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Does Social Conflict in Rural Regions Decrease Firm Ownership? Evidence from the Mining Sector in Latin America

Alberto Chong and Paul Haslam*

August 2019

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. We apply an instrumental variables approach and find that this link may be causal. The instrument employed is altitude of the mine location—which we claim is uncorrelated with the dependent variable, firm ownership—but is correlated with social conflict. This variable serves as an ideal instrument, as it complies with the exclusion restriction. Our results hold to a formal test of changes in specification.

Keywords: Ownership, Investment, Social Conflict, Latin America, Altitude

* Chong (achong6@gsu.edu): Georgia State University; Haslam (phaslam@uottawa.ca): University of Ottawa. The standard disclaimer applies.

Introduction

Despite the fact that large investment, foreign or domestic, is an essential economic policy for countries to grow, sometimes there are disagreements among economic agents that lead to protracted social conflict. This is particularly true in developing countries, which are precisely the ones that need investment the most. Furthermore, such conflicts tend to occur with relatively more frequency in poorer areas, as inhabitants tend to become suspicious on the benefits of such investments to themselves and to their livelihoods.[1] While the reasons and motivations of social conflict in these areas have been studied relatively extensively (e.g., Easterly and Levine, 1997; Collier and Hoeffler, 2000), the impact on the incentives to invest, which is the other side of the same coin, has been rarely studied empirically.

In this paper, we ask whether social conflict in rural areas decreases the likelihood of large investing 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, which are typically mostly composed by indigenous population. Regardless of whether this may be true, this may result in an increase in 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 to establish business interests

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

in such problematic areas. This is particularly true in the mining sector where very large initial investments are required (Bebbington et al., 2008; Bebbington, 2012).

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, there is a generalized belief that 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) the profit motive will tend to predominate—thus, making longer term negative impacts resulting of social conflicts rather unlikely. In this context, we believe that ownership is a good proxy for long-term commitment, one that may help reflect whether this is true, which from our perspective makes it interesting question to pursue. In addition, we believe that this is an important question, as in recent years there has been massive domestic and foreign investment in mining exploration and exploitation in many developing countries, which has increased the interaction between firms and remote rural communities and may have also increased the chance for potential social conflict.

The above is particularly true for Latin America, the geographical focus of this research and a region with comparative advantage in mining resources and where its mining related revenues account for a very sizable share of gross domestic product of the region. At the same time, this is a continent where most mining tends to be done in very poor, rural, and indigenous areas that are typically located at very high altitude. 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 commodities 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 (Bebbington, 2012). As a matter of illustration, in

countries such as Bolivia, Chile, and Perú, investment in mining activities easily accounts for upwards of 40 percent of the total foreign direct investment and about 10 to 15 percent of the annual gross domestic product. At the same time, however, externalities derived from these significant capital inflows have increases the likelihood of interaction between the people living in rural and remote regions where mining properties tend to be located with the large mining operations, which may increase the potential for social conflict (Bebbington and Bebbington, 2011).

In this paper we use an original database first collected by Haslam and Ary Tanimoune (2016) for the period 2011–13, 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 on social conflicts 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 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 the next section, we provide a brief review of the literature with emphasis on conflicts. This is followed by a description of the data and methodology. The next section shows our main findings, including a detailed description of the instrument employed in order to disentangle causality from social conflict to ownership. The final section summarizes and concludes.

Brief Review of the Literature

While to our knowledge there is no existing research on our question of interest, there is

some literature on conflict and related socio-economic outcome variables. 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.

Similarly, Bellows and Miguel (2009) discuss 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 the country after the civil conflict ended. Along these lines, Jennings and 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 find that an external threat on social capital is stronger in poor countries.

The paper closest to ours is Menon and Sanyal (2007) which analyzes 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

it is well known, a weakness of employing state-specific fixed effects is that they do not control for endogeneity in a convincing manner. In cross-section work what is crucially important from a methodological perspective is to come up with a credible variable that can be used as an instrument one that can convincingly comply with the so-called exclusion restriction.

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 and 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. While in theory our data cover the full universe of mining properties in five Latin American countries namely, Argentina, Brazil, Chile, Mexico and Peru, they were further expanded using additional data that were available via fieldwork.[2] The inclusion of this complementary information allows for the analysis of the determinants of conflicts at a subnational level. Overall, the dataset for this paper include 640 geo-located firms at the advance exploration stage and above, which allows for the construction of 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 cases derived from these countries are very well represented in the case study literature (Bebbington et al., 2008; Bebbington, 2012). Table 1 provides summary statistics of the variables

[2] The original data source is *Infomine* an industry site that collects data from stock market regulatory flings GIS information, country surveys, and census data. The data we employ do not include properties at the "raw prospect" or "exploration" phases, only those at the "advanced exploration" stage or higher.

employed in this paper. In addition, the variables that capture social conflict measures are manually constructed by Haslam and Ary Tanimoune (2016) from case summaries and news reports of Latin American civil society information clearinghouses. The majority of reports come from OCMAL *(Observatorio de Conflictos Mineros de America Latina),* MAC *(Mines and Communities)* reports filed by the Ombudsman's office. They were further complemented using information retrieved from available media by us.[3] Figure 1 presents the geographical location of conflicts and mining properties for Latin American countries between 1998 and 2012.[4]

We sort ownership shares for each mining company and select the owner with the largest share. 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 significant in terms of influence and behavior to the rest of the shareholders as the largest shareholder is typically considered the lead owner. We use the share of this first owner as our dependent variable. On the other hand, 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. The second proxy measures duration of conflict in number of days. Finally, the third measure is a three-category indicator of intensity of the conflict as it captures the extent to which violence occurred (peaceful, violent but with no people hurt, and violent with people hurt). Appendix 1 provides the list of variables employed as well as their corresponding definitions, which include basic firm and property characteristics, socio-

[3] Media include the national newspapers "El Comercio" as well as other important newspapers with large national circulation, in particular, "Expreso," "Peru 21" and "La Republica." We also consider national television networks, which include four private networks (Frecuencia Latina, Panamericana Television, America Television, and Andina de Television) and the National State Channel (Radio Television Peruana).

[4] As Haslam and 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 mine 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.

environmental and livelihoods characteristics, basic socio-economic, demographic conditions of the nearby population, and social conflict.

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

$$Ownership_i = \Lambda + \alpha Conflict_i + \Pi Conditions_i + \Theta MineType_i + \varepsilon_i \ (1)$$

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 native 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 ε is an error term. In addition, all regressions include commodity fixed effects, country fixed effects, mine-fixed effects and clusters at the mine level.

Whereas linear probability estimates can only detect an association between our variable of interest and the dependent variable, we also pursue an instrumental variables methodology using the altitude of the mine as our instrument. Formally, our instrumental variables specification is as follows:

$$Ownership_i = \Lambda + \alpha E[Conflict_i|Z_i] + \Pi Conditions_i + \Theta MineType_i + \varepsilon_i \ (2)$$

$$Conflict_i = \dot{q} + \varphi Z_i + \Omega Conditions_i + \Gamma MineType_i + \eta_i \ (3)$$

where $E[Conflict_i|Z_i]$ is the predicted value of the conflict variable and Z_i represents the instrumental variable, namely the altitude in meters.

It is reasonable to expect that when livelihood choices based on agriculture, animal

husbandry or aquaculture are severely limited due to arid climates or high altitude, there is less resistance to mining. On the other hand, and as a matter of opportunity cost, it is reasonable to expect that the consequences of mine altitude at median or lower altitudes, with relatively abundant livelihood alternatives should translate in more resistance to mining. Thus, according to this view, our variable of interest, social conflict, is negatively correlated with the instrument proposed, altitude. Recent empirical evidence on this regard has been produced by Haslam and Ary Tanimoune (2016).

In addition, the physiological literature shows that high-altitude environments can be debilitating as moderate hypoxia may induce substantial alterations in physiological and psychological parameters. This is translated in adverse changes in mood states, impairment in mental performance, behavior, and cognitive functioning during altitude exposure (Bahrke and Shukitt-Hale, 1993). More importantly, it is believed that behavioral impairments caused by ascent to high altitude may impact judgment as well affected. The adverse behavioral consequences of hypoxia are dependent on both the level of altitude and the duration at altitude. Some research indicates that some performance decrements induced by extreme altitudes may persist for up to a year or longer after individuals return to lower elevations. The neurochemical basis for mood and performance change, which is linked to behavioral decrements at altitude may be attributable to changes in neurochemistry (Shukitt-Hale and Lieberman, 1996).

In fact, recent research shows that long-term exposure to high altitude with hypoxia may lead to impairment on conflict control (Ma et al., 2015). This was tested using treatment and control groups in which event related potentials were recorded in a flanker task or set of response inhibition tests used to assess the ability to suppress responses that are inappropriate in a particular context in order to investigate the influence of high altitude on conflict control in the high-altitude

group and the low-altitude group. By doing this, Ma et al. (2015) show cognitive conflict modulation, which suggests that long-term exposure to high altitude affects conflict control in the conflict-resolving stage, and that attention resources are decreased to resist the conflict control in the high-altitude group, which confirms that conflict control may be influenced by long-term exposure to high altitude (Ma et al., 2015). In summary, previous studies show that significant correlation between altitude and potential social conflict may be correlated, which is consistent with the necessary condition that our variable of interest should be correlated with our chosen instrument.

On the other hand, it is not reasonable to expect that decisions on ownership would be directly linked with the altitude of the mining property. While both direct and indirect considerations such as profit, size of the reserve area and type of commodity may be important factors to proceed with investment and ownership, we believe that altitude is not one of them for several reasons. First, the technological barriers related to accessing mining areas located at high altitudes have been overcome to the point where not even the presence of domestic infrastructure is needed. Second, the marginal cost of accessing locations at high altitudes is negligible given the vast fixed costs that mining companies have to spend even before breaking ground for the first time—more so in times of skyrocketing prices, which coincides with our period of study (Haslam and Ary Tanimoune, 2016). Third, the political and administrative costs associated with obtaining exploration and exploitation permits are very significant and offer no economies of scale. Fourth, most of the countries included in this study enjoy some market power in their specific minerals that they produce and as such, firms interested in doing business may have some difficulties finding alternative countries with the same geopolitical structure where to invest in the long term.[5] This is

[5] For instance, while China ranks second in production of copper and silver in the world, it would be unrealistic to consider that this country would open its barriers to both the domestic and international private firms for investment.

illustrated by the fact that Latin American countries rank among the top producers of several minerals in the world. For instance, in 2017 Chile and Peru occupy the first and third positions, respectively, among top country producers of copper in the world. Similarly, Mexico and Peru occupy the first and third positions, respectively, among top silver producers in the world. Finally, Peru is among the top five producing country of gold while Mexico ranks number nine in the world. In addition, all the five countries considered in this paper also produce very significant amounts of several other minerals placing them among the top five to top 10 producing countries of iron ore, tin, aluminum, bauxite and several others (USGS, 2017).

To the extent that our instrument is correlated to our variable of interest but not correlated to our dependent variable, our identification strategy is a sensible one; something that is supported by the facts presented above. As such, we are confident that any statistically significant link between social conflict and ownership may be considered as causal when using an instrumental variables approach.

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 in terms of violence matter and have a detrimental link with ownership.

The presence of a known social conflict reduces the first majority ownership of the mining operations as much as 12 percent, while an increase in one day of the duration of a conflict diminish

the majority ownership in 6 percent. The intensity of a conflict also presents a negative impact in the ownership thus decreasing the biggest owner share in 3 percent when the conflict escalated to its following category of violence. That is, a violent conflict with no people hurt will reduce the share in 3 percent compared to a peaceful dispute, while a violent event where people got hurt will reduce it in 6 percent.

Regarding the set of controls employed, the rate of infant mortality showed a significant decreasing effect over the first majority ownership of nearly one half of a percentage point in all the specifications, as long as an underground mine type increases the biggest owner share in 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 20-39 population and the open pit mine type showed a positive coefficient, whereas the share of native population in the locations of the mine properties revealed a negative coefficient respecting the first majority of ownership.

Having in mind that these results computed through ordinary least squares can only detect association between variables and not causality, we present findings using instrumental variables, too. Table 3 shows the results using an instrumental variables approach, which indeed supports our causal claim. As described above, we employed the altitude of mine location in meters as our instrument. We believe that this instrument fulfills the assumptions required by this approach since altitude may be highly correlated with the presence of conflicts but unlikely that it may be correlated with ownership by other direct channels, ones that do not go through social conflicts.

The results for the instrumental variables regressions are presented in Table 3. As in the previous case, we find that our three measures of conflict are negative and statistically significant at conventional levels. In this regard, the presence of conflict reduces the first majority ownership

in 18 percent, an increase in one day in the duration of the dispute diminish this share in almost 10 percent, while an increase in the intensity of the struggle has a declining effect of 6 percent. The significance levels and sign of the respective control variables have an analogous behavior as the ordinary least squares estimates. Unsurprisingly, the related coefficients of the instrumented regression are higher than the ordinary least squares ones, which is quite expected econometrically as the instrumental variables is essentially capturing a LATE effect. This give support to the idea that we our finding is, in fact, causal.

Finally, in Table 4 we go a step further and formally test whether our findings are robust to changes in specification empirical specification by systematically including additional variables to the specification presented in equation (1). The systematic methodology that we employ follows Sala-i-Martín (1997). We augment the empirical specifications used in the equation presented in (a) by using a pool of five ancillary variables from our 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.[6]

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

[6] The ancillary variables included are (i) cropland in the vicinity of the mining property up to 25 kilometers; (ii) share of protected areas of buffer's area that overlaps with a protected area at 25 square kilometers; (iii) share of homes where the predominant construction material is adobe; (iv) if stockholders are foreign majority: share in capital > 50 = 1, otherwise=0; (v) market capitalization of the firm in billions of US dollars.

further support to our main findings above.

Conclusions

Using firm-level data for five countries in Latin America, we find a statistically significant link between social conflict in rural areas and ownership of mines. We apply an instrumental variables approach and find that the link appears to be causal, as our instrument, altitude of the mine location, is uncorrelated with the dependent variable, foreign ownership, although previous evidence indicates that it is highly correlated with social conflict, thus providing an ideal instrument as it complies with the exclusion restriction. Our results hold to a formal test of changes in specification.

From a policy perspective, our paper shows that social conflict can have significant consequences for future domestic and foreign investment in countries, a crucial finding in the context of developing countries that constantly seek ways in which to pursue optimal economic reform. Our paper shows that social conflict may lead to long-term negative consequences in terms of economic growth.

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Table 1. Summary Statistics

	Mean	Std Dev	Min	Max
Dummy Social Conflict	0.482	0.321	0	1
Conflict Duration	69.35	43.25	1	198
Conflict Severity	1.323	0.242	0	2
Percent HH No Sewerage	0.711	0.147	0	1
Infant Mortality	0.358	0.242	0.165	0.835
Percent Native Population	0.902	0.125	0.795	0.984
Access to Piped Water	0.464	0.363	0	1
Percent 20-39 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

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

Table 2. Social Conflict and Ownership

	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 Native Population	-0.048	-0.047	-0.057
	(0.099)	(0.100)	(0.099)
Percent 20-39 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

Method employed is ordinary least squares. Dependent variable is defined as dummy equal to one when foreign ownership is greater or equal to 50 percent. (*) Statistically significant at 10 percent; (**) statistically significant at 5 percent; (***) statistically significant at 1 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, population density and precipitation.

Table 3. Social Conflict and Ownership: Instrumental Variables

	Dependent Variable: First Majority Ownership		
Presence of Conflict	-18.333**		
	(8.551)		
Duration of Conflict		-9.823*	
		(5.399)	
Intensity of Conflict			-5.743*
			(3.111)
Percent HH No Sewerage	0.163	0.167	0.172
	(0.187)	(0.187)	(0.189)
Infant Mortality	-0.653**	-0.655**	-0.712**
	(0.287)	(0.288)	(0.301)
Percent Native Population	-0.111	-0.123	-0.128
	(0.121)	(0.129)	(0.131)
Percent 20-39 Population	0.457	0.488	0.470
	(0.321)	(0.328)	(0.330)
Mine Type: Underground	6.333**	6.743**	6.853**
	(2.342)	(2.443)	(2.546)
Mine Type: Open Pit	6.868	6.112	6.086
	(4.780)	(4.784)	(4.746)
Constant	91.943***	96.964***	96.397***
	(15.195)	(16.426)	(16.148)
R-squared	0.177	0.178	0.169
F-test (Stock-Yogo)	19.164	19.147	19.854
p-value weak instrument	0.95	0.95	0.95
Observations	363	363	363

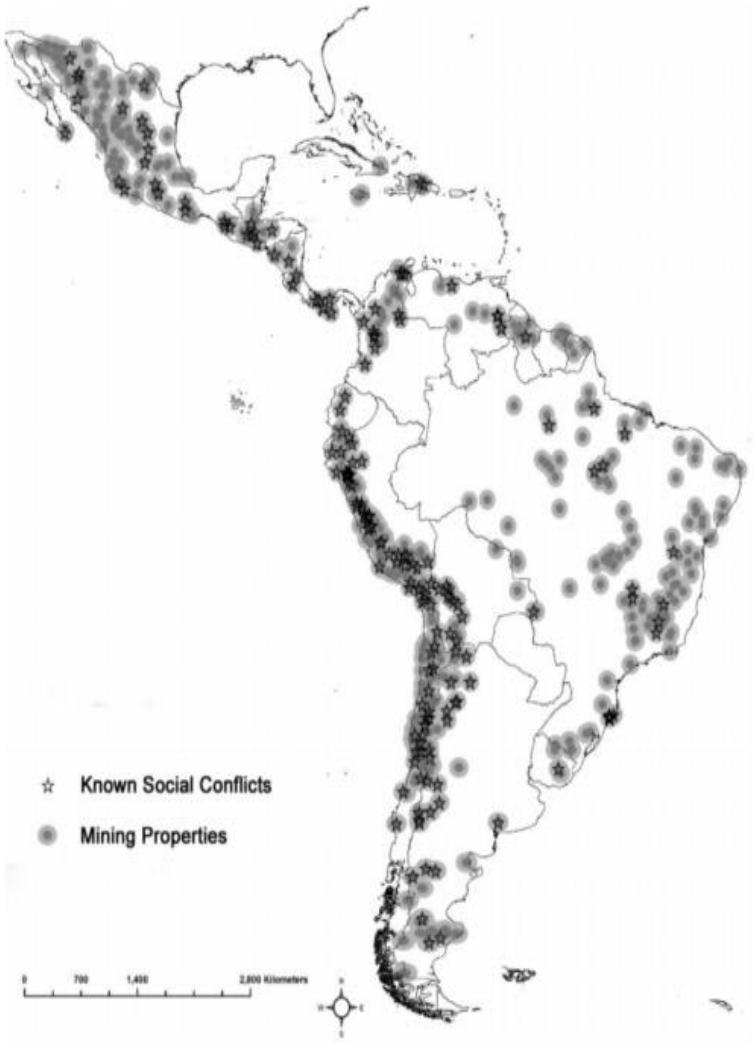
Instrument is altitude of mine location in meters; Dependent variable is defined as dummy equal to one when foreign ownership is greater or equal to 50 percent. (*) Statistically significant at 10 percent; (**) statistically significant at 5 percent; (***) statistically significant at 1 percent. All regressions include commodity dummies, country fixed effects and clusters at the community level. The following controls are not reported (they are all non-statistically significant): education dummies, population density and precipitation.

Table 4. Sensitivity Analysis

Conflict Type	Cumulative Distribution Function (0)	Standard Error	Statistical Significance
A. Presence			
OLS	-0.764	0.215	0.945
Inst. Var.	-1.142	0.542	0.946
B. Duration			
OLS	-0.638	0.178	0.944
Inst. Var.	-0.843	0.332	0.952
C. Intensity			
OLS	-0.437	0.185	0.954
Inst. Var.	-0.563	0.311	0.958

The ancillary variables employed are described in Footnote 5 in the text. 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.

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



Source: Haslam and Tanimoune (2016)

Appendix 1. Definition of Variables

Presence of Conflict	Conflict is defined as the moment when the obstacles to collective action among otherwise unorganized individuals are overcome, and coalesce in an identifiable group that makes ongoing, *public* demands on civil authorities, or the authority-delegate, in many cases the firm.[7] It is measured as one when it is present and zero otherwise.
Intensity of Conflict	Asks about what causes collective action to deteriorate into violent acts: Under what conditions collective action against mining emerges? It is measured by the extent to which violence occurred: peaceful, violent but with no people hurt, and violent with people hurt, as reported by the media.
Duration of Conflict	Number of days that the conflict lasted from official announcement to official end as reported by the media.
Mine Type	Underground=1 ; Surface=2 ; Open-Pit/Underground=3 and zero otherwise
Altitude	Altitude of localized mine in meters above sea level.
Majority Ownership	If stockholders are majority: share in capital > 50 = 1, otherwise=0
State	If there is any State participation in the capital (Foreign-State, Local-State, State-Foreign, State-Local, State)=1, otherwise=0
Commodity	Three commodity dummies, gold, silver and copper. The corresponding commodity is defined as a dummy = 1, otherwise=0
Sewage	Share of community next to the mining property with absence of public utilities in particular, sewage system
Primary education	Share of community located next to mining property with primary education
Secondary education	Share of community located next to mining property with secondary education
Post-secondary education	Share of community located next to mining property with tertiary education
Active population	Share of population aged 20-59 in community located next to mining property
Indigenous	Share of aboriginal people in community located next to mining property
Population density at 25 km	Density per square kilometer at 25 squares kilometers.
Precipitation at 25 km	Total annual amount of precipitation in mm at 25 square kilometers

Source: Haslam and Ary Tanimoune (2016) and own data

[7] This approach corresponds with the definition of social protest from the contentious politics literature, which underlines the key features of observable participation of individuals in collective action, claims upon authority that threaten powerful interests, and publicness (Haslam and Ary Tanoumine, 2016).