A. Chong and P. Haslam *Lat Am Econ Rev* (2020) 29:2
https://doi.org/10.47872/laer-2020-29-2s

Latin American Economic Review

RESEARCH ARTICLE Open Access

Social Conflict in Rural Regions and Firm Ownership: Evidence from the Mining Sector in Latin America

Alberto Chong* and Paul Alexander Haslam**

* Chong (corresponding author: achong6@gsu.edu): Georgia State University, 14 Marietta St. Room 516, Atlanta, GA 30303, USA and Universidad del Pacifico, Av. Salaverry 2020, Lima, Perú.

** Haslam (phaslam@uottawa.ca); University of Ottawa, 120 University Private, Social Sciences Building, Ottawa, Canada.

Abstract

Using firm-level data for five countries in Latin America we find a negative and statistically significant link between social conflict in rural areas and ownership of mines. This result suggests that the social conflict around mining projects can affect strategic firm behavior intended to diversify risk in the face of social, political and financial pressures. It constitutes evidence that the costs of social conflict can be considered a serious challenge for firms and diverges from the literature which has generally viewed these costs as relatively unimportant to investment decisions. We apply broad sensitivity tests and find that this is robust. Our results also hold to a formal test of changes in specification.

Keywords: Ownership, Investment, Social Conflict, Latin America, Mining, Causality.

JEL Classification: O13, Q30, J50, H00.

1. Introduction

Despite the fact that large investments, both foreign and domestic, are viewed by economists as essential to growth, economic agents may disagree about their desirability, leading to protracted social conflict. This is particularly true in developing countries, where investment is most needed. Furthermore, such conflicts tend to occur with relatively more frequency in poorer areas, as inhabitants become suspicious about the benefits of such investments to themselves and to their livelihoods.[1] While the logic and motivations behind social conflict in these areas have been studied relatively extensively (e.g. Easterly & Levine, 1997; Collier & Hoeffler, 2000; Haslam & Ary Tanimoune, 2016; Conde & Le Billon, 2017) the impact on the incentives to invest, which is the other side of the same coin, has been rarely studied empirically.

In this article we ask whether social conflict in rural areas decreases the likelihood of large investments in developing countries and in particular, whether rural conflict in mining areas is associated with any increase in the likelihood of firm owners to sell, regardless of nationality or type of firm. As straightforward as this question may be, social scientists have been unable to disentangle the direction of the actual link between these two variables. On the one hand, it is reasonable to expect that non-local, large firms will bring their own corporate culture as well as their own way of doing business and as such may behave in ways that may be perceived as alien to the local rural areas where they locate. Regardless of whether this may be true or not, the presence of the firm may result in increased social friction and eventually social conflict. On the other hand, it is also rather plausible to expect that rural communities with records of social conflict may have a bearing on the probability of owners establishing business interests or reducing their exposure to social risk in such areas. This is particularly true in the mining sector where very large initial investments are required.

While both questions are equally important, in this paper we study the specific question that goes from social conflict in rural areas to ownership. The reason for doing this is that according to the conventional wisdom, the location and rationale for mining investments are determined exogenously by the availability of exploitable mineral deposits (for example, Haslam et al., 2019). Mining interests in developing countries are essentially driven by a profit motive and while mining performance may be negatively impacted by social conflict in the short run, longer term negative impacts for the investor resulting from social conflicts are generally viewed as either unlikely or manageable.

And yet, there are good reasons to suspect that social conflict may have an effect on firm decisions about the ownership stake held by the principal investor in a mining project. Conflict is now known to affect the social, political and financial risk of a project, and increase the cost of extraction through delays and the blockage of production, expensive social benefit agreements with communities, and enhanced likelihood of political and regulatory oversight (Humphreys, 2000; Bice et al., 2017). Corporate responses to these risks have principally been viewed through the lens of changes to corporate social responsibility (CSR) practices (Owen, 2016), but an impact on "core" aspects of the business such as ownership decisions could also be inferred (Kemp & Owen, 2013). Anecdotal evidence from Latin America, also suggests that changes to ownership may be part of the firm responses to challenges associated with social conflict. For example, faced with ballooning costs related to social conflict and regulatory oversight at its Argentine-Chilean Pascua Lama project, Canadian major Barrick Gold sold part of an associated mine to a Chinese company, reducing its ownership stake.

In this context, we believe that ownership share is a good proxy for long-term commitment and may help assess whether the assumption of the literature that the core interests of firms are relatively unaffected by social conflict is true, which from our perspective makes it an interesting question to pursue. In addition, we believe that this is an important question as in recent years

1 A very recent example is the "Tia Maria" social conflict in Perú, which has been on-going for several years now: https://www.peruviantimes.com/19/arequipa-governor-defends-tia-maria-mine-protests/31498/

there has been massive domestic and foreign investment in mining exploration and exploitation in many developing countries, which has increased the potential for social conflict (Bridge, 2004; Bebbington et al., 2008; Steinberg, 2019).

The above is particularly true for Latin America, the geographical focus of this research, a region with a comparative advantage in mining resources, and where mining related revenues account for a very sizable share of gross domestic product of the region - but at the same time a continent where most mining tends to be done in very poor, rural, and often indigenous areas that are frequently located at high altitudes. Latin America has long been recognized as a region with a strong comparative advantage in natural resources. This, along with the development of new extractive technologies, a dramatic rise in commodity prices, and a vastly improved legal regime has translated into an enormous increase in investment for both mining exploration and exploitation in the last couple of decades (Haslam & Heidrich, 2016). As a matter of illustration, in countries such as Bolivia, Chile, and Perú, investment in mining activities easily accounts for upwards of forty percent of the total foreign direct investment and about ten to fifteen percent of the annual gross domestic product. At the same time, however, externalities derived from these significant capital inflows have increased the likelihood of interaction between the people living in rural and remote regions where mining properties tend to be located, which increases the potential for social conflict (Bridge, 2004; Bebbington & Bury, 2014).

In this paper we use an original database first collected by Haslam & Ary Tanimoune (2016) for the period 2011-2013, which includes 640 geo-located mining properties in five Latin American countries, namely Argentina, Brazil, Chile, Mexico and Peru, which was complemented with additional data collected by us. The advantages of these data are that they cover most of the mining operations in these five countries and provide systematic information at the firm level, something unusual in the literature where either micro-level work is performed qualitatively at the case-study level or empirical systematic work tends to be done at higher aggregations such as provinces or states.

Our paper is organized as follows. In Section 2 we provide a brief review of the literature with emphasis on conflicts. Section 3 describes the data and methodology. Section 4 shows our main findings. Finally, Section 5 summarizes and concludes.

2. Review of the Literature

The existing literature on social conflict and mining has been entirely concerned with understanding the causes of social conflict, as mentioned in the introduction. In this regard, social conflict has only been treated as the dependent variable of interest, and issues of ownership have received scant treatment. Yet, ownership is an important characteristic of mining companies that is variable over time. The largest shareholder in a mining project is typically responsible for all operational aspects of the project, including community relations. This means that first majority ownership is associated with technical and managerial capacity, community relations, "brand" visibility and public relations, as well as economic and political risk, and financial liability. The mining industry is also characterized by active mergers and acquisitions, as juniors often aim to sell "proven" deposits to larger companies, and larger companies seek to mitigate risk, develop new technical and managerial capacities, and strengthen their position vis-à-vis competitors.

In so far as that literature has been exclusively concerned with explaining why social conflict occurs, it has focused on activist strategies (Bebbington & Bury, 2014; Canel et al., 2010; Svampa et al., 2010), institutional frameworks that shape the propensity to protest and its effectiveness (Arellano-Yanguas, 2011; Ponce & McClintock, 2014; Verbrugge, 2015; Orihuela,

2017; Arce et al., 2020), and corporate efforts to forestall or mitigate conflict through corporate social responsibility (Prno, 2013; Mercer-Mapstone et al., 2017). Corporate characteristics have not attracted a lot of attention from researchers working on mining conflict, but where they have, it is as causal variables. Qualitative analyses have linked firm size, namely junior mining companies (Dougherty, 2011) and industrial processes associated with gold (Ali, 2006; Urkidi & Walter, 2011) to protest. In contrast, Haslam et al. (2019) find that neither firm size nor gold is correlated with social conflict, but do underline the role of ownership, linking foreign-owned firms to a greater likelihood of social conflict than locally-owned firms.

However, the literature has been slow to treat social conflict as an independent causal variable that affects strategic behavior by firms. Of course, the consequences of conflict have been examined more broadly. For example, Bellows & Miguel (2009) argue for the impact of civil war on institutions, politics and social norms in Sierra Leone. They find that individuals whose households directly experienced more intense war violence are robustly more likely to attend community meetings, more likely to join local political and community groups, and more likely to vote, which may have had a bearing on the rapid postwar political and economic recoveries observed in that country after the civil conflict ended. Along these lines, Jennings & Sanchez-Pages (2017) study the role of external conflict as a force that can create social capital. They find that the presence of an outside threat can induce higher levels of social capital either because a protective aspect of social capital comes into play and/or as a reallocation of investments from private to social capital. Since the latter social capital is subject to free riding, the threat, by promoting a greater level of social capital, can be welfare improving. When the threat is severe, social capital and welfare are more likely to fall and they find that an external threat on social capital is stronger in poor countries.

In terms of the consequences of social conflict for strategic behavior by firms, including changes to ownership, the evidence is limited. For instance, Klapper et al. (2012) find that heterogeneous impacts of conflicts in Cote d'Ivoire may be important by providing evidence that firms owned by and employing more foreign employees might have been affected disproportionally in terms of economic performance. These researchers argue that increasing hostility and differential treatment towards foreigners, as signaled by economic impacts, might further exacerbate social cohesion. This fits with a broader international business literature on the "liability of foreignness", in which the "institutional distance" associated with foreign ownership – basically a lack of understanding and embeddedness in the local context - is thought to contribute to a performance liability such as lower profitability and survival in host countries (Zaheer, 1995; Eden & Miller, 2004). These liabilities are also thought to be exacerbated in rural contexts, such as those where most mines are located (Nachum, 2009; Haslam et al., 2019). One may hypothesize that the liability of foreignness is an incentive for wholly owned foreign firms to sell shares of their enterprise to domestic investors in order to mitigate this risk.

The paper closest to ours is Menon & Sanyal (2007) who analyze patterns of foreign direct investment in India. They investigate how labor conflict, credit constraints, and indicators of a state's economic health influence location decisions of foreign firms and account for the possible endogeneity of labor conflict variables in modeling the location decisions of foreign firms by using state-specific fixed effects and find a strong negative impact on foreign investment. However, as is well-known, a weakness of employing state-specific fixed effects is that they do not control for endogeneity in a convincing manner.

Additionally, Henisz et al. (2013) outline a pathway whereby social conflict can affect matters of strategic importance to the firm, finding that poor relations with stakeholders (conflict) can cause a significant reduction in the premium that investors are willing to pay to hold company shares. In this regard, Henisz et al. (2013) provide compelling evidence that social conflict can affect a company's ability to raise capital. Steinberg (2019) also demonstrates that social conflict in mining implies strategic responses by the firm. She outlines a game theoretical model

in which three actors interact (the firm, the state, and local communities), and the firm must decide whether to honor a distributive pact with local communities based on its estimation of the likelihood of protest, and the nature of the state's response. Further evidence that social conflict affects core costs beyond the CSR program choices of the firm, is available from executive interviews reported by researchers. A Rio Tinto executive described community relations as a strategic issue (Humphreys, 2000). In fact, Franks et al. (2014) explain that social conflict can result in lost productivity costs of up to $US 20 million/week for a major project, as well as opportunity costs related to the inability to pursue other projects, and the overuse of senior management time on the problem projects. Lack of access to a deposit, due to social conflict, means a company may have to reclassify its mineral assets out of the reporting category of "proven and probable reserves", with important consequences on its valuation (Owen, 2016).

It should be noted that most researchers believe that the corporate response to conflict with communities rarely extends beyond compensation packages to embrace "core" aspects of the business (Kemp & Owen, 2013; Bice et al., 2017). Nonetheless, it is also clear from the literature discussed above that social conflict between mining firms and communities can affect issues of strategic importance. Therefore, changes to ownership may be hypothesized to be part of the firm's response to managing social, political and financial risk associated with social conflict.

3. Data and Methodology

We take advantage of the fact that the data we employ are collected at the mining property level, which helps provide a more accurate empirical picture. As described above, Haslam & Ary Tanimoune (2016) collected the data around geo-located mining properties. For each set of property coordinates, they added firm-level economic information; socio-environmental characteristics of the area around the mining property, socio-economic and demographic data of the population living near the mining property, and information about firm-community conflicts at that property. In theory, the data cover the full universe of mining properties in five Latin American countries namely, Argentina, Brazil, Chile, Mexico, and Peru. Overall, the dataset for this paper include 640 geo-located firms at the advanced exploration stage and above, which allows for the construction of a good quality series of subnational data. It is important to mention that these five countries represent the largest mining economies of Latin America and have attracted the vast majority of foreign mining investment as demonstrated by the fact that the social conflicts found in these countries are very well represented in the case study literature (Bebbington et al., 2008; Bebbington & Bury 2014).

A full description of data collection methods is provided in Haslam & Ary Tanimoune (2016). The sample of mining properties and their geo-location was purchased from the industry site, *Infomine* (now *Mining Intelligence*) in June 2011, and covered 713 properties in 23 countries, at the "advanced exploration" stage and above. Selecting properties at this stage includes projects that are more likely to become functioning mines, as most "raw prospects", the initial project stage, are unlikely to be developed. Haslam & Ary Tanimoune (2016) added an additional 70 properties that had social conflicts, obtaining universal coverage of social conflicts within the sample, and demonstrating that the addition of these properties did not bias results. Using a restricted sample of the five most important mining countries with better data reduces the number of mining properties considered to 640. *Infomine* was also the source of data related to ownership (the shares and names of each owner), and the mine type (surface, underground, mixed underground/open-pit, and open-pit). *Infomine* (*Mining Intelligence*) is a professional service that collects and organizes data available from regulatory agencies and stock market filings. A summary of the total number of properties and social conflicts by county included in the database is found in Appendix 2.

Based on the *Infomine* coordinates, Haslam & Ary Tanimoune (2016) linked the most recent census data (as of 2013) at the third level of government, usually municipality or its equivalent, to each mining property. National censuses were the source of data for local socio-economic and demographic variables (such as percentage of indigenous population, percentage of the "economically active" population in the 20-59 age group) and proxies for state presence (such as the percent of households with sewage removal) used in this analysis. Table 1 provides summary statistics of the variables employed in this paper. In addition, the variables that capture social conflict measures were manually constructed by Haslam & Ary Tanimoune (2016) from case summaries and news reports by Latin American civil society information clearinghouses. The majority of reports come from OCMAL *(Observatorio de Conflictos Mineros de America Latina),* a Chilean civil society organization, the MAC *(Mines and Communities)* media aggregator, and the Peruvian national Ombudsman's office, which issues monthly summaries of social conflicts in that country.

Table 1. Summary Statistics

	Mean	Std Dev	Min	Max
First Majority Ownership	93.14	14.637	50	100
Presence Social Conflict	0.482	0.321	0	1
Conflict Duration	69.35	43.25	1	198
Conflict Severity	1.323	0.242	0	2
HH no sewerage	0.711	0.147	0	1
Infant mortality	0.358	0.242	0.165	0.835
Percent indigenous population	0.902	0.125	0.795	0.984
Access to Piped Water	0.464	0.363	0	1
Percent 20-59 pop	0.535	0.261	0453	0.721
Mine Type: Underground	0.352	0.321	0	1
Active Mine Status	0.957	0.08	0	1

Source: Haslam & Ary Tanimoune (2016) and own data collection.

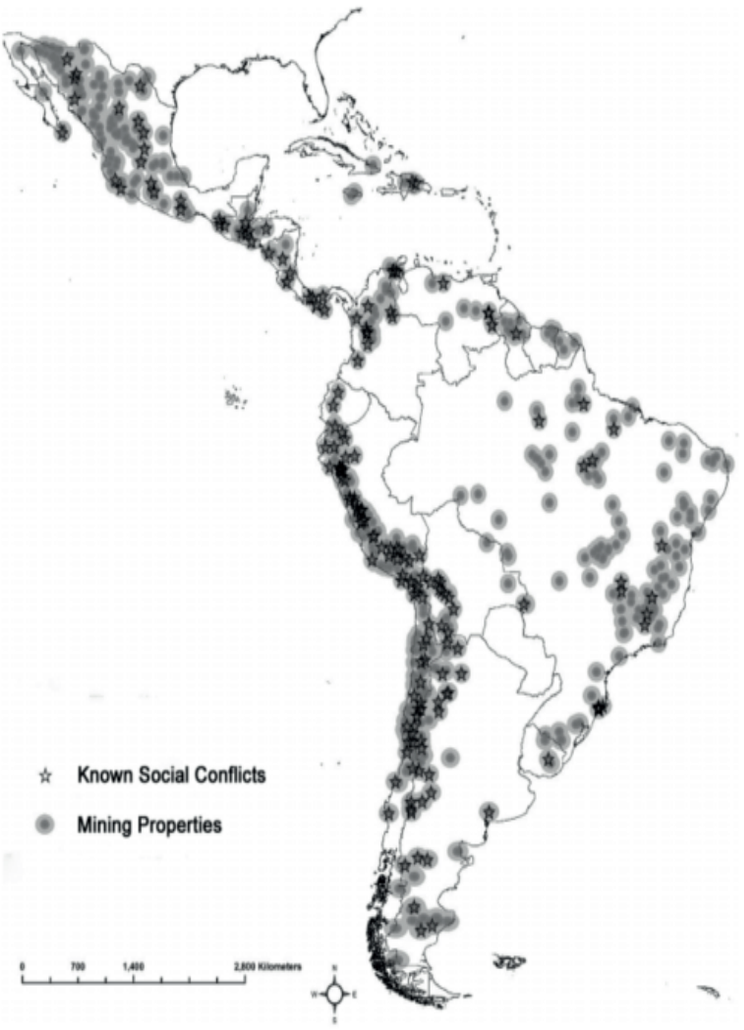
These sources were further complemented using information retrieved from available Peruvian media by us. Media include the national newspapers "El Comercio" as well as other important newspapers with large national circulation, in particular, "Expreso", "Peru 21" and "La República". We also consider national television networks, which include four private networks (Frecuencia Latina, Panamericana Televisión, América Televisión, and Andina de Televisión) and the National State Channel (Radio Televisión Peruana). As indicated above, the coverage of reported social conflicts in the mining sector in the five countries is universal – that is to say all social-environmental conflicts reported in the media sources consulted were included. Nonetheless, we cannot be certain that media-reported accounts of social conflict accurately reflect the real world, and although this problem has been noted in media-based studies, they remain the only source of information on this topic (Earl et al., 2004). Figure 1 presents the geographical location of conflicts and mining properties for Latin American countries between 1998 and 2012.[2]

We sort ownership shares for each mining company and select the share of the agent with the largest ownership stake as our dependent variable. While this share might or might not be a controlling one, the behavior of the owner with the largest number of shares is typically very

2 As Haslam & Ary Tanimoune (2016) report, 21 percent of mining properties experienced a known conflict. Of the properties for which no conflict was recorded, 46 percent were open-pit projects, 13 percent were combined open-pit/underground, 31 percent were underground, and 10 percent were surface mines. Mines that have experienced a known conflict are located at a higher altitude than mines that have not, respectively averaging 2260 meters above sea level against 1610 meters above sea level. Of the 133 mines that experienced a "known conflict", 62.41 percent were majority-owned by foreign capital, in comparison to mines without conflicts of which 58.38 percent were foreign-owned. In contrast, 9.7 percent of mines without a known conflict were owned by private companies without any public participation, against 8.27 percent of mines with a known conflict.

significant in terms of influence on the rest of the shareholders as the largest shareholder is typically considered the lead owner. We use the share of this majority owner as our dependent variable. To further clarify, consider a mining company that has four owners with the following ownership shares: (i) 30 percent, (ii) 25 percent, (iii) 25 percent and (iv) 20 percent. For this specific case, the dependent variable will take a value of 30, which corresponds to the share of the first majority owner.

Figure 1. Mining Properties and Social Conflict in Latin America (1998-2012)



Source: Haslam & Ary Tanimoune (2016)

Our social conflict variable is proxied in three different ways. The first one is by using a simple dummy that accounts for the presence of social conflict as reported in the media (there is a report of a social conflict associated with that mine, or there is not) the evaluation of which is very straightforward and unlikely to suffer from any interpretative bias. Conflicts that were labor-based (on wages, working conditions, etc.) were excluded as the dataset was focused on what are known as social-environmental conflicts. The second proxy measures duration of conflict in number of days. This variable was calculated using data from Peruvian media (see above), which allowed as to obtain a proxy on number of days of conflicts. Finally, the third measure, conflict severity, is based on a ranked ordinal scale (none, low, and high), and involved interpreting the case histories. Appendix 1 provides the list of variables employed as well as their corresponding definitions, which include basic firm and property characteristics, basic socio-economic, demographic conditions of the nearby population, and social conflict.

From a methodological perspective, we apply the following reduced form:

$$Ownership_i = b + a\ Conflict_i + d\ Conditions_i + g\ MineType_i + e_i \quad (1)$$

where, as described above, *Ownership* is the share of the individual or entity with largest ownership share of the mining firm and *Conflict* is a variable that captures social conflict according to the three categories described above namely, presence, duration, and intensity. The vector *Conditions* includes basic characteristics of the households surrounding the specific mine, including access to water and sewerage, infant mortality, percentage of indigenous population, and basic age categories. Likewise, *MineType* is a variable that captures whether mine extraction is underground or not, as more open types may exacerbate conflict for environmental reasons, while *e* is an error term. In addition, all regressions include commodity fixed effects, country fixed effects, mine fixed effects and clusters at the mine level.

4. Findings

Table 2 shows our main findings employing the full set of controls, fixed effects at the commodity and country level, as well as the three dependent variables regarding conflict. We find that all the variables employed in order to capture social conflict yield negative coefficients, which are all statistically significant at the 1 percent level. Not only is the presence of conflict linked to a decrease of first majority ownership in Latin American mines, but also the duration of the conflict as well as its intensity matter and also have a detrimental link with ownership.

Table 2. Social Conflict and Ownership: Ordinary Least Squares

	Dependent Variable: First Majority Ownership		
Presence of Conflict	-11.717***		
	(3.171)		
Duration of Conflict		-5.850***	
		(1.786)	
Intensity of Conflict			-3.292***
			(1.106)
Percent HH no sewerage	0.084	0.090	0.096
	(0.067)	(0.067)	(0.070)
Infant Mortality	-0.443**	-0.455**	-0.423**
	(0.187)	(0.183)	(0.185)
Percent indigenous population	-0.048	-0.047	-0.057
	(0.099)	(0.100)	(0.099)
Percent 20-59 population	0.157	0.155	0.158
	(0.228)	(0.228)	(0.230)
Mine Type: Underground	4.514**	4.627**	4.637**
	(2.211)	(2.247)	(2.252)
Mine Type: Open Pit	3.219	3.444	3.439
	(2.720)	(2.724)	(2.740)
Constant	92.664***	92.324***	90.327***
	(9.960)	(9.886)	(10.868)
R-squared	0.119	0.110	0.100
F-test	2.827	2.794	2.509
Observations	363	363	363

Source: Authors' own elaboration.

Notes: Method employed is ordinary least squares. Dependent variable is the share of the largest majority owner of the firm. (*) Statistically significant at ten percent; (**) statistically significant at five percent; (***) statistically significant at one percent. All regressions include commodity dummies, country fixed effects, neighborhood fixed effects, and clusters at the neighborhood level. The following controls are not reported (they are all non statistically significant): education dummies and population density.

The presence of a reported social conflict reduces the first majority ownership of the mining operations as much as 12 percent, while an increase in one day in the duration of a conflict is associated with a decrease in the majority ownership of about 6 percent for the period of study, on average. The intensity of a conflict also presents a negative association with respect to ownership and in particular, it is linked to a decrease in ownership share of around three percent in majority ownership when conflicts escalate to the following category. In particular, low-intensity conflicts with no people hurt are linked with a reduction in majority ownership share of about three percent compared to no reported conflict, while a severe conflict is linked to a decrease in majority ownership of around six percent. Regarding the set of controls employed, the rate of infant mortality (which proxies for poverty) showed a significant decreasing effect over the first majority ownership of nearly half a percentage point in all the specifications, as long as an underground mine type increases the biggest owner share by approximately 5 percent for the three regressions. Even though the rest of variables do not show a significant effect, the percentage of households with no sewerage, the percent of 20-59 (economically active) population and the open-pit mine type showed a positive coefficient, whereas the share of indigenous population near the locations of the mine properties revealed a negative coefficient regarding the first majority ownership.

Table 3. Social Conflict and Ownership: Alternative Methods

Dependent Variable: First Majority Ownership				
Odds Ratios	Probit	Logit	Ordered Logit	
Presence of Conflict	-0.027*	0.105**		
	(0.015)	(0.105)		
Duration of Conflict			0.532***	
			(0.088)	
Intensity of Conflict				0.686***
				(0.072)
Percent HH no sewerage	0.001	1.031	1.013	1.013
	(0.001)	(0.043)	(0.009)	(0.009)
Infant Mortality	0.000	1.002	0.954**	0.961*
	(0.001)	(0.093)	(0.020)	(0.021)
Percent indigenous population	-0.001*	0.939**	0.999	0.997
	(0.000)	(0.028)	(0.010)	(0.010)
Percent 20-59 population	0.001	1.114***	0.994	0.993
	(0.001)	(0.046)	(0.035)	(0.036)
Mine Type: Underground			1.593	1.552
			(0.909)	(0.876)
Mine Type: Open Pit			1.457	1.463
			(0.467)	(0.467)
Constant		2.778		
		(7.402)		
Pseudo R-squared	0.176	0.191	0.043	0.041
Observations	298	298	363	363

Source: Authors' own elaboration.

Notes: Dependent variable is the share of the largest majority owner of the mining company (*) Statistically significant at ten percent; (**) statistically significant at five percent; (***) statistically significant at one percent. All regressions include commodity dummies, country fixed effects, neighborhood fixed effects, and clusters at the neighborhood level. The following controls are not reported (they are all non-statistically significant): education dummies and population density. Also, Mine type dummies are not included in logit regression since they perfectly predict success.

Table 3 provides analogous exercises but in this case, we apply different econometric methods. In particular, we test the extent to which the presence, duration and severity of social conflict determines firm ownership. In order to do this, we apply both Probit and Logit methods when the dependent variable is presence of social conflict, as this is a dummy variable. Similarly, we apply and ordered logit method when testing for duration and severity of social conflicts, in order to be consistent with the way these two variables are measured. Unsurprisingly, our results are very similar to the ones in Table 2, which employed an ordinary least squares approach.

Having in mind that our findings above results can only detect association between variables and causality is difficult to affirm, it may be possible that the process may occur inversely that is, that social conflicts may be explained by ownership even when controlling for other observables.[3] A first exploratory approach would be to determine the role of mining ownership on the existence, intensity and duration of social conflicts, in particular, three different specifications may be fitted, binary, ordered and count. When doing this we find that ownership determines social conflict in the binary case with a statistical significance of ten percent. Similarly, in the case of ordered and count methods we find that ownership determines social conflict with a statistical significance of five percent. These findings, however, are not robust as they easily lose statistical significance to changes in specification. In short, these results highlight the fact that while it is reasonable to believe that there may be a causal link from conflict and ownership further analysis might be necessary in order to fully rule out the possible presence of endogeneity between these two variables.

Table 4. Sensitivity Analysis

Conflict Type	Cumulative Distribution Function (0)	Standard Error	Statistical Significance
A. Presence			
OLS	-0.764	0.215	0.945
B. Duration			
OLS	-0.638	0.178	0.944
C. Intensity			
OLS	-0.437	0.185	0.954

Source: Authors' own elaboration.

Notes: The ancillary variables employed are (i) intensively cultivated cropland in the vicinity of the mining property up to 25 kilometers; (ii) share of protected areas; (iii) share of homes where the predominant construction material is adobe; (iv) If stockholders are a foreign majority; that is if the share in capital is greater than 50 percent, in which case we assign the variable a value of 1 and otherwise we assign a value of zero; (v) market capitalization of the firm in billions of US dollars. The second column presents the standard deviation of the variable of interest while the first column shows the cumulative distribution function (0). A variable whose weighted cdf(0) is larger than 0.95 is significantly correlated with the dependent variable (i.e. robust) at a 5 percent significance level. This is shown in the third column. The cdf is computed assuming non-normality of the parameters estimated. Results are similar if we assume normality, instead. The specification shown is the same one employed in Table 2 and Table 3.

Finally, in Table 4 we go a step further and formally test whether our main findings are robust to changes in empirical specification by systematically including additional variables to the specification presented in equation (1). The systematic methodology that we employ follows Sala-i-Martin (1997). We augment the empirical specifications used in the equation presented in (a) by using a pool of five ancillary variables from the dataset and add up to two at a time in order to perform regressions that include all possible combinations of these five additional variables added in pairs.[4]

3 Since these results are not robust, they are not shown, but are available upon request. We would like to thank an anonymous referee for this comment.

4 The ancillary variables employed are (i) intensively cultivated cropland in the vicinity of the mining property up to 25 kilometers, (ii) share of protected areas that overlaps with the 25 kilometer radius buffer around each mining property; (iii) share of homes where the predominant construction material is adobe; (iv) If stockholders are a foreign majority; that is if

The variable of interest is said to be strongly correlated or robust with the dependent variables if the weighted cumulative distribution function, cdf (0) is greater than or equal to 0.95. In the first column of Table 4 we report the non-weighted means. The second column shows the aggregate cdf (0) under the assumption of non-normality. Finally, the third column presents the standard error computed from the non-weighted variance estimate for all the regressions and in both cases, ordinary least squares and instrumental variables. These additional results provide further support to our main findings above.

5. Conclusions

Using firm-level data for five countries in Latin America we find a statistically significant link between social conflict in rural areas and the ownership of mines, in which an increase in social conflict is associated with a decrease in the percentage share held by the first majority owner. Our results hold to a formal test of changes in specification. Interestingly, our findings are consistent with what is currently being observed in several Latin American countries where social conflict appears to be impacting the interest and ability of both domestic and foreign private sector to invest.

Our findings represent the first econometrically rigorous evidence that the strategic decision-making by mining firms may be affected by social conflict with communities, and builds on recent work that portrays social conflict as generating costs for enterprise (Menon & Sanyal, 2007; Franks et al., 2014; Klapper et al., 2012; Henisz et al., 2013; Owen, 2016). It seems probable that a reduction in the share held by the first majority owner of a mining company is a response to the costs and risks generated by a social conflict. In this regard, selling part of the ownership stake is likely an effort to diversify risk (political, economic, or financial), or raise capital in response to the pressures created by a social conflict. Although, our article is unable to distinguish between these hypotheses, it establishes the basic association between social conflict and core strategic concerns of mining companies. This is a new approach to social conflict, which has almost exclusively been treated as the dependent variable by the literature. Furthermore, the issues raised are of particular relevance in the context of greater concern on whether the private sector may want to further invest in developing countries given the social and political turmoil currently observed in countries such as Bolivia, Peru, Argentina, and more recently Chile and Ecuador.

Acknowledgements

We acknowledge the comments and suggestions of seminar participants at Georgia State University, Universidad del Pacífico, University of Connecticut and the World Bank. Angelo Cozzubo and Alan Wang provided excellent research assistance.

References

Ali, S. H. (2006). Gold mining and the golden rule: a challenge for producers and consumers in developing countries. *Journal of Cleaner Production*, *14*(3-4), 455-462. https://doi.org/10.1016/j.jclepro.2004.05.009

Arce, M., Polizzi, M. S., & Reeder, B. W. (2020). Willingness to protest over resource extraction in Latin America. *The Extractive Industries and Society*, *7*(2), 716-728. https://doi.org/10.1016/j.exis.2020.03.005

the share in capital is greater than 50 percent, in which case we assign the variable a value of 1 and otherwise we assign a value of zero; (v) market capitalization of the firm in billions of US dollars (see Haslam & Ary Tanimoune, 2016).

Arellano-Yanguas, J. (2011). Aggravating the Resource Curse: Decentralisation, Mining and Conflict in Peru. *Journal of Development Studies*, *47*(4), 617-638. https://doi.org/10.1080/00220381003706478

Bebbington, A., & Bury, J. (2014). Political Ecologies of the Subsoil. In: Bebbington, A., & Bury, J. (Eds). *Subterranean Struggles: New Dynamics of Mining, Oil, and Gas in Latin America*, 1-25. Austin: University of Texas Press.

Bebbington, A., Humphreys Bebbington, D., Bury, J., Lingan, J., Muñoz, J. P., & Scurrah, M. (2008). Mining and Social Movements: Struggles Over Livelihood and Rural Territorial Development in the Andes. *World Development*, *36*(12), 2888-2905. https://doi.org/10.1016/j.worlddev.2007.11.016

Bellows, J., & Miguel, E. (2009). War and local collective action in Sierra Leone. *Journal of Public Economics*, *93*(11-12), 1144-1157. https://doi.org/10.1016/j.jpubeco.2009.07.012

Bice, S., Brueckner, M., & Pforr, C. (2017). Putting social license to operate on the map: A social, actuarial and political risk and licensing model (SAP Model). *Resources Policy*, *53*, 46-55. https://doi.org/10.1016/j.resourpol.2017.05.011

Bridge, G. (2004). Mapping the Bonanza: Geographies of Mining Investment in an Era of Neoliberal Reform. *The Professional Geographer, 56*(3), 406-421. https://www.scribd.com/document/80842991/44-Mapping-the-Bonanza-Geographies-of-Mining-Neoliberal-Reform-Bridge

Canel, E., Idemudia, U., & North, L. L. (2010). Rethinking Extractive Industry: Regulation, Dispossession, and Emerging Claims. *Canadian Journal of Development Studies / Revue canadienne d'études du développement*, *30*(1-2), 5-25. https://doi.org/10.1080/02255189.2010.9669279

Collier, P., & Hoeffler, A. (2000). *Greed and Grievance in Civil War*. The World Bank.

Conde, M., & Le Billon, P. (2017). Why do some communities resist mining projects while others do not? *The Extractive Industries and Society*, *4*(3), 681-697. https://doi.org/10.1016/j.exis.2017.04.009

Dougherty, M. L. (2011). The Global Gold Mining Industry, Junior Firms, and Civil Society Resistance in Guatemala. *Bulletin of Latin American Research*, *30*(4), 403-418. https://doi.org/10.1111/j.1470-9856.2011.00529.x

Earl, J., Martin, A., McCarthy, J. D., & Soule, S. A. (2004). The Use of Newspaper Data in the Study of Collective Action. *Annual Review of Sociology*, *30*(1), 65-80. https://doi.org/10.1146/annurev.soc.30.012703.110603

Easterly, W., & Levine, R. (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions. *The Quarterly Journal of Economics*, *112*(4), 1203-1250. https://doi.org/10.1162/003355300555466

Eden, L., & Miller, S. R. (2004). Distance Matters: Liability of Foreignness, Institutional Distance and Ownership Strategy. In: Hitt, M. A., & Cheng, J. L. C. (Eds.) *Theories of the Multinational Enterprise: Diversity, Complexity and Relevance* (*Advances in International Management, Vol. 16*), Emerald Group Publishing Limited, Bingley, 187-221. https://doi.org/10.1016/S0747-7929(04)16010-1

Franks, D. M., Davis, R., Bebbington, A. J., Ali, S. H., Kemp, D., & Scurrah, M. (2014). Conflict translates environmental and social risk into business costs. *Proceedings of the National Academy of Sciences*, *111*(21), 7576-7581. https://doi.org/10.1073/pnas.1405135111

Haslam, P. A., & Ary Tanimoune, N. (2016). The Determinants of Social Conflict in the Latin American Mining Sector: New Evidence with Quantitative Data. *World Development*, *78*, 401-419. https://doi.org/10.1016/j.worlddev.2015.10.020

Haslam, P. A., Ary Tanimoune, N., & Razeq, Z. M. (2019). Is "being foreign" a liability for mining companies? Locational liabilities and social conflict in Latin America. *Resources Policy*, *63*, 101425. https://doi.org/10.1016/j.resourpol.2019.101425

Haslam, P., & Heidrich, P. (2016). From Neoliberalism to Resource Nationalism: States, Firms and Development. In: Haslam, P. A., & Heidrich, P. (Eds.) *The Political Economy of Natural Resources and Development: From neoliberalism to resource nationalism*. Routledge, Milton Park, 1-32. https://doi.org/10.4324/9781315687698

Henisz, W. J., Dorobantu, S., & Nartey, L. J. (2013). Spinning gold: The financial returns to stakeholder engagement. *Strategic Management Journal*, *35*(12), 1727-1748. https://doi.org/10.1002/smj.2180

Humphreys, D. (2000). A business perspective on community relations in mining. *Resources Policy*, *26*(3), 127-131. https://doi.org/10.1016/s0301-4207(00)00024-6

Jennings, C., & Sanchez-Pages, S. (2017). Social capital, conflict and welfare. *Journal of Development Economics*, *124*, 157-167. https://doi.org/10.1016/j.jdeveco.2016.09.005

Kemp, D., & Owen, J. R. (2013). Community relations and mining: Core to business but not "core business". *Resources Policy*, *38*(4), 523-531. https://doi.org/10.1016/j.resourpol.2013.08.003

Klapper, L., Richmond, C., & Trang, T. (2012). *Civil Conflict and Firm Performance*. The World Bank, Policy Research Working Paper, Washington, DC.

Menon, N., & Sanyal, P. (2007). Labor Conflict and Foreign Investments: An Analysis of FDI in India. *Review of Development Economics*, *11*(4), 629-644. https://doi.org/10.1111/j.1467-9361.2007.00423.x

Mercer-Mapstone, L., Rifkin, W., Louis, W., & Moffat, K. (2017). Meaningful dialogue outcomes contribute to laying a foundation for social licence to operate. *Resources Policy*, *53*, 347-355. https://doi.org/10.1016/j.resourpol.2017.07.004

Nachum, L. (2009). When Is Foreignness an Asset or a Liability? Explaining the Performance Differential Between Foreign and Local Firms. *Journal of Management*, *36*(3), 714-739. https://doi.org/10.1177/0149206309338522

Orihuela, J. C. (2017). Institutions and place: bringing context back into the study of the resource curse. *Journal of Institutional Economics*, *14*(1), 157-180. https://doi.org/10.1017/s1744137417000236

Owen, J. R. (2016). Social license and the fear of Mineras Interruptus. *Geoforum*, *77*, 102-105. https://doi.org/10.1016/j.geoforum.2016.10.014

Ponce, A. F., & McClintock, C. (2014). The Explosive Combination of Inefficient Local Bureaucracies and Mining Production: Evidence from Localized Societal Protests in Peru. *Latin American Politics and Society*, *56*(03), 118-140. https://doi.org/10.1111/j.1548-2456.2014.00243.x

Prno, J. (2013). An analysis of factors leading to the establishment of a social licence to operate in the mining industry. *Resources Policy*, *38*(4), 577-590. https://doi.org/10.1016/j.resourpol.2013.09.010

Sala-i-Martin, X. X. (1997). I Just Ran Two Million Regressions. *The American Economic Review 87*(2), 178–183. Papers and Proceedings of the Hundred and Fourth Annual Meeting of the American Economic Association (May 1997). https://www.jstor.org/stable/2950909

Steinberg, J. (2019). *Mines, Communities, and States: The Local Politics of Natural Resource Extraction in Africa*. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108638173

Svampa, M., Sola Alvarez, M., & Bottaro, L. (2010). Los movimientos contra la minería metalífera a cielo abierto: escenarios y conflictos. In: Svampa, M., & Antonelli, M. (Eds.) *Minería transnacional, narrativas del desarrollo y resistencias sociales*, 123-180. Buenos Aires: Biblos.

Urkidi, L., & Walter, M. (2011). Dimensions of environmental justice in anti-gold mining movements in Latin America. *Geoforum*, *42*(6), 683-695. https://doi.org/10.1016/j.geoforum.2011.06.003

Verbrugge, B. (2015). Decentralization, Institutional Ambiguity, and Mineral Resource Conflict in Mindanao, Philippines. *World Development*, *67*, 449-460. https://doi.org/10.1016/j.worlddev.2014.11.007

World Bank (2020). World Development Indicators. https://datacatalog.worldbank.org/dataset/world-development-indicators

Zaheer, S. (1995). Overcoming the Liability of Foreignness. *Academy of Management Journal*, *38*(2), 341-363. https://doi.org/10.5465/256683

Appendix 1

Definition of Variables

Presence of Conflict	Conflict occurs when otherwise unorganized individuals cooperate in an act of collective and public protest. The variable is theoretically grounded in the literature on contentious politics. It is measured as one when it is present and zero otherwise. This variable is researcher-coded based on the interpretation of conflict case histories. Source: Haslam & Ary Tanimoune (2016).
Intensity of Conflict	Measures the disruptiveness of the conflict for the enterprise. In particular, severity is defined on a five-point ordinal scale as: 0=No conflict, 1=Complaint, petition, strikes, protests, marches, 2=Legal action involving and/or broad protest interrupting operations, legal sanction. This variable is researcher-coded based on the interpretation of conflict case descriptions. Source: Haslam & Ary Tanimoune (2016).
Duration of Conflict	This variable was defined in two different ways, which was done in order to facilitate the application of the corresponding econometric method: (a) Definition in Table 2: Number of days that the conflict lasted from official announcement to official end as reported by the media; Source: Own data collection from Newspapers, as described on the text; (b) Definition in Table 3 Duration variable: 0=No conflict, 1=Single occurrences, 2=Continuing occurrences. Source: Haslman & Ary Tanimoune (2016).
Mine Type	An ordinal scale that assesses the extraction method of the project and increases in value with the expected impact on the surrounding environment. The variable is coded as Underground=1 ; Surface=2 ; Open-Pit/Underground=3 and zero otherwise. This variable is based on information from *Infomine* (now *Mining Intelligence*).
First Majority Ownership	We sort shareholders by capital ownership. The largest shareholder is defined as the "first majority owner". The share of the first majority ownership is our value of interest. This variable is based on information form *Infomine* (now *Mining Intelligence*).
Commodity	Three commodity dummies, gold, silver and copper. The corresponding commodity is defined as a dummy = 1 (when commodity equals gold, silver or copper) and otherwise=0
Infant Mortality	Mortality rate of male and female infants per 1000 live births. Source: World Development Indicators, World Bank (2020).
HH no sewage	Share of community next to the mining property with absence of public utilities in particular, sewage systems. This variable is based on national census information for the third level of government (equivalent to municipality). Source: World Development Indicators, World Bank (2020).
Active population	Share of population aged 20-59 in community located near the mining property and assumed to be economically active. This variable is based on national census information for the third level of government (equivalent to municipality). Source: World Development Indicators, World Bank (2020).
Percent Indigenous	Share of people in a community located near the mining property who self-identify as being of indigenous origin. This variable is based on national census information for the third level of government (equivalent to municipality). Source: World Development Indicators, World Bank (2020).

Source: Authors' own elaboration.

Appendix 2

Number of Mining Properties and Social Conflicts in the Dataset

Country	Number of Mining Properties	Number of Social Conflicts
Argentina	54	26
Brazil	179	16
Chile	100	23
Mexico	171	20
Peru	136	48
Total	640	133

Source: Haslam & Ary Tanimoune (2016).