions from 100 iterations with random classification of events on regulations. The error bar represents the 95% confidence interval of the mean. Non-overlapping confidence intervals imply a significant difference between means.

Table 10: Robustness test for the classification of regulations

A11. Robustness Test of Estimation Window

	Dependent variable:		
	3-day cumulative abnormal return (CAR)		
	(1)	(2)	(3)
Decrease in conflict intensity	0.019*** (0.002)		
No event	-0.000 (0.000)		
Increase in conflict intensity	0.001 (0.002)		
Increase in law enforcement		0.015*** (0.001)	
No event		-0.000 (0.000)	
Decrease in law enforcement		0.001 (0.002)	
Increase in regulations			0.008** (0.004)
No event			-0.000 (0.000)
Decrease in regulations			-0.016*** (0.004)
SE clustered by company	Yes	Yes	Yes
Observations	63,873	63,625	63,172
Adjusted R2	0.089	0.066	0.036

Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The regression differs from the main regression with a 200-days estimation window. Each observation is a trading day for one of the 25 companies from 2010 to 2023. The dependent variable is the three-day cumulative abnormal return. The variable Increase in conflict intensity, law enforcement, and regulations takes the value 1 if an event increases the factor on day t and 0 otherwise. The variable Decrease in conflict intensity, law enforcement, and regulations takes the value 1 if an event decreases the factor on day t , and 0 otherwise. The variable No Event is the constant, indicating the average effect on three-day abnormal returns without events. Robust standard errors clustered by company in the parentheses.

Table A11: Robustness test of the estimation window

A12. Robustness Test of Event Window

	Dependent variable:		
	3-day cumulative abnormal return (CAR)		
	(1)	(2)	(3)
Decrease in conflict intensity	0.016*** (0.002)		
No event	-0.000 (0.000)		
Increase in conflict intensity	0.007 (0.002)		
Increase in law enforcement		0.013*** (0.001)	
No event		-0.000 (0.000)	
Decrease in law enforcement		0.007 (0.002)	
Increase in regulations			0.002 (0.004)
No event			-0.000 (0.000)
Decrease in regulations			-0.014*** (0.004)
SE clustered by company	Yes	Yes	Yes
Observations	60,868	60,665	60,248
Adjusted R2	0.065	0.058	0.019

Note:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The regression differs from the main regression with a 11-days event window. Each observation is a trading day for one of the 25 companies from 2010 to 2023. The dependent variable is the three-day cumulative abnormal return. The variable Increase in conflict intensity, law enforcement, and regulations takes the value 1 if an event increases the factor on day t and 0 otherwise. The variable Decrease in conflict intensity, law enforcement, and regulations takes the value 1 if an event decreases the factor on day t , and 0 otherwise. The variable No Event is the constant, indicating the average effect on three-day abnormal returns without events. Robust standard errors clustered by company in the parentheses.

Table A12: Robustness test of the event window

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