

The Unwritten License: The Social License to Operate in Latin America's Extractive Sector

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The Unwritten License: The Social License to Operate in Latin America's Extractive Sector*

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December, 2021

Abstract

The Latin America and the Caribbean region has benefited significantly from economic growth driven by the extractive sector. At the same time, the region has experienced high levels of conflicts related to this sector. This paper presents an overview of citizens' perceptions of the extractive industries in Bolivia, Colombia, Ecuador, Peru, and Venezuela. Using a representative sample for each country, we identify regional and country-specific determinants of the Social License to Operate (SLO). The SLO is an unwritten license of social approval accorded to extractive projects by citizens. In this paper, we investigate a generalized version of the SLO, capturing public sentiment toward the mining and the oil and gas sectors in general. While our findings confirm that perceptions vary across countries, we show that governance is the strongest predictor of trust between citizens and the extractive sector, which is consistent with the evidence in the literature. In addition, procedural justice, distributive justice, and nationalism play essential roles in shaping individuals' attitudes. These findings suggest that strengthening government institutions could contribute to the prevention of conflict around extractive industries.

Keywords: Social License, natural resources, mining, oil and gas, Latin America and the Caribbean.

JEL classification: L71, L72, C83.

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1 Introduction

This paper presents an overview of citizens' perceptions of the extractive industries in the Andean countries (henceforth CAN): Bolivia, Colombia, Ecuador, Peru, and Venezuela. Using a representative sample from each country, we identify both regional and country-specific traits associated with the Social License to Operate (SLO) accorded by citizens. The SLO in the extractive industries exists as an intangible and unwritten agreement that a project is seen as having the broad, ongoing approval of the local community (Prno, 2013; Poelzer et al., 2020). In other words, the legitimacy granted by the SLO is attained when social expectations align with the distribution of costs and benefits (Haslam et al., 2019).

Latin America and the Caribbean (LAC) has the highest prevalence of mining-related conflicts (Andrews et al., 2017) of any region in the world, and those conflicts tend to be more violent than elsewhere (Albrieu and Palazzo, 2020). At the same time, as a resource-rich region, the LAC region has benefited significantly in terms of economic growth driven by the extractive sector. In fact, over the last decade, natural resources rents accounted for approximately 4.1% of regional GDP. Certain countries are extremely reliant on natural resources, with rents by themselves accounting for 9.5% of GDP in Ecuador, 7.5% in Bolivia, 6.9% in Peru, and 5.8% in Colombia, compared to the worldwide average of 2.9% (World Bank, 2021).¹

Important efforts have been made to gather data on extractives-related conflicts in the region. For example, the Latin American Observatory of Mining Conflicts (OCMAL, by its Spanish acronym) curates a database of conflicts in LAC, covering incidents over the past two decades that include 9 conflicts in Bolivia, 8 in Ecuador, 16 in Colombia, 39 in Peru and 2 in Venezuela.² Other databases collect information at the national level only. For example, the Organismo de Evaluación y Fiscalización Ambiental (OEFA)³ gathers data on natural resource exploitation conflicts in Peru, and examined citizens' perceptions in a 2017 survey. As such endeavors are typically carried out at the country level, their methodologies do not tend to be consistent across nations and the time periods are not often parallel. For instance, Brújula Minera (Mining Compass) stands out for its tracking of citizens' perceptions about the mining industry over the past seven years, although its efforts are limited to Colombia. In 2021, for the first time, the project expanded the study to include smaller samples in seven other Latin American countries.⁴

We contribute to the existing literature by enriching the understanding of citizens' percep-

¹Authors' calculations for the 2010–2019 period using the World Bank's data catalog.

²Note that there are databases combining conflict incidents and the spatial locations of natural resources (see Denly et al. (2021) for a comprehensive data set of 197 natural-resource extraction sites georeferenced across 116 countries). Here, however, we only focus on extractives-related conflict, in contrast to the large body of literature analyzing the so-called "natural resource curse." This literature often uses a broader definition of conflict that does not necessarily involve the extractive industries.

³Data from OEFA as of June 15, 2021. [link]

⁴The study can be accessed here: [link]

tions toward the extractive industry in LAC. Our regional-level analysis compares the responses to the same survey questions across representative samples from five Andean countries. To our knowledge, this is the first study that compares perceptions of the sectors of mining and oil and gas in Bolivia, Colombia, Ecuador, Peru, and Venezuela. We find that the relationship between the SLO and its institutional and demographic determinants in Latin America is consistent with the evidence in the literature. Governance is the strongest predictor of trust between host communities, governments, and companies; however, procedural justice, distributive justice, and nationalism also play important roles in shaping individuals' attitudes. An average individual who has positive views of each institutional determinant, independent of the subsector, is around 40 percentage points more likely than an individual with only negative perceptions to report that the industry is positive for the country. We also provide evidence of the interaction of demographic characteristics with the SLO and with opinions about the institutional setting.

Citizens' perceptions lie at the heart of the SLO. Here, we concentrate on national-level sentiment, which is an important complement to local-level sentiment: both are intertwined and influence each other. There is much to be done in terms of identifying and preventing potential extractives-related conflicts and resolving actual ones. Continuing to amass data at various scales will lead to the better comprehension of conflict and in turn the devising of solutions. Data analysis can provide key insights, informing conversations between communities, government, and the private sector by offering a nuanced understanding of the priorities, goals, and expectations of all involved.

The rest of the paper is organized as follows. Section 2 discusses the existing literature and categorizes the determinants of the SLO. This analysis underpins the design of the survey and the empirical analysis. Section 3 presents the data and highlights some initial insights from the survey. Section 4 describes the empirical analysis used to understand how the SLO and its determinants interact. In Section 5 we present the results and estimate different robustness tests. Section 6 discusses strategies for realizing the SLO using the literature review and the results from the survey, and Section 7 concludes.

2 Determinants of the SLO in the extractive industries

The Social License to Operate (SLO) can be understood as the process by which natural resource projects obtain social approval from multiple stakeholders (Van Putten et al., 2018). The concept is dynamic and can change depending on the context, as there is no unique formula for obtaining social approval. Different factors and agents affect the decisions of host communities to grant SLO. An agreement is reached and maintained when social expectations align with the distribution of each project's costs and benefits (Haslam et al., 2019).

As an intangible, unwritten, and dynamic concept, the concept of the SLO is difficult to frame and synthesize. In the literature, the SLO is often confused with corporate social

responsibility (CSR) while, in reality, CSR is just an instrument that helps to obtain the SLO. Specifically, companies guided by a commitment to CSR try to maximize their contribution to sustainable development instead of maximizing profits only (Cesar, 2020). This formulation ignores the concerns of the communities and in particular of their members affected by companies' actions; in the SLO, companies and communities are equally important stakeholders. This paper focuses on the main determinants of individuals' perceptions to address this gap in the literature.

We categorize each determinant as being either primarily institutional, socioeconomic, or demographic in nature. However, these characteristics are not strictly independent. Their interplay affects individuals' attitudes and behaviors, interacting with cognitive, affective, and contextual beliefs, and shaping individuals' judgments about specific policies or projects (Stankey and Shindler, 2006).

2.1 Institutions and perceptions

The interaction between public perception and the local context are an indication of how the characteristics of local and national institutions can affect social approval. Institutional determinants of the SLO are usually mediated by trust, legitimacy, and government capacity (Van Putten et al., 2018). With regard to the extractive industries, trust in the state as a guarantor of environmental standards and appropriate revenue distribution is an essential determinant of the SLO (Jartti et al., 2020; Smits et al., 2017). There are two types of public or institutional trust: integrity based and competence based. The former depends on whether the trustee adheres to specific values or principles,⁵ and the latter on whether the trustee has the knowledge and skills necessary to perform their role (Poppo and Schepker, 2010; Smits et al., 2017; Vaske et al., 2007; Poelzer et al., 2020; Winter et al., 2004; Ford et al., 2020; Moffat and Zhang, 2014).

Worries over negative externalities on *social infrastructure*⁶ increase when there is little trust in the government to properly regulate the impact of extractive activities (Cruz et al., 2020; Moffat and Zhang, 2014). Latin American communities face concerns over a number of issues: the emergence of tensions due to increased competition for jobs and disproportionate changes in the number of men compared to women, which are correlated with an increase in gender-based crime and alcohol consumption, are among the factors that undermine the social infrastructure. Expectations about these factors affect project acceptance. Companies and institutions that work closely with host communities can help build solid relationships and reduce the distress caused by potential negative externalities (Milano, 2018; Moffat and

⁵"Trustee" refers to an agent that receives control or power of administration in trust by the trustor (Schoorman et al., 2007). In the framework of this study, the government and the extractive companies act as the trustee, while the host communities are the trustors.

⁶Social infrastructure is defined here as the state of public assets considered to be guaranteed in a society. This concept encompasses the current status of the labor market, public services infrastructure, housing, crime, and insecurity, among others (Moffat and Zhang, 2014).

Zhang, 2014).

The incentives for companies to abide by the consensus reached with stakeholders are defined by the strength of the rule of law, the government's enforcement capacity, and the level of monitoring and accountability. These institutional characteristics (which we refer to as *governance capacity*) are critical factors in the extractive industry, because governments are in charge of granting licenses, enforcing social and environmental laws, and managing royalties from projects. Perceptions of the level of local and national governance capacity influence public acceptance of natural resource extraction projects and the confidence in the equitability of the arrangements between host communities and companies (Zhang et al., 2015; Jartti et al., 2020).

In general, communities prefer to be part of the decision-making process and to be rewarded for allowing companies to extract resources. These preferences reflect individual community members' sense of justice and fairness and, in particular, society's conception of the intrinsic values of *distributive justice* and *procedural justice* (Jartti et al., 2020). Distributive justice refers to equality in the distribution of benefits from natural resource exploitation projects. This concept of justice focuses on outcomes and does not take into account the process by which they are achieved. This may directly affect the SLO if communities do not observe positive impacts on their wealth (Zhang et al., 2015). Procedural justice, on the other hand, focuses on the process itself and specifically on whether all involved parties contribute to the decision-making process. It requires four elements to be present: access to information, access to (and meaningful participation in) decision-making, decision-makers' neutrality, and access to legal processes for achieving redress. In communities with low perceived levels of procedural justice, a common belief is that state institutions promote the interests of companies rather than regulate companies to serve the public interest (Bowles et al., 2019); such a belief may reflect or deepen a negative perception of governance capacity writ large. These mechanisms highlight the centrality of ideas of justice and fairness to the SLO (Zhang et al., 2015; Jartti et al., 2020; Moffat and Zhang, 2014).

Finally, *value similarity* and the *foreignness of the firm* are also determinants of trust and SLO. Value similarity is a concept related to integrity-based trust, whereby people's confidence in government agencies and private companies depends on the extent to which communities view these institutions' values as similar to their own. In other words, companies with a deeper understanding of host communities' opinions, values, and goals, and with an approach to management that reflects these local views in practice attain higher levels of social acceptance and stronger bonds of trust (Vaske et al., 2007). This also helps to explain in part the increasing number of conflict incidents involving foreign companies worldwide. The foreignness of the firm is particularly important in Latin America, where the public has more-negative feelings toward foreign companies, feelings that pave the way for such companies to be disproportionately penalized in comparison to local firms (Andrews et al., 2018; Haslam et al., 2019; Jartti et al., 2020).

2.2 Socioeconomic characteristics

Obtaining the SLO is partially a reflection of expected and observed direct impacts on communities and individuals' wealth. This reality is intertwined with the concepts of *social infrastructure* and *distributive justice*. For host communities, development projects may generate direct positive impacts, including the generation of employment, human capital formation, and increased investment in infrastructure (Moffat and Zhang, 2014; Cruz et al., 2020). These effects are often felt even before a company has started the natural resource exploitation and can, therefore, shape public opinion through higher perceived benefits from the project.

However, the direct impact of the extractive industry is not always positive and production externalities can harm individual wealth. We identify two types of externalities: wealth externalities, and environmental externalities (Haslam et al., 2019). In mining, for example, the likelihood of social conflict increases in poor areas with precarious agricultural livelihoods—this is an example of a wealth externality. An environmental externality, by contrast, is when air and water quality are degraded by a mine's operation. Attitudes and preferences in these scenarios do not necessarily involve the government as the intermediary, and the public's decision to reject a project may be independent of their levels of trust in local and national institutions.

2.3 Demographic characteristics

Awareness of the two types of externalities is not necessarily uniform in communities contemplating a new extractive project. The range of attitudes that individuals may hold points to the interaction between demographic characteristics and the SLO. Gender, age, and education, for example, have been shown to be important factors in different contexts (Poelzer et al., 2020; Measham and Zhang, 2019; St-Laurent et al., 2019; Jartti et al., 2020; Straughan and Roberts, 1999; Lesser et al., 2020).

Extractive industries provide unequal opportunities to women and men, and these differences in perceived benefits contribute to the construction of heterogeneous attitude toward the sector. In developing countries in particular, the economic benefits from mining—specifically, new job opportunities—usually go to men (Poelzer et al., 2020). A similar argument holds for oil and gas, where women globally hold less than 15% of all positions in the sector (BID, 2018). As such, women tend to respond more negatively toward new projects and acknowledge perceived national and local benefits from the industry to a lesser degree (Measham and Zhang, 2019).

Education is correlated with higher levels of trust between communities and important stakeholders in the sector. For example, St-Laurent et al. (2019) find that a higher level of education predicts greater trust in different forestry actors. Similarly, familiarity with the industry and a clear understanding of a project's risks and benefits help to increase the level of community acceptance. Familiarity with the mining industry is a positive predictor of the

SLO's being accorded, but it does not have an impact on trust levels (Jartti et al., 2020).

The evidence of the relationship between age and the SLO is mixed. The literature tends to focus on the heterogeneity in environmental consciousness as the channel between the two. Younger people, especially cohorts growing up in a context in which environmental concerns are salient, are more likely to be environmentally responsible (Straughan and Roberts, 1999). However, older people are more involved in recycling behaviors (Liobikienė and Juknys, 2016). We argue that this relationship has not yet been precisely estimated and that environmental awareness and age may not be clearly correlated in a particular direction (Straughan and Roberts, 1999).

The final characteristic that we find relevant is geographical location. As is often the case with oil wells and mining sites, "stakeholders living in peripheral zones are likely to be poorer, less connected, have fewer economic opportunities, and be more parochial in attitude [than the average population]" (Haslam et al., 2019). Furthermore, mining can frequently have environmental impacts on local rivers and streams. In some cases, mining companies circumscribe the SLO to communities near the mine, neglecting downstream communities that are also directly impacted by the mining operations (Prno, 2013; Bowles et al., 2019). This poses risks not only to the local communities in which the project is implemented, but also to nearby populations. Similarly, the misalignment between local values and societal values in a country can create tensions between stakeholders. Societal values related to climate change and environmental protection could conflict with a local desire for jobs and economic growth (Lesser et al., 2020).

3 Data

A survey of a minimum of 1,200 people was carried out in each of the Andean countries (Bolivia, Colombia, Ecuador, Peru and Venezuela). Data were collected via cellphone calls between January and March 2021 from citizens 18 years of age and older. The survey responses analyzed here were collected as part of the Public Opinion Survey (henceforth POS), which has been conducted by CID-Gallup⁷ in triannual waves in Colombia, Ecuador, and Peru. We use data from the first wave ever launched in Bolivia, and in Venezuela data collection was conducted by a separate consulting firm.⁸ We restrict our analysis to a subsample of 5,312 individuals who completed responses for all of our variables of interest. Table 3.1 shows each country's sample size and data collection period.

All further analyses and results refer exclusively to the subsample of completed interviews for which no key data are missing. Sampled data are representative at the national level in terms of gender, age, educational attainment, and region for Bolivia, Colombia, Ecuador, and

⁷Consultoría Interdisciplinaria en Desarrollo S.A. (CID).

⁸When data were collected, the Public Opinion Survey (POS) by CID Gallup did not cover Venezuela. Thus data from this country were collected by the Venezuelan firm, Consultores 21. We applied the same data collection procedure as in all other countries.

Table 3.1: Survey sample size by country

Country	Sampled	Completed	Data Collection Period
Bolivia	1,204	954	Jan. 22–Feb. 04, 2021
Colombia	1,200	936	Jan. 16–Feb. 06, 2021
Ecuador	1,202	917	Jan. 08–Jan. 20, 2021
Peru	1,200	997	Jan. 05–Jan. 16, 2021
Venezuela	2,000	1,508	Feb. 24–Mar. 12, 2021
Total	6,806	5,312	

Note: Here, "completed" refers to the number of respondents with non-missing values for variables associated with perceptions of mining, and oil and gas, or missing sociodemographic variables, such as gender, age, and educational attainment.

Peru. For Venezuela, sampled data are representative at the national level in terms of the same variables, except for educational attainment. Table 3.2 shows how the sample compares to country-level demographics in terms of gender, age, and educational attainment when only completed surveys are considered. We use a harmonized database of household survey data compiled by the Inter-American Development Bank as our benchmark for national-level demographics (BID, 2021). Overall, in the sample of completed surveys, 47% of respondents are women, 54% are at least 35 years old and 69% have at least completed high school. The gender balance of the sample is similar to countrywide values. The population in our sample tends to have more males and be younger than the national average, except in Ecuador, while respondents with low levels of schooling (less than high school) tend to be underrepresented in our sample.⁹

Our survey included a list of seven questions about perceptions of extractive industries.¹⁰ The construction of the questions was informed by the growing literature about the SLO.¹¹ Some of the complex concepts targeted by the survey had to be addressed by a single question and adapted for a general audience, in order to (a) avoid survey response fatigue, given that the questions were part of an already lengthy survey; (b) simplify the task for a diverse population, as our survey aimed to be representative at the national level; and (c) make the survey questions relevant to all respondents, i.e., to those directly affected by the extractive

⁹A total of 1,706 respondents were excluded from the analysis as a result of having missing values in our variables of interest. We performed difference of means tests with the available data on the demographic composition of this group of excluded respondents and the completed sample. The excluded sample is not statistically significantly different in terms of educational attainment. However, the excluded sample has a greater proportion of women (59%) and of people at least 35 years old (66%). We also estimated the models described in Section 4 weighting the observations by household survey data distributions in terms of gender, age, and educational attainment. We obtain similar results in terms of statistical significance and coefficient size. Therefore, any potential bias that may be induced by the excluded respondents is not driving our results.

¹⁰The questions asked were part of a broader public perception survey covering topics beyond the SLO, though these are not included in our analysis.

¹¹The issue of the SLO has been largely studied over the past two decades as it relates to the the mining industry, especially in Australia and North and South America (Lesser et al., 2020)

Table 3.2: Sample characteristics compared with household survey data (HSD)

	CAN		BOL		COL		ECU		PER		VEN	
	POS	POS	HSD									
Gender												
Male	53.01	52.41	48.22	51.50	48.11	52.02	48.36	52.06	47.94	55.57	48.18	
Female	46.99	47.59	51.78	48.50	51.89	47.98	51.64	47.94	52.06	44.43	51.82	
Age												
18-24	19.18	27.36	16.86	28.63	17.11	11.78	18.01	18.15	15.57	13.33	16.14	
25-34	26.26	29.35	21.55	32.26	22.53	21.70	19.81	26.18	18.66	23.41	21.29	
35-44	21.29	21.17	19.59	19.87	18.98	21.92	19.22	22.07	18.75	21.35	19.95	
45-54	17.04	12.68	15.64	9.40	15.69	19.74	15.84	18.86	17.82	21.68	17.06	
55+	16.23	9.43	26.36	9.83	25.70	24.86	27.12	14.74	29.20	20.23	25.56	
Educational attainment												
Primary or less	30.59	28.20	45.93	34.40	43.35	36.97	51.58	35.11	39.58	22.88	37.14	
High school	37.22	42.77	21.24	38.57	30.48	38.06	28.58	39.42	29.12	30.90	27.01	
Higher education	32.19	29.04	32.83	27.03	26.18	24.97	19.84	25.47	31.31	46.23	35.85	

Note: All numbers stated as percentages. Numbers from the POS (Public Opinion Survey) correspond to the 5,312 completed responses in our sample (Table 3.1 shows the breakdown per country). HSD columns show most recent household survey data available for each country from IDB's harmonized household surveys in LAC (BID, 2021), which includes the 2020 ECH for Bolivia, the 2020 GEIH for Colombia, the 2020 ENEMDU for Ecuador, the 2020 ENAHO for Peru, and the 2021 ENCOVI for Venezuela. All figures from household survey data are calculated on adult population only, using the households' expansion factor to assign weights to observations. CAN stands for Country Andean Nations and refers to the pooled data from the five countries in our sample.

industries and to others who may not even be near a mining site or oil well. Therefore, questions were presented in general terms and did not refer to any specific project or complex concept. This also facilitated cross-country comparisons.

Social License to Operate

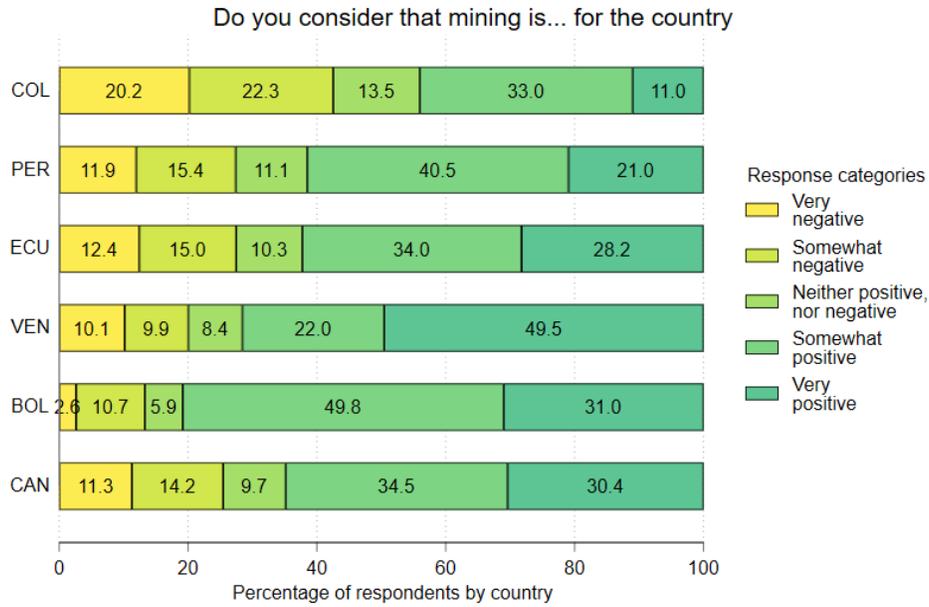
As shown in Section 2, the SLO is an evolving concept that encompasses interactions between communities, governments, and companies. Furthermore, the SLO is a localized phenomenon, as it is accorded to individual projects on a case-by-case basis. In this paper, however, we adopt a generalized version of the SLO, capturing public sentiment toward the extractive industries as a whole. Understanding public sentiment is important, because the public shapes societies' priorities, drives political discourse, and feeds social mobilization.

To capture the general perception of the extractive industries, we asked participants to express their view of the two types of extractive industries in their countries. For this and all subsequent questions, respondents were provided with five choices to allow for some degree of nuance in their responses.¹² Conceptual models about the SLO summarize the process as a gradual transition from legitimacy to credibility to trust, which can vary between the different

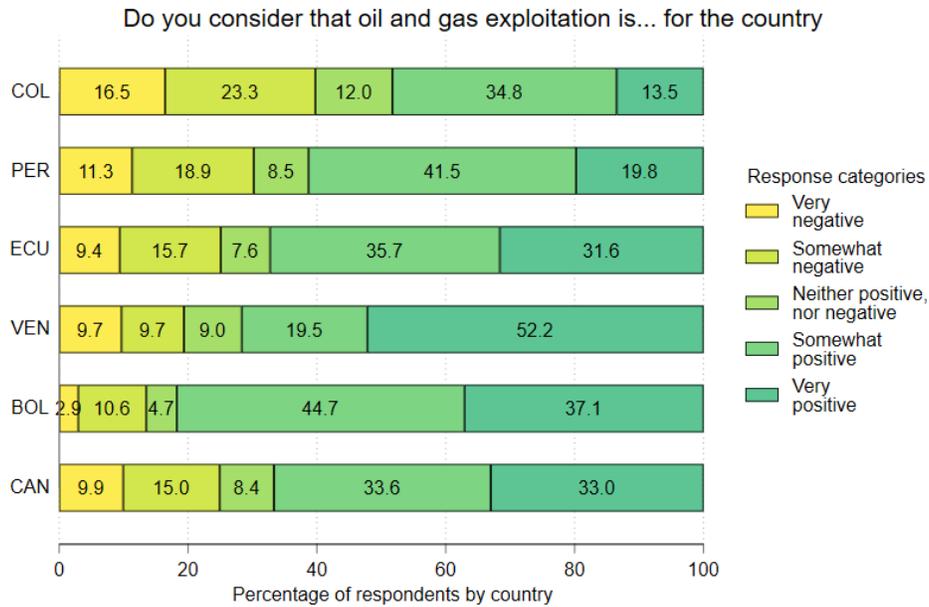
¹²This variation was kept to five options for other questions. Depending on the question, answer choices ranged from "very negative" to "very positive," "strongly disagree" to "strongly agree," and from "very unfair" to very fair."

Figure 3.1: Citizens' perceptions of extractive industries

(a) Mining:



(b) Oil & Gas:



Note: Countries are shown in ascending order according to the interviewees' perceptions of the specific industry. The larger the green area, the better the perception of the industry. CAN stands for Country Andean Nations and refers to the pooled data from the five countries in our sample.

groups who grant the SLO¹³ (Boutilier and Thomson, 2011; Morrison, 2014; Wüstenhagen et al., 2007). We do not intend to define in which stage of this process an individual's views can be located, but to capture the general attitude toward the sector.

Figure 3.1 displays the distribution of answers for each country, with Colombia showing the greatest opposition to both industries, followed by Peru, Ecuador, Venezuela, and Bolivia in that order. There also appears a well-defined pattern from one country to the next, interrupted only by the large portion of Venezuelans who indicated the highest level of approval of these industries. Note that the results are similar for both mining, and oil and gas. In particular, interviewees with strongly negative views of each industry are a minority in all these countries.

Institutional determinants of the SLO

The first determinant we explore is governance capacity. Our survey question on governance focuses on competence-based concerns as a predictor of trust in a government's regulatory capacity. In this question we explore two domains of governance, environmental and social norms, and we ask participants to rate their government's enforcement capacity in both. Figure 3.2a shows the regional response distribution by industry. For both industries, the proportion of interviewees who believe in their government's enforcement capacity (strongly agree and somewhat agree) is larger than the proportion of interviewees who do not (strongly disagree and somewhat disagree).

Next, we explore in Figures 3.2b and 3.2c the two concepts of justice we identified earlier, procedural and distributive. Our question regarding the former captures the most basic form of procedural justice that the industry can implement: listening to communities. Certainly, procedural justice has several levels and can be implemented in different ways depending on the context. Further levels can involve taking community interests into account, openly sharing information relevant to the community, and engaging the community in the decision-making process. However, given the project-specific nature of these latter aspects of procedural justice, we excluded them from this national-level survey.

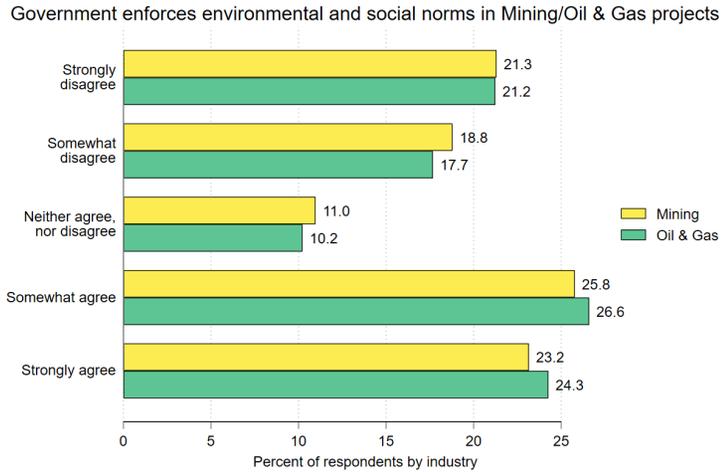
Distributive justice refers to the fairness of a given outcome. Our distributive justice question refers to the distribution of economic benefits. These may include royalties, employment, and other economic externalities. The question included in the survey refers to economic benefits in general, with respondents being asked to report the level of fairness in the distribution of such benefits for each industry. The responses indicate that the proportion of interviewees who perceive low levels (very unfair and somewhat unfair) of procedural and distributive justice is larger than those who perceive high levels (very fair and somewhat fair) for both industries.

The last institutional determinant we explore is nationalism. Foreignness of the firm is another aspect reported in the literature that is considered by communities when granting

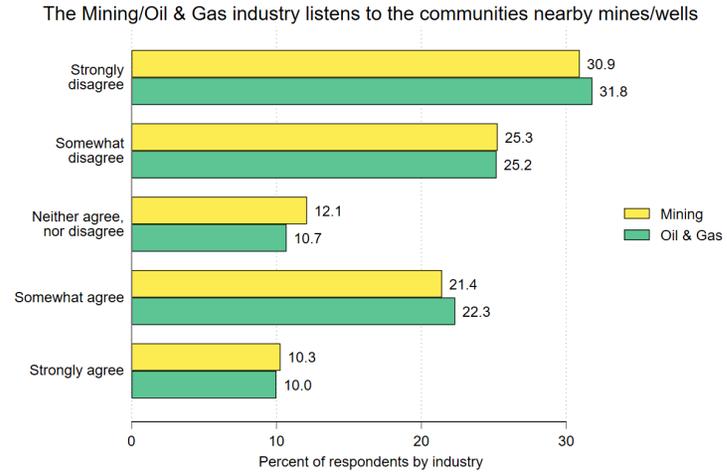
¹³Depending on the group, the SLO could also refer to a legal, political, or economic license.

Figure 3.2: Citizens' perceptions of extractive industries

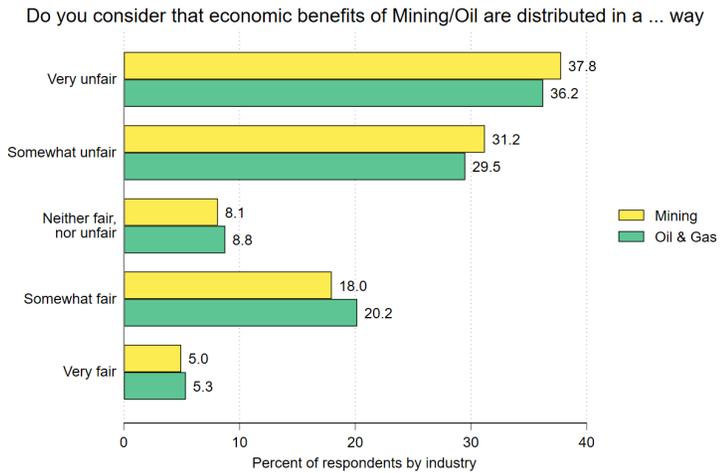
(a) Governance:



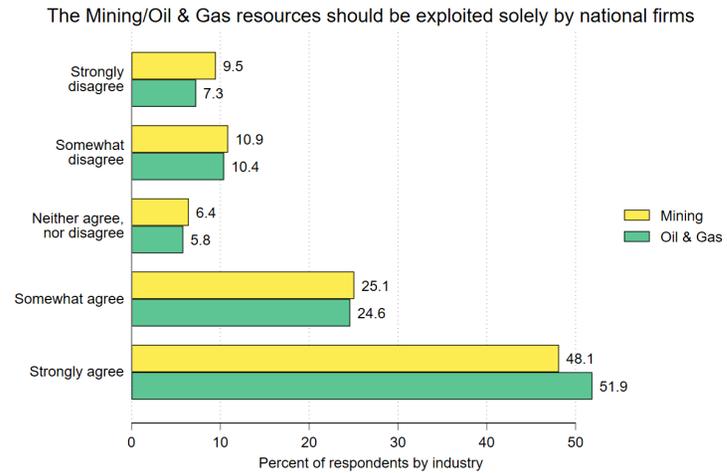
(b) Procedural justice:



(c) Distributive justice:



(d) Nationalism:

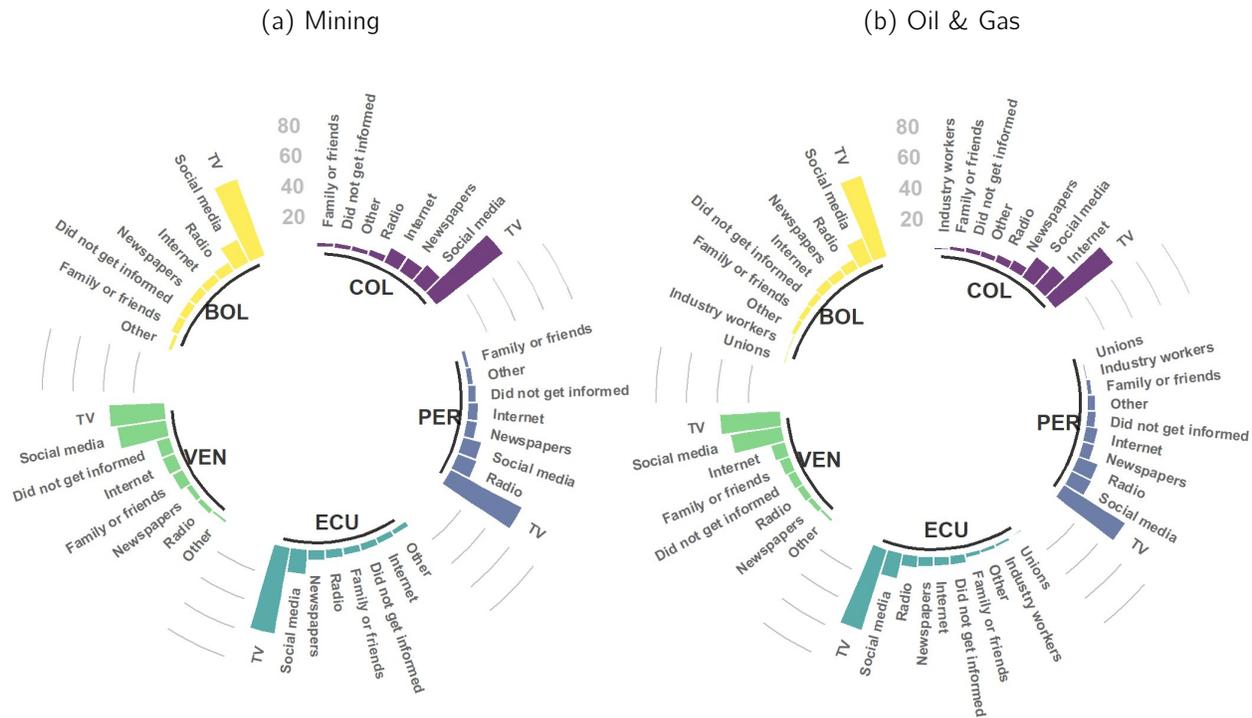


Note: Pooled data for all countries in the sample: Bolivia, Ecuador, Colombia, Peru, and Venezuela (N=5,312). Each respondent was asked separately about their perception of the mining, and the oil and gas industries.

a SLO. The question we included in the survey asks respondents whether resources should be exploited by domestic firms only. As shown in Figure 3.2d, the majority of respondents consider that resources should be exploited solely by domestic extractive-industry firms. This preference may be the result of a concern about lack of value similarity with foreign firms, and this result is in line with previous literature on Latin America (See Section 2)

Finally, an important aspect of belief formation that may impact public sentiment toward extractive industries is the source of information. Figure 3.3 shows that the main source of information in all of the countries under study regarding both industries is television, according to a minimum of 46% of the respondents in Bolivia, Colombia, Ecuador, and Peru. In the case of Venezuela, the lower percentage of individuals using television as their main source of information (36% for mining and 38% for oil and gas) appears to be compensated for by wider use of social media as the second source of information.

Figure 3.3: Information sources



Note: Bars show the percentage of answers for each category to the question: "What was your last source of information about mining/oil and gas?" The same list of categories was presented for both industries. Lines between countries mark the 20%, 40%, 60%, and 80% levels. Each color corresponds to a different country in our sample.

3.1 Specific minerals

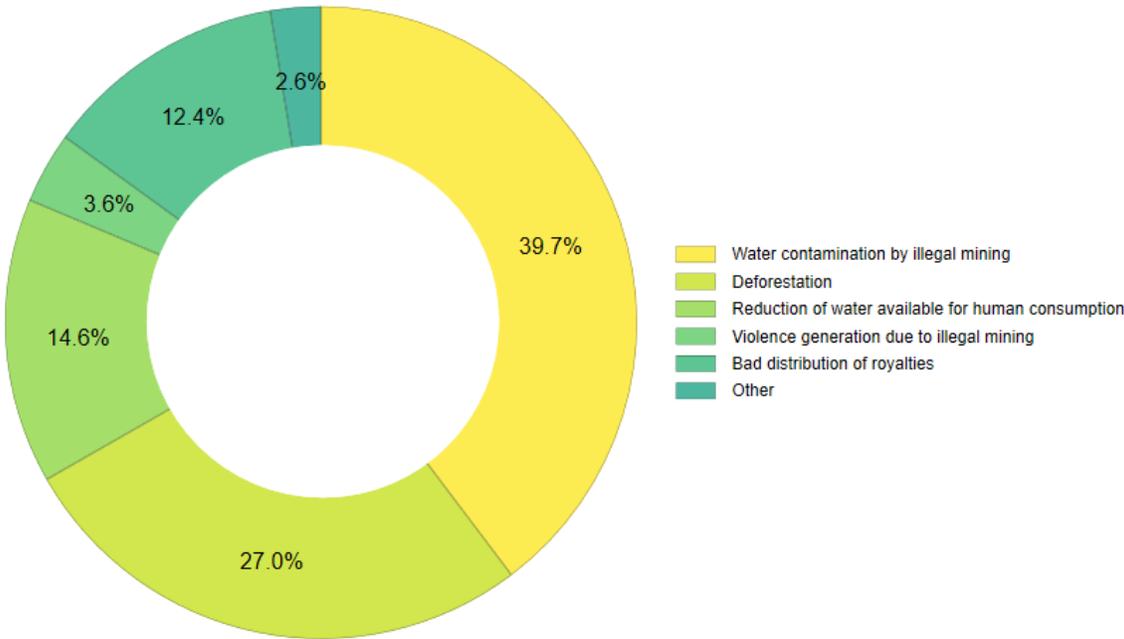
We included two questions to learn about the perception of specific minerals in Bolivia and Colombia. Reflecting their importance in each country, we chose lithium for the former and gold for the latter. These questions were posed at the end of the survey to prevent biasing the responses to the questions that were asked in all countries.

3.1.1 Gold in Colombia

Colombia ranks fourth in terms of gold production in Latin America and is the nineteenth-largest producer in the world.¹⁴ Gold constitutes 5.93% of Colombia’s net exports, making it the country’s fourth-biggest export, behind oil, coal, and coffee.¹⁵ Although most goods and services exports suffered from a major contraction during the pandemic, the 2020 production volume of gold actually increased by 29.9% over 2019 levels.¹⁶

Figure 3.4: Negative impacts of gold mining in Colombia

Taking into account the negative impacts of gold mining in Colombia, which one is the most concerning?



Note: This question was posed to half of the respondents in Colombia (N=466). Participants were asked to choose only one of the available categories.

¹⁴Data as of June 15, 2021, from the World Gold Council: [\[link\]](#)
¹⁵Data as of June 15, 2021, from the Atlas of Economic Complexity: [\[link\]](#)
¹⁶Data as of June 15, 2021, from the Ministry of Mining and Energy: [\[link\]](#)

Unlike coal and other mineral resources, much of the gold mining in Colombia is illegal. A report from the United Nations Office on Drugs and Crime (UNODC) and the government of Colombia (2020) on alluvial gold mining in the country states that 66% is illegal and 52% takes place in environmentally protected areas, especially in rain forests. Much of this activity occurs in the Pacific Forest Reserve, one of the biggest biodiversity reserves in the world. Furthermore, gold mining takes place in areas with a heavy presence of illegal armed groups and drug cartels, who are increasingly relying on mining activities to finance their operations. In fact, the report mentions that 43% of the territories with alluvial gold mining coincide with coca cultivation areas (UNODC and Gobierno de Colombia, 2020).

We asked a subgroup of the Colombian sample (50%) about their biggest concern relative to gold mining in Colombia. A plurality of respondents (39.8%) identified water contamination due to illegal mining as the most detrimental negative impact of gold mining in the country. On the other hand, violence due to such activities was the least common concern (see Figure 3.4). In general, these results demonstrate that the environmental impacts of mining activities are of greater concern to the citizens surveyed than impacts such as violence or the inequitable distribution of royalties.

3.1.2 Lithium in Bolivia

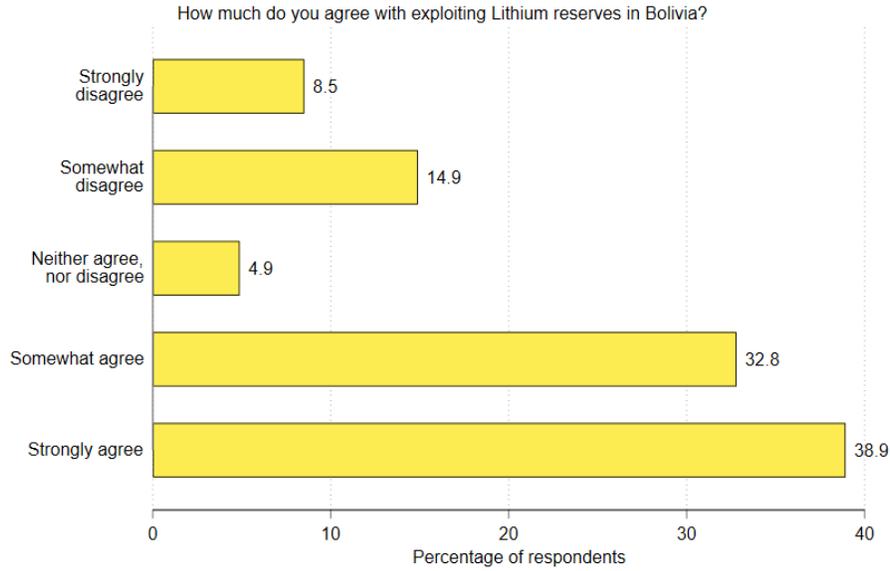
Bolivia has the largest lithium resources in the world identified to date. These total 21 million tons, out of the 86 million tons identified worldwide.¹⁷ In the era of lithium-ion batteries, electric cars and nontraditional renewable energy sources, this represents an immense opportunity for increasing economic development and expanding investment and trade for Bolivia. With the global commitment to decarbonization, the demand for lithium is expected to increase; Hund et al. (2020) estimate that five times more lithium will be needed to meet global climate targets by 2050, compared to 2018 production levels.

However, Bolivia faces several challenges before it can become the world capital of lithium extraction. These range from technical aspects, as separating the high levels of magnesium that is mixed with lithium in Uyuni's brines, to social conflict, as the different sectors of Bolivian society need to agree on the conditions for lithium exploitation. In the past decade, the Bolivian government has transitioned from having full control over lithium production to working with foreign partners. However, massive demonstrations in 2019 shook the country, and resulted in the termination of one of those partnerships with a German company.

We asked a subgroup of the Bolivian sample (84%) about the extent to which they approve of exploiting lithium resources in the country. The majority (a combined 70.8%) of interviewees indicated that they strongly or somewhat agreed with exploiting the lithium resources (see Figure 3.5). This high level of acceptance is consistent with Bolivia's respondents' approval of mining in general (80.1%), although that of lithium mining is 10 percentage points lower than that of the sector as a whole.

¹⁷Data as of 2021 from the U.S. Geological Survey [[link](#)]

Figure 3.5: Perceptions of lithium exploitation in Bolivia



Note: This question was posed to 84% of the respondents in Bolivia (N=799).

4 Methodology

This section presents the details of the methodology we used to quantify the relationship between attitudes toward extractive industries and the determinants of the SLO in Latin America. The following model helps to capture these multivariate correlations between the different components and stakeholders. We estimate the following specification using a linear probability model (henceforth OLS):

$$SLO_{ice} = \alpha_c + \beta Inst_{ice} + \gamma Dem_i + \epsilon_{ice}, \quad (1)$$

where SLO_{ic} is a proxy for the SLO for each individual i in the country c and for extractive industry e . The variable SLO_{ice} is a dummy equal to 1 when a person (i) believes that industry (e) is neither positive nor negative, somewhat positive, or very positive for country (c), and 0 otherwise.

$Inst_{ice}$ is a vector that contains variables measuring individual opinions about the institutional determinants that can impact the SLO. We include measures for governance, distributive justice, procedural justice, scale, and nationalism. Dem_{ice} is a vector that contains demographic characteristics. Individual heterogeneity associated with gender, educational attainment, age, residence in a metropolitan area, and access to information can produce divergent attitudes toward these industries. In our main estimation, we include country fixed

effects (α_c), but also explore the results of estimating Equation 1 independently for each country. Finally, ϵ_{ice} corresponds to the error term.

5 Results

Attitudes toward the institutional determinants of the SLO show a significant correlation for both mining and for oil and gas. In contrast, the relationship between social approval and demographic characteristics is more heterogeneous and less precise depending on the subsector. We show the empirical evidence for this in Tables 5.1 and 5.2, which present the results of estimating Equation 1 for CAN. In both tables, we keep the set of demographic characteristics fixed and show the results of including the institutional determinants one by one. All the variables are self-reported by the individuals and the opinions about government institutions may suffer from a higher measurement error than the demographic variables. Additionally, the opinion about a particular SLO determinant may be highly correlated with the opinions about the others.¹⁸ Our goal in doing this is to test whether our estimates are consistent across different specifications while controlling for demographic characteristics.

As shown in Table 5.1, governance, distributive justice, procedural justice, and nationalism are positively correlated with the SLO, while the scale of the mining project is negatively correlated. Column 1 indicates that the survey group with the most positive views on governance is 23 percentage points more likely to state that mining is positive for the country. Column 2 documents a similar correlation between distributive justice and the SLO. The view that the economic benefits of the sector are well distributed across stakeholders increases the probability of approval by 19 percentage points. Surprisingly, this result is identical to the correlation with procedural justice, which is shown in Column 3. The perception that mining companies listen to the communities impacted by the activities of the projects increases approval of mining by 19 percentage points. Column 4 shows that individuals who believe that mining resources should be exploited by domestic firms are 9 percentage points more likely to approve of mining activities. This result partially captures the differences in cultural and social values between domestic and foreign firms, as perceived by the host communities.

In Column 5, we present data generated by a question that targeted views concerning the scale of mining projects. This question is of particular interest, because individuals' perceptions of large-scale projects and artisanal mining may differ. As it happens, this variable is correlated not only with institutional factors, but also with individuals' expectations about direct impacts on their wealth. Indeed, the factor of scale appears to be related to the full spectrum of SLO determinants discussed in the literature review. We find that the belief that large-scale mining is worse for communities than artisanal mining reduces the level of SLO by 2 percentage points. This estimate also depends on what the individual believes

¹⁸For example, the concepts of justice and governance can be difficult to differentiate in some cases. Furthermore, individuals can hold strong views about the government in general without discriminating by specific governmental institutions.

the composition of the industry to be in the country—that is, whether large-scale mining or artisanal mining is more dominant. Because of this, the correlation could be attenuated for the regional averages in comparison with the other institutional determinants.

The correlations between the institutional determinants and the SLO in the mining industry are robust to including all of the variables. As expected, the multicollinearity between the determinants makes the coefficients drop,¹⁹ but we still find significant and consistent estimates. This can be seen in Table 5.1, Column 6, which is our baseline estimation. Summarizing Column 6, we find that the probability of obtaining the SLO from the public increases with positive views of governance (by 16 percentage points), distributive justice (10), procedural justice (9), and nationalism (6). Negative views of large-scale mining relative to artisanal mining are correlated with a decrease of 3 percentage points in the probability of obtaining the SLO.

The evidence on the correlation between demographics and the SLO in mining is not conclusive. The estimates are consistent throughout Table 5.1, but are less precisely estimated and are only statistically significant in a few cases.²⁰ Women, higher educated individuals, older people, and the provincial population are less likely to report that the industry is positive for the country. Familiarity with the industry is positively correlated with social approval. Furthermore, we observe statistically significant differences between countries. The ranking, from the least to the most favorably disposed toward mining, is Colombia, Peru, Ecuador, Venezuela, and Bolivia. For reference, when controlling for demographic and institutional determinants, the average individual of reference in Colombia with negative views on the institutional determinants of the SLO, male, with lower level of education, uniformed about the sector, and living in the provincial area of the country, more specifically, in non-resource intensive regions, is about 38% likely to hold a positive opinion about the mining industry.

With regard to the oil and gas industry, governance, distributive justice, procedural justice, and nationalism are positively correlated with the SLO, similar to the results for the mining industry. The results in Table 5.2, Column 5²¹ show that the probability of obtaining the SLO increases with positive sentiments toward governance (16 percentage points), distributive justice (9), procedural justice (7), and nationalism (7). The relative importance of each of these determinants with respect to the likelihood of obtaining the SLO is the same as for mining.²²

¹⁹The average variable inflation factor corresponds to 1.31 for mining, and 1.33 for oil and gas. The F-test of joint significance of the difference in means between the individuals according the SLO and those not according it, for only the institutional determinants, is significant at the 1% level for both mining, and oil and gas.

²⁰When comparing metropolitan with provincial populations, a possible explanation of the lack of significance in our estimates is the underrepresentation of relevant local communities in our sample. Nonetheless, there is no generally accepted definition of who and what constitutes the relevant local community for a project (Meesters and Behagel, 2017; Matebesi and Marais, 2018) and defining this can be a complex task.

²¹For the sake of conciseness, we interpret only Column 5. Columns 1–4 serve the same purpose for consistency as before, and the results are robust throughout the table. This is our preferred specification, as we control for all of the institutional determinants and all the countries are included.

²²The average estimates are different between mining and oil and gas, because the constant is different

Table 5.1: Determinants of the SLO for the mining industry

Dependent variable:	Social license to operate (dummy)					
	(1)	(2)	(3)	(4)	(5)	(6)
Governance (dummy)	0.23*** (0.01)					0.16*** (0.01)
Distributive justice (dummy)		0.19*** (0.01)				0.10*** (0.01)
Procedural justice (dummy)			0.18*** (0.01)			0.09*** (0.01)
Nationalism (dummy)				0.10*** (0.02)		0.06*** (0.02)
Large-scale mining (dummy)					-0.03* (0.01)	-0.03** (0.01)
Female (dummy)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Higher Education (dummy)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.01 (0.01)
35 or more years (dummy)	-0.03** (0.01)	-0.03** (0.01)	-0.03* (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.03* (0.01)
Informed (dummy)	0.03 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)	0.05 (0.03)	0.03 (0.03)
Metropolitan area (dummy)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)
Resource intensive (dummy)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Peru (dummy)	0.15*** (0.02)	0.16*** (0.02)	0.16*** (0.02)	0.16*** (0.02)	0.15*** (0.02)	0.15*** (0.02)
Ecuador (dummy)	0.12*** (0.02)	0.15*** (0.02)	0.15*** (0.02)	0.17*** (0.02)	0.16*** (0.02)	0.12*** (0.02)
Venezuela (dummy)	0.23*** (0.02)	0.24*** (0.02)	0.23*** (0.02)	0.25*** (0.02)	0.24*** (0.02)	0.22*** (0.02)
Bolivia (dummy)	0.24*** (0.02)	0.25*** (0.02)	0.25*** (0.02)	0.28*** (0.02)	0.28*** (0.02)	0.21*** (0.02)
Constant	0.44*** (0.03)	0.50*** (0.03)	0.47*** (0.03)	0.47*** (0.03)	0.57*** (0.03)	0.38*** (0.03)
N	5312	5312	5312	5312	5312	5312
R ²	0.113	0.089	0.091	0.060	0.052	0.141

Notes: This table estimates the correlation between the SLO and its determinants in the Andean region. All the columns are estimated using a linear probability model. The base country for the country dummies is Colombia. Robust standard errors presented in parentheses. *, **, and *** imply statistical significance at the 10%, 5% and 1% level, respectively. Variable definitions and summary statistics are available in Tables A1 and A2.

Table 5.2: Determinants of the SLO for the Oil & Gas industry

Dependent variable:	Social license to operate (dummy)				
	(1)	(2)	(3)	(4)	(5)
Governance (dummy)	0.22*** (0.01)				0.16*** (0.01)
Distributive Justice (dummy)		0.16*** (0.01)			0.09*** (0.01)
Procedural Justice (dummy)			0.16*** (0.01)		0.07*** (0.01)
Nationalism (dummy)				0.11*** (0.02)	0.07*** (0.02)
Female (dummy)	-0.04*** (0.01)	-0.04** (0.01)	-0.03** (0.01)	-0.04** (0.01)	-0.03** (0.01)
Higher Education (dummy)	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.06*** (0.01)
35 or more years (dummy)	0.02 (0.01)	0.02 (0.01)	0.02* (0.01)	0.02 (0.01)	0.03* (0.01)
Informed (dummy)	0.07* (0.03)	0.08** (0.03)	0.09** (0.03)	0.08* (0.03)	0.07* (0.03)
Metropolitan (dummy)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)
Resource intensive (dummy)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Peru (dummy)	0.08*** (0.02)	0.11*** (0.02)	0.10*** (0.02)	0.09*** (0.02)	0.10*** (0.02)
Ecuador (dummy)	0.12*** (0.02)	0.14*** (0.02)	0.14*** (0.02)	0.15*** (0.02)	0.13*** (0.02)
Venezuela (dummy)	0.19*** (0.02)	0.21*** (0.02)	0.19*** (0.02)	0.20*** (0.02)	0.20*** (0.02)
Bolivia (dummy)	0.21*** (0.02)	0.22*** (0.02)	0.22*** (0.02)	0.24*** (0.02)	0.19*** (0.02)
Constant	0.40*** (0.03)	0.44*** (0.03)	0.43*** (0.03)	0.42*** (0.04)	0.31*** (0.04)
N	5312	5312	5312	5312	5312
R ²	0.111	0.081	0.083	0.059	0.132

Notes: This table estimates the correlation between the SLO and its determinants in the Andean region. All the columns are estimated using a linear probability model. The base country for the country dummies is Colombia. Robust standard errors presented in parentheses. *, **, and *** imply statistical significance at the 10%, 5% and 1% level, respectively. Variable definitions and summary statistics are available in Tables A1 and A2.

The demographic determinants are more precisely estimated for the oil and gas industry than for the mining industry, with differences in the direction of the coefficients. In particular, individuals with more education, older people, and individuals with knowledge about the sector are more likely to report that the oil and gas industry is positive for the country. The coefficients for women and the provincial population show a negative correlation with the SLO. There are a number of between-country differences in the oil and gas industry. The ranking of countries, from the least to the most favorably disposed toward the oil and gas industry is Colombia, Peru, Ecuador, Venezuela, and Bolivia. As before and for reference, when controlling for demographic and institutional determinants, the average individual of reference in Colombia with negative views on the institutional determinants of the SLO, male, with lower level of education, unformed about the sector, and living in the provincial area of the country, more specifically, in non-resource intensive regions, is about 32% likely to hold a positive opinion about the oil and gas industry.

The results shown in Tables 5.1 and 5.2 are robust to using different definitions of the dummy variables used for the left- and the right-hand sides of Equation 1, as well as to separate estimations of the OLS model for each country and to applying binomial logistic regressions—see Tables A3 and A4. We conducted additional tests using specific subsamples to observe the interaction between the demographic and the institutional determinants. Specifically, Equation 1 was estimated by gender (men vs. women), education (lower vs. higher), age bracket (younger vs. older), area (metropolitan vs. provincial), and resource intensiveness (low vs. high) for each industry. The results are available in Table 5.3.

Table 5.3 is organized as follows: Panel A presents the results regarding opinions about the mining sector, while Panel B presents the results for the oil and gas sector. Hence, results in each column use the same sample, but correspond to different models. The dependent variable is our proxy for the industry's SLO. All the models include country fixed effects, with the demographic determinants as covariates.²³ For reference, Columns 1 and 10 present our baseline specifications as shown in Column 7 of Table 5.1 and Column 6 of Table 5.2, respectively. Columns 2–3 and 11–12 split the sample by gender; Columns 4–5 and 13–14 split it by education; Columns 6–7 and 15–16 split it by age bracket; and Columns 8–9 and 17–18 split it by metropolitan/provincial area.

We find that our baseline estimates for governance, distributive justice, and procedural justice in both sectors are robust to different samples. However, individuals from metropolitan areas are 4 to 7 percentage points less likely to approve of mining than are individuals from provincial regions (Table 5.3, Columns 8–9) when both groups have positive views about the level of governance. It is worth noting that citizens in provincial areas also have more

depending on the subsector.

²³We include age, education, gender, industry familiarity, metropolitan/provincial area, and resource-/nonresource-intensive region. If the covariate is used to define the subsample, it is not included in the estimation.

Table 5.3: Institutional determinants of the SLO for the extractive industries by subsamples

Dependent variable:	Social license to operate (dummy)										
	Baseline	Gender		Education		Age		Area		Resource Intensive	
			Female	Male	Low	High	18-35 years	35 or more	Metro-politan	Provincial	Low
<i>Panel A: Mining</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Governance (dummy)	0.16*** (0.01)	0.15*** (0.02)	0.16*** (0.02)	0.14*** (0.02)	0.18*** (0.02)	0.16*** (0.02)	0.15*** (0.02)	0.11*** (0.02)	0.18*** (0.02)	0.15*** (0.03)	0.16*** (0.02)
Distributive Justice (dummy)	0.10*** (0.01)	0.09*** (0.02)	0.12*** (0.02)	0.11*** (0.01)	0.08*** (0.02)	0.11*** (0.02)	0.10*** (0.02)	0.11*** (0.02)	0.10*** (0.02)	0.10*** (0.02)	0.11*** (0.01)
Procedural Justice (dummy)	0.09*** (0.01)	0.10*** (0.02)	0.08*** (0.02)	0.07*** (0.02)	0.12*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.06** (0.02)	0.10*** (0.02)	0.09*** (0.02)	0.09*** (0.01)
Nationalism (dummy)	0.06*** (0.02)	0.10*** (0.02)	0.02 (0.02)	0.08*** (0.02)	-0.00 (0.02)	0.07** (0.02)	0.05* (0.02)	0.03 (0.03)	0.07*** (0.02)	0.08** (0.03)	0.04* (0.02)
Large-scale mining (dummy)	-0.03** (0.01)	-0.03 (0.02)	-0.03* (0.02)	0.00 (0.01)	-0.09*** (0.02)	-0.01 (0.02)	-0.04** (0.02)	-0.01 (0.02)	-0.04** (0.01)	-0.03 (0.02)	-0.03* (0.01)
Constant	0.38*** (0.03)	0.38*** (0.05)	0.38*** (0.05)	0.39*** (0.04)	0.39*** (0.07)	0.37*** (0.05)	0.36*** (0.05)	0.40*** (0.07)	0.37*** (0.04)	0.33*** (0.06)	0.42*** (0.04)
N	5312	2496	2816	3602	1710	2414	2898	1830	3482	1564	3748
R ²	0.141	0.139	0.151	0.125	0.205	0.163	0.129	0.117	0.151	0.147	0.142
<i>Panel B: Oil & Gas</i>	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Governance (dummy)	0.16*** (0.01)	0.18*** (0.02)	0.15*** (0.02)	0.17*** (0.02)	0.14*** (0.02)	0.17*** (0.02)	0.15*** (0.02)	0.14*** (0.02)	0.18*** (0.02)	0.12*** (0.03)	0.18*** (0.02)
Distributive Justice (dummy)	0.09*** (0.01)	0.08*** (0.02)	0.10*** (0.02)	0.09*** (0.01)	0.09*** (0.02)	0.08*** (0.02)	0.10*** (0.02)	0.07*** (0.02)	0.10*** (0.02)	0.13*** (0.02)	0.07*** (0.01)
Procedural Justice (dummy)	0.07*** (0.01)	0.05* (0.02)	0.10*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07** (0.02)	0.07*** (0.01)
Nationalism (dummy)	0.07*** (0.02)	0.12*** (0.02)	0.01 (0.02)	0.09*** (0.02)	0.02 (0.02)	0.09*** (0.02)	0.05* (0.02)	0.08** (0.03)	0.06** (0.02)	0.07* (0.03)	0.06** (0.02)
Constant	0.31*** (0.04)	0.18*** (0.05)	0.40*** (0.05)	0.33*** (0.04)	0.29*** (0.07)	0.29*** (0.05)	0.35*** (0.05)	0.27*** (0.08)	0.33*** (0.04)	0.31*** (0.06)	0.32*** (0.04)
N	5312	2496	2816	3602	1710	2414	2898	1830	3482	1564	3748
R ²	0.132	0.139	0.131	0.128	0.150	0.148	0.122	0.122	0.132	0.114	0.144

Notes: This table estimates the correlation between the SLO and its determinants in the Andean region in particular sub-samples of interest. All the columns are estimated using a linear probability model. All the columns include country fixed, and the demographic determinants as controls. Robust standard errors presented in parentheses. *, **, and *** imply statistical significance at the 10%, 5% and 1% level, respectively. Variable definitions and summary statistics are available in Tables A1 and A2.

trust in domestic firms than citizens in metropolitan areas. At the same time, Equation 1 fails to reject the null hypothesis of no differences between domestic and foreign companies for survey respondents residing in metropolitan areas. The results of these analyses, which try to obtain a proxy for the heterogeneity in the SLO between urban/rural areas, can be explained by the different impacts in labor markets that individuals experience, depending on their geographical location. For example, citizens in a metropolitan area are more exposed to the benefits of new administrative and professional jobs from the extractive industries; those in provincial areas can experience positive impacts from the labor market, but they also experience negative impacts from potential environmental externalities. In LAC, foreign firms use different production technologies and invest in larger projects, in comparison with domestic firms, and this produces differences in the perceived net benefit (or cost) of the industry. In terms of value similarity, metropolitan citizens are more likely than provincial citizens to share similar views with foreign firms in relation to social norms.²⁴ However, these statistical differences across provincial regions can also be attributed to other factors,²⁵ because governance, distributive justice, and procedural justice do not show additional significant differences between subsamples of demographic characteristics. To continue with the case of foreignness, we find similar patterns between the mining and the oil and gas industries. Women and less-educated people who prefer domestic over foreign companies are significantly more likely than men and more-educated people with the same view to approve of extractive industries. The difference in probabilities ranges between 7 and 11 percentage points. Table 5.3 shows that demographic characteristics help to shape the relationship between the SLO and the institutional determinants. However, perceptions about governance do not differ by gender, level of education, and age when estimating the correlation with the levels of approval of extractive industries.

In summary, the relationship between the SLO and its institutional and demographic determinants in Latin America is consistent with the evidence in the literature. We find that governance is the strongest predictor of trust between host communities, governments, and companies, but procedural justice, distributive justice, and nationalism each play important roles in shaping individuals' attitudes. An average individual with positive views of each institutional determinant, independent of the specific sector of the extractives industry, is around 40 percentage points more likely than an individual with negative perceptions to consider the extractives industry as being positive for the country.²⁶ Nevertheless, we provide evidence on how demographic characteristics interact with the SLO and opinions on the institutional setting.

²⁴Metropolitan areas show higher levels of immigration and bigger differences in ethnic composition and citizens have more contact with foreign firms from different industries.

²⁵Examples of such factors include the size of the sample, measurement error, oversampling of populations in metropolitan areas, and violations of the OLS model assumptions, any or all possibly due to the restrictions of our framework.

²⁶These calculations can be inferred by estimating the expected values of Equation 1 and using the point estimates from our baseline specification in Tables 5.1 and 5.2.

6 Discussion and strategies

LAC is the region with the highest prevalence of mining-related conflicts (Andrews et al., 2017), and these events tend to be more violent than in other regions of the world (Albrieu and Palazzo, 2020). Over the past two decades, the Latin American Observatory of Mining Conflicts (OCMAL)²⁷ has reported 10 conflicts in Bolivia, 9 in Ecuador, 19 in Colombia, 46 in Peru, and 2 in Venezuela. For the entire LAC region, there have been 112 threats, 43 crimes against women defending the environment, and 71 homicides/attacks. Thus, it is crucial that a path to peaceful agreements between the host communities and the extractive companies be found.

The literature review shows that there is no one-size-fits-all approach to establishing an SLO and multiple factors can lead to heterogeneous outcomes. Understanding the local context and the views of the different stakeholder groups within a community is therefore of paramount importance (Prno, 2013). Institutions, corporate-community engagement, and sustainability are three mandatory elements to any discussion of the SLO (Poelzer et al., 2020). These constantly redefine public acceptance and engage with citizens' sociodemographic characteristics and views on the institutional environment.

Community outreach and engagement can be an effective strategy to achieve an SLO. Many case studies suggest that public engagement is most effective when done early and often (Prno, 2013; Poelzer et al., 2020). Moreover, the quality, not the quantity, of contact between a company and the host community is a better predictor of the emergence of trust bonds and acceptance (Moffat and Zhang, 2014; Milano, 2018; Poelzer et al., 2020). Similarly, these strategies help with the dissemination of the understanding of the projects' benefits (Ford and Williams, 2016). The provision of information to the communities and the existence of guarantees for procedural fairness are embedded as the main channels in this scenario.

However, the effect of information on social acceptance is complex. Information is necessary, but it alone does not lead to an SLO. The existence of prior beliefs determines the impact of information on social acceptability judgements (Ford et al., 2009). Specifically, information does not influence acceptance when it is consistent with existing beliefs, and it decreases acceptance when unexpected negative outcomes are revealed. This results in a differential effect based on affiliation. For example, information increases acceptance from people with no expressed direct interest in the environmental asset impacted by the activities of the extractive industry, but has no effect on those who are already affiliated with an environmental conservation group (Ford et al., 2009).

Procedural fairness requires that host communities have a say in the decisions that affect them. For example, an effective strategy could be to require the host communities' consent before the commencement of a mining project, thus ensuring that residents exert influence

²⁷Data as of November 10, 2021, from OCMAL: [\[link\]](#)

over the development paths of their local communities (Jartti et al., 2020). The literature has also explored strategies to increase public participation as power sharing—through co-management or joint decision-making committees, and local ownership—through share offerings, equity positions, and revenue sharing (Prno, 2013).

Both community outreach and engagement are usually strategies led by mining companies. Governments for their part can and should play an active role by convening, supporting, and participating in processes of institutionalized dialogue with communities, rather than being reactive by opening dialogue only after major outbreaks of conflict (Andrews et al., 2018). The dialogue between the government and communities should commence prior to the initiation of the extractive projects and continue throughout the production cycle (Andrews et al., 2018; Jartti et al., 2020). This is especially important in Latin America, where trust in the regulatory framework is critically low (Poelzer et al., 2020), and both, national and international organizations, actively work toward influencing public opinion in a systematic way.

The results of the public opinion survey can enhance the implementation of these strategies. The gaining of an SLO is positively correlated with a country's institutional performance. While governance does seem to be a top priority on average across the LAC region, Ecuadorians and Peruvians in particular weigh governance as much as distributive and procedural justice. The extractive industries, along with governments, must understand the priorities and composition of each community. The understanding of communities' characteristics, such as the age and gender distribution, levels of education, and locational attributes, as shown in our analysis, is an essential element of understanding citizens' acceptance of the extractive industries. Engagement and information programs should be tailored to the composition of the host communities, not only in terms of demographic characteristics but also in terms of public opinions concerning domestic governmental institutions.

7 Conclusion

The analysis presented herein indicates that governance capacity is a key determinant of the SLO in the Andean region. It is thus critical to combine community outreach and engagement with a continued effort to strengthen governance capacity. Although this is an endeavor bigger than solving extractives-related-conflicts, it is a goal that must be pursued. The evidence indicates that the number of conflict incidents associated with mining operations is correlated with the decreasing quality of country governance, as well as with a decline in the strength of economic, legal and social development institutions. In order to prevent conflict around extractive industries, it is imperative to keep improving the efficacy of government institutions.

With the foregoing in mind, it is the case that the SLO as a concept has been misinterpreted in the literature. We understand the SLO to be the overall process through which

natural resource projects obtain social approval from the host communities of the projects. We categorize their main determinants and establish how the different stakeholders are involved. This analysis guided the design of a unique multicountry survey for the Andean region by means of which we have started to disentangle the interaction between the SLO, the extractive industries, and public opinion. Citizens' perceptions about these industries are highly correlated with their views on the institutional determinants of the SLO. As mentioned before, governance should be the primary focus for governments and companies, although strategies focused on distributive justice, procedural justice, and value similarity could be effective under the right circumstances. The presence of country and, most importantly, individual heterogeneity tells us that there are significant differences in the way we understand how the SLO is gained at the national and local levels.

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8 Appendix

Table A1: Variable descriptions

Variable	Description
35 years or older	Dummy that takes the value 1 if the person reports being 35 years of age or older and 0 otherwise.
Distributive justice	Dummy variable that takes the value 1 if the individual answers "Neither fair, nor unfair," "Somewhat fair," or "Very fair" to the following question: "Do you consider that economic benefits of Mining/Oil & Gas are distributed in a ... way." The dummy is equal to 0 otherwise.
Female	Dummy variable that takes the value 1 if the person self-identifies as female and 0 otherwise.
Governance	Dummy variable that takes the value 1 if the individual answers "Neither agree, nor disagree," "Somewhat agree," or "Strongly agree" to the following question: "Government enforces environmental and social norms in Mining/Oil & Gas projects." The dummy is equal to zero otherwise.
Higher education	Dummy variable that takes the value 1 if the person reports having technical studies beyond high school, incomplete college, complete college, or other studies after college. The dummy is equal to zero otherwise.
Large-scale mining	Dummy variable that takes the value 1 if the individual answers "Neither agree, nor disagree," "Somewhat agree," or "Strongly agree" to the following statement: "Large-scale mining brings more problems than artisanal mining?". The dummy is equal to zero otherwise. This question was randomly posed in terms of benefits to half of the individuals in our sample. As we did not find framing effects, we combine both questions, reversing the answers of those with the benefits framing.
Metropolitan area	Dummy variable that takes the value 1 if the person resides in a metropolitan area and 0 otherwise. The following were considered metropolitan areas: in Bolivia: Cochabamba, La Paz, and Santa Cruz; in Colombia: Bogotá, Medellín, and Barranquilla; in Ecuador: Quito and Guayaquil; in Peru: Lima; and in Venezuela: areas with more than 500,000 inhabitants, such as Caracas, Maracaibo, and Valencia.
Nationalism	Dummy variable that takes the value 1 if the individual answers "Neither agree, nor disagree," "Somewhat agree," or "Strongly agree" to the following statement: "The Mining/Oil & Gas resources should be exploited solely by national firms." The dummy is equal to 0 otherwise.

Procedural justice	Dummy variable that takes the value 1 if the individual answers "Neither agree, nor disagree," "Somewhat agree," or "Strongly agree" to the following statement: "The Mining/Oil & Gas industry listens to the communities nearby mines/wells." The dummy is equal to 0 otherwise.
Resource intensive	Dummy variable that assumes the value 1 if the number of workers in the <i>Mining and Quarrying</i> sectors of the municipality of residence is above the median number of workers for the country. The dummy is equal to 0 otherwise. This indicator is calculated using the number of workers in the sector, according to the International Standard Industrial Classification (ISIC), from the Inter-American Development Bank's harmonized household surveys in LAC (BID, 2021), which includes the 2020 ECH for Bolivia, the 2020 GEIH for Colombia, the 2020 ENEMDU for Ecuador, the 2020 ENAHO for Peru, and the 2019 ENCOVI for Venezuela.
Social License to Operate (SLO)	Dummy variable that takes the value 1 if the individual answers "Neither positive nor negative," "Somewhat positive," or "Very positive" to the following question: "Do you consider that Mining/Oil & Gas is ... for the country?". The dummy is equal to 0 otherwise.

Table A2: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.
<i>Mining</i>			
Distributive justice (dummy)	5,312	0.31	0.46
Governance (dummy)	5,312	0.60	0.49
Nationalism (dummy)	5,312	0.80	0.40
Large-scale mining (dummy)	5,312	0.54	0.50
Procedural justice (dummy)	5,312	0.44	0.50
Social license to operate (dummy)	5,312	0.74	0.43
<i>Oil & Gas</i>			
Distributive justice (dummy)	5,312	0.34	0.47
Governance (dummy)	5,312	0.61	0.49
Nationalism (dummy)	5,312	0.82	0.38
Procedural justice (dummy)	5,312	0.43	0.49
Social license to operate (dummy)	5,312	0.75	0.43
<i>Demographic characteristics</i>			
35 years or older (dummy)	5,312	0.54	0.50
Female (dummy)	5,312	0.47	0.50
Higher Education (dummy)	5,312	0.32	0.47
Informed about mining (dummy)	5,312	0.94	0.23
Informed about oil & gas (dummy)	5,312	0.95	0.21
Metropolitan (dummy)	5,312	0.34	0.47
Resource intensive (dummy)	5,312	0.70	0.45

Note: Sample with non-missing values for variables associated with attitudes toward mining and oil and gas; and sociodemographic variables such as gender, age, and educational attainment.

Table A3: Determinants of the SLO for the extractive industries by country

Dependent variable:	Social license to operate (dummy)									
	Mining					Oil & Gas				
	BOL	COL	ECU	PER	VEN	BOL	COL	ECU	PER	VEN
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Governance (dummy)	0.10*** (0.03)	0.24*** (0.04)	0.11** (0.03)	0.14*** (0.03)	0.16*** (0.02)	0.10** (0.03)	0.26*** (0.04)	0.12*** (0.03)	0.17*** (0.03)	0.15*** (0.02)
Distributive justice (dummy)	0.05* (0.02)	0.13*** (0.03)	0.13*** (0.03)	0.16*** (0.03)	0.08*** (0.02)	0.02 (0.02)	0.15*** (0.03)	0.09** (0.03)	0.14*** (0.03)	0.08*** (0.02)
Procedural justice (dummy)	0.05* (0.02)	0.20*** (0.03)	0.11*** (0.03)	0.07* (0.03)	0.04 (0.02)	0.08** (0.02)	0.15*** (0.04)	0.11*** (0.03)	0.02 (0.03)	0.01 (0.02)
Nationalism (dummy)	-0.00 (0.03)	0.07 (0.04)	0.04 (0.04)	0.09** (0.03)	0.07* (0.03)	0.12** (0.04)	0.10* (0.04)	-0.02 (0.04)	0.05 (0.04)	0.07* (0.03)
Large-scale mining (dummy)	0.05* (0.02)	-0.06 (0.03)	-0.04 (0.03)	-0.04 (0.03)	-0.03 (0.02)					
Female (dummy)	-0.03 (0.02)	0.05 (0.03)	-0.06 (0.03)	-0.05 (0.03)	0.00 (0.02)	-0.06* (0.02)	-0.05 (0.03)	-0.04 (0.03)	-0.05 (0.03)	-0.01 (0.02)
Higher Education (dummy)	0.03 (0.02)	-0.10** (0.03)	0.01 (0.03)	0.06* (0.03)	-0.03 (0.02)	0.06* (0.02)	-0.03 (0.04)	0.14*** (0.03)	0.11*** (0.03)	0.03 (0.02)
35 years or older (dummy)	-0.01 (0.02)	-0.05 (0.03)	0.02 (0.03)	0.01 (0.03)	-0.07*** (0.02)	0.02 (0.02)	0.03 (0.03)	0.10** (0.03)	0.03 (0.03)	-0.03 (0.02)
Informed (dummy)	-0.03 (0.05)	-0.11 (0.10)	0.13 (0.08)	0.14* (0.07)	0.02 (0.03)	0.07 (0.07)	0.05 (0.10)	0.07 (0.07)	0.09 (0.07)	0.07 (0.05)
Metropolitan (dummy)	-0.03 (0.03)	0.00 (0.04)	0.00 (0.03)	0.03 (0.03)	0.03 (0.02)	0.01 (0.04)	0.04 (0.04)	0.03 (0.03)	0.05 (0.03)	-0.01 (0.02)
Resource intensive (dummy)	-0.00 (0.04)	0.04 (0.03)	-0.00 (0.04)	0.06 (0.03)	0.00 (0.02)	0.02 (0.04)	0.01 (0.03)	0.02 (0.03)	0.04 (0.04)	-0.01 (0.02)
Constant	0.78*** (0.06)	0.42*** (0.11)	0.45*** (0.09)	0.35*** (0.08)	0.67*** (0.05)	0.54*** (0.08)	0.22 (0.12)	0.43*** (0.08)	0.37*** (0.08)	0.59*** (0.06)
N	954	936	917	997	1508	954	936	917	997	1508
R ²	0.054	0.228	0.080	0.111	0.111	0.077	0.212	0.109	0.095	0.077

Note: This table estimates the correlation between the SLO and its determinants in the Andean region. All the columns are estimated using a linear probability model. The base country for the country dummies is Colombia. Robust standard errors presented in parentheses. *, **, and *** imply statistical significance at the 10%, 5%, and 1% level, respectively. Variable definitions and summary statistics are provided in Tables A1 and A2.

Table A4: Institutional determinants of the SLO for the extractive industries

Dependent variable:	Social license to operate (dummy)					
	Baseline	Model			Dummy Definitions	
	OLS	Logit	Probit	Ordered Logit	2 categories	Excluding middle category
<i>Panel A: Mining</i>	(1)	(2)	(3)	(4)	(5)	(6)
Governance (dummy)	0.16*** (0.01)	0.14*** (0.01)	0.14*** (0.01)	2.07*** (0.12)	0.15*** (0.01)	0.17*** (0.02)
Distributive justice (dummy)	0.10*** (0.01)	0.13*** (0.01)	0.13*** (0.01)	1.40*** (0.08)	0.13*** (0.01)	0.12*** (0.02)
Procedural justice (dummy)	0.09*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	1.34*** (0.07)	0.08*** (0.01)	0.09*** (0.02)
Nationalism (dummy)	0.06*** (0.02)	0.05*** (0.01)	0.05*** (0.01)	1.21** (0.08)	0.06*** (0.01)	0.05** (0.02)
Scale (dummy)	-0.03** (0.01)	-0.03** (0.01)	-0.03* (0.01)	0.73*** (0.04)	-0.05*** (0.01)	-0.05** (0.01)
Metropolitan (dummy)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	1.02 (0.06)	-0.00 (0.01)	0.02 (0.02)
Resource intensive (dummy)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	1.07 (0.07)	0.01 (0.01)	-0.00 (0.02)
N	5312	5312	5312	5312	5312	3465
R ²	0.141	0.134	0.133	0.059	0.137	0.174
<i>Panel B: Oil & Gas</i>	(7)	(8)	(9)	(10)	(11)	(12)
Governance (dummy)	0.16*** (0.01)	0.14*** (0.01)	0.14*** (0.01)	2.05*** (0.12)	0.19*** (0.01)	0.18*** (0.02)
Distributive justice (dummy)	0.09*** (0.01)	0.10*** (0.01)	0.10*** (0.01)	1.28*** (0.07)	0.07*** (0.01)	0.08*** (0.01)
Procedural justice (dummy)	0.07*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	1.34*** (0.07)	0.10*** (0.01)	0.09*** (0.02)
Nationalism (dummy)	0.07*** (0.02)	0.06*** (0.01)	0.06*** (0.01)	1.14 (0.08)	0.07*** (0.01)	0.07*** (0.02)
Metropolitan (dummy)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	1.09 (0.07)	0.01 (0.01)	0.03 (0.02)
Resource intensive (dummy)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	1.08 (0.07)	0.01 (0.01)	0.01 (0.02)
N	5312	5312	5312	5312	5312	3791
R ²	0.132	0.123	0.123	0.057	0.149	0.166

Note: This table estimates the correlation between the SLO and its determinants in the Andean region. All the columns include country fixed effects, and the demographic determinants as controls. Columns 2–4 test if our baseline results are robust to alternative models. In particular, we estimate the coefficients with a logit, a probit, and an ordered logit model in Columns 2, 3, and 4, respectively. Column 4 shows the odds ratios instead of the average marginal effects as in the other columns and using the original question with 5 categories in the dependent variable instead of a dummy. Columns 5–6 test whether our estimates are consistent when we redefine the dummy variables used for the dependent variables and the institutional determinants. In Column 5, the dummies are equal to 1 when the response is "Positive"/"Agree"/"Somewhat fair" or "Very positive"/"Strongly agree"/"Very fair" and 0 otherwise. And in Column 6, we remove all the individuals replying "Neither positive(fair/agree) nor negative(unfair/disagree)." Robust standard errors are presented in parentheses. *, **, and *** imply statistical significance at the 10%, 5%, and 1% level, respectively. Variable definitions and summary statistics are available in Tables A1 and A2.