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Modes of Lithium Extraction in Argentina: Mining Politics in Catamarca, Jujuy, and Salta

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Lithium is a strategic mineral resource. Because of the high-charge density and long life of lithium carbonate, rechargeable lithium-ion batteries are widely used not only in consumer electronic devices, such as mobile phones and laptops, but also in electric vehicles and for storing electricity from wind and solar energy. Lithium is thus a vital element for making a successful global transition from fossil fuel to renewable energy. Together, Argentina, Chile and Bolivia account for about half the total lithium reserves in the world (US Geological Survey, 2016). Argentina is the only one of these three countries that permits exploitation freely through concessions, and this lack of regulation, coupled with low taxes makes Argentina especially attractive for foreign investors. Argentina's exports of lithium carbonate were \$ 356M in 2018, ranking second only to Chile, with exports of \$ 1B.¹ The gap between the two countries is expected to narrow as production increases in Argentina with a wave of new investment in lithium mining (Fornillo, 2015, p.12).

The production of lithium carbonate in Argentina dates to 1998, with a boom beginning in 2010 and continuing through the rest of the decade. All current production of lithium is located in three north-western provinces, Catamarca, Jujuy, and Salta, which together form the Argentine leg of the so-called 'lithium triangle' that straddles parts of Argentina, Bolivia and Chile. The three provinces produced about 30,000 tons of lithium carbonate in 2016, or approximately 16% of total global production. Jujuy was responsible for about 12,000 tons with the bulk of the remaining output com-

¹ [https://oec.world/en/profile/hs92/6283691/#:~:text=Lithium%20carbonates%20are%20the%20world's,and%20Germany%20\(%2446.2M\).](https://oec.world/en/profile/hs92/6283691/#:~:text=Lithium%20carbonates%20are%20the%20world's,and%20Germany%20(%2446.2M).)

ing mostly from Catamarca and, to a far smaller degree, Salta. The companies in the three provinces estimate they can extract about 145,500 total tons by 2022 (Ministerio de Energía y Minería, 2017). Although there are some projects in other provinces, such as San Luis and Córdoba, these mines are not in operation yet.

Although these three Argentine provinces have shared historical roots, cultural traditions, socio-economic profiles and political institutions as subnational units in a federal system, we observe striking variation both across and within them in the *modes of lithium extraction*, that is, in how mining projects articulate with local stakeholders, especially indigenous communities and organisations.

In some mining projects, lithium extraction was *non-negotiated*, with mining companies imposing their preferred terms and conditions and making minimal concessions, if any, to local stakeholders. In such instances, the economic benefits of mining for nearby communities were minimal, and the environmental impact was usually large and negative. In other cases, by contrast, companies had to negotiate with local communities for mining to proceed. In these instances, for what we call *negotiated extraction*, companies had to make concessions that improved some local socio-economic indicators and mitigated environmental damage. Company concessions included providing local communities a guaranteed number of jobs, investment in public goods, monetary payments, and environmental monitoring. A third outcome, *aborted extraction*, resulted when companies decided to halt a project and withdraw from the production site because of large costs, usually stemming from organised resistance by local stakeholders. In these cases, conflict was often intense, the socio-economic impact of mining on localities very limited, and environmental damage minimal. Why do some lithium mining ventures result in non-negotiated extraction whereas others result in negotiated or, alternatively, aborted extraction?

To address this question, we focus on five mining projects across the three provinces. Together, these five projects encompass a wide range of extraction outcomes: *Fénix*, a long-standing instance of non-negotiated extraction located in the Salar del Hombre Muerto in Catamarca; *Sales de Jujuy* and *Minera Exar*, two cases of negotiated extraction located in the Salar de Olaroz-Cauchari in Jujuy, as well as *AIS*, a case of aborted extraction in Salinas Grandes-Guayatayoc,

also in Jujuy; and, lastly, *ADY*, a recent case of non-negotiated extraction located in the Salar de Rincón in Salta.

The next section discusses existing theoretical perspectives on resource extraction. We then describe the selected cases, focusing on cross-province variation in the role of state institutions in regulating lithium mining and also in the linkages between mining projects and local indigenous communities. We propose a typology of modes of extraction and explore the effects of different modes on local social conflict and economic conditions. The conclusion summarises the main findings and considers comparative implications of the study.

1. The Subnational Political Economy Of Mineral Wealth

A prominent body of comparative cross-national research finds that mineral wealth is mostly a curse (Mahdavi, 1970; Beblawi & Luciani, 1987; Ross, 2012). In so-called 'rentier states'², mineral resources are expected to promote poor macroeconomic performance, unstable growth, deindustrialisation, and authoritarianism (Gylfason et al., 1997; Larsen, 2006; Torvik, 2001; Van der Ploeg, 2011). In the case of lithium, most studies report vast negative effects of mining on traditional economic activities, including small-scale agriculture, cattle husbandry and artisanal salt production, in addition to the local environment, mainly because of the massive amounts of water required to extract lithium carbonate from lithium brine pumped up from beneath the surface of salt flats (*salares*) (Argento & Zicari, 2015, p.42; see also Slipak, 2015; Puente & Argento, 2015; Fornillo, 2015; inter alia).

However, a growing number of recent studies find that resource wealth can have contrasting effects, acting as a curse or, alternatively, as a blessing depending on mediating institutional factors (Snyder, 2006; Snyder & Bhavnani, 2005; Jones-Luong & Weinthal, 2012). The varied consequences of resource wealth are especially visible subnationally, inside countries, because mineral and other natural resources are rarely, if ever, distributed evenly within countries. Recent research has effectively exploited subnational variation in the distribution of mineral wealth to test, refine and even challenge the national 'resource curse' thesis (Díaz-Rioseco, 2016; Orihuela, 2017; González,

² In rentier states, defined as those countries that 'receive on a regular basis substantial amounts of external rent', (Mahdavi 1970, p. 428), only a few people generate the rent, the majority is involved only in its distribution or utilisation, and the government is the principal recipient of it (Beblawi and Luciani 1987).

2018; González & Lodola, 2019). While some subnational studies offer new evidence that supports the resource curse, they also show that the causal mechanisms proposed in the national level literature, to explain the association between resource wealth and underdevelopment, either do not travel to subnational levels or require significant modifications when applied there. For example, in a study of the US states, Goldberg et al. (2008) conclude that the ‘Dutch disease’ mechanism, whereby natural resource booms cause an appreciation of the exchange rate which, in turn, leads to poor economic performance, did not explain why resource-rich states in the US performed worse economically, because all the US states shared the same currency, and real prices varied little among them. Likewise, Monteiro and Ferraz (2012) show that although oil windfalls stifle political competitiveness at the municipal level in Brazil by providing incumbents more resources to spend on patronage, a result congruent with the national-level resource curse literature, the mechanism of resource-driven patronage as a source of incumbency advantage, works differently at the local level. Because of an increase in the enforcement of federal regulations that constrain the use of oil rents to hire public employees on a permanent basis, the large incumbency advantage at the municipal level associated with the oil windfall boom proved fleeting in Brazil, disappearing after just two elections.

Other studies go further, using a subnational perspective to challenge the notion of a resource curse altogether. In his analysis of oil wealth in the Argentine provinces, Díaz-Rioseco (2016) shows that, in some instances, oil actually leads to more, not less, political contestation at the subnational level. To explain the contrasting consequences of oil on levels of political competitiveness at the provincial level, Díaz-Rioseco focuses on ‘rent sharing regimes’, that is, the fiscal institutions for sharing resource revenues among levels of government. When these institutions distributed rents to municipal governments, rather than concentrating them under the control of governors, the result was an increase in political competitiveness at the provincial level.³ We build on these and other exemplars of ‘place- and institution-sensitive research’ (Orihuela, 2017, p.2) by exploring subnational variation in the political, socio-economic and environmental consequences of lithium.⁴

Argentine provinces offer an excellent setting for assessing these effects of lithium mining. Firstly, there is large variation both across and

within provinces in modes of lithium extraction, with different modes, in turn, hypothesised to have contrasting political, socio-economic and environmental consequences. Secondly, Argentine provincial governments are constitutionally mandated to administer mineral wealth, allowed to levy their own royalties, and enjoy significant discretion over how these revenues are used. This discretion, which is evident in the strikingly different roles played by provincial government agencies in the mining sectors across the three provinces, provides an opportunity to explore how subnational variation in the degree of state regulation and intervention affects modes of extraction. Lastly, while taking advantage of this subnational variation in provincial politics and modes of lithium extraction, a focus on these three adjacent provinces allows us to hold constant key economic, cultural, and institutional factors, in addition to the unobservable determinants that are invariant across our cases and that might also affect our outcomes of interest (Snyder, 2001; Goldberg et al., 2008, p.488; Weitz-Shapiro, 2012, p.572; Giraudy et al., 2019).

2. Lithium Mining In Argentina: Regulatory And Social Contexts

Extraction by transnational mining companies (TMCs) does not occur in a vacuum. Mining in the contemporary period is nested in a complex set of multilevel rules and regulations designed to protect the environment and, especially, local communities. At the international level, these rules include legal instruments codified in international treaties and regimes that protect indigenous peoples and the environment from ‘negative externalities’ of mining, for example, Convention 169 of the International Labour Organization (1989), the United Nations (UN) Convention on Biological Diversity (1992), and the UN Declaration on the Rights of Indigenous Peoples (2007).

At the national level, most governments across the world, in addition to signing these international treaties regulating extraction and agreeing to abide by them, issue additional regulations, including setting tax and royalty rates on TMCs. In Argentina, the federal government (*Código Minero*, Law 24,196, adopted in 1993) completely deregulated the mining sector, granting companies extensive benefits

3 Regarding the local economic and environmental impact of mineral and oil production, Caselli and Michaels (2013) and Postali and Slaibe (2009) find limited positive spillovers of oil rents on local economic activity in Brazilian municipalities. Aragón and Rud (2009) find that gold extraction in the Peruvian mine of Yanacocha has only modest positive effects on local income and household welfare. Similarly, Arellano-Yanguas (2016) shows that mineral rents transferred to producing regions in Peru have a small positive effect on economic growth but are also associated with higher poverty levels.

4 Lithium mining is generally smaller in magnitude, both in the scale of investments and the amount of revenue generated, than extraction associated with minerals like oil or kimberlite diamonds, the conventional source of wealth for classic rentier states.

5 The Constitutional Reform of 1994, in Article 124 states, 'The provinces have the original domain of all natural resources in their territory', which implies that provinces set their own rules in mining matters (Puente & Argento 2015, p.123).

for extracting and processing of minerals, including 'extensive tariff exemptions, tax relief schemes, 30 years of fiscal stability, and low provincial royalties' (Nacif, 2014, n/p, quoted in Puente & Argento, 2015, p.122).⁵ This law eliminated all municipal taxes and stamp duties, setting royalties at three per cent of the pithead price (Marchegiani et al., 2019, p.10). The federal government plays a minimal regulatory role in extractive industries, mostly limited to environmental protection and the participation of indigenous communities in managing natural resources located in their territories (Puente & Argento 2015, p.123). As a result, in Argentina there is no specific federal regulatory framework for lithium mining.

2.1. The Varied Roles of the Provincial State

Because the federal government of Argentina lacks a centralised strategy for lithium and ownership of minerals is reserved to the provinces, provincial governments and their state agencies play a decisive role. The provincial state plays different roles in the lithium sector across the three provinces on which this study focuses. In both Catamarca and Salta, the provincial state has taken a *laissez-faire* approach in the case of lithium, letting private companies make investments and carry out their mining activities with little oversight. In Jujuy, by contrast, the provincial state has played a more active and interventionist role, becoming a minority shareholder in lithium mining projects launched by private companies (Puente & Argento, 2015, p.123).

The first modern, lithium mining project in Argentina was launched in Catamarca near the border with Salta in 1998 as Project Fénix. Today, the main projects are owned by the US firm, Livent (previously FMC Lithium), and Sal de Vida, owned by Galaxy Resources Limited, an Australian firm. Both are in Salar del Hombre Muerto and are run by private companies. The province of Catamarca created the state-owned company Catamarca Minera y Energética Sociedad Del Estado (CAMYEN S.E.) in 2012, which had a monopoly over extraction of rhodochrosite but played no role in the extraction and processing of lithium.⁶ Lithium mining operations in Salta are also run by private companies. Although the province created the state-owned enterprise, Recursos Energéticos y Mineros

Salta (REMSA), the main goal of this corporation is to attract private business to take over the extraction of lithium (Slipak, 2015, p.98). Like Catamarca, Salta thus opted for a private business-led approach, very much dependent on private companies for the extraction and processing of lithium. The main production sites in Salta are Salar de Rincón, operated by the Australian firm, Argosy Minerals Ltd. (ADY) mining company ADY, and in Salar de Ratones y Salar Centenario, where the French company, Eramet has invested. In Jujuy, by contrast, the provincial state plays an active role in regulating lithium extraction and processing. In early 2011, the provincial government (through Decree-Agreement No. 7592) declared lithium a 'strategic resource' and created a committee of experts in charge of overseeing mining projects related to lithium (Informe Paralelo CDESC, 2011, p.4, quoted in Puente & Argento, 2015, p.123).⁷

The Salar de Olaroz-Cachauri in the department of Susques, at 4,500 metres above sea level and 60 km from the Jama pass to Chile, is the main site for lithium extraction in Jujuy. Sales de Jujuy and Minera Exar are the main companies. The Argentine subsidiary of the Australian transnational mining company, Orocobre Limited and the Japanese automaker, Toyota Tsusho are responsible for operations in Sales de Jujuy. The Chinese company Ganfeng and the Canadian company Lithium Americas Corporation run the Minera Exar project in a 50/50 joint venture (Marchegiani et al., 2019, p.21).

After the concessions and the provincial government's declaration of lithium as a strategic resource, the government of Jujuy negotiated with Orocobre and created the state-owned enterprise Jujuy Energy and Mining State Society (Jujuy Energía y Minería Sociedad del Estado, JEMSE) in 2011.⁸ JEMSE got 8.5% of the shares, while the remaining 91.5% stayed in the hands of the private companies Orocobre (66.5%) and Toyota (25%).⁹ In a parallel arrangement, JEMSE also got 8.5% of the shares of Minera Exar (Marchegiani et al., 2019, p.22). A second important site for lithium mining in Jujuy is Salinas Grandes-Laguna Guayatayoc, where, as discussed below, the Canadian firm, A.I.S. Resources, ceased its operations after facing sustained resistance from local indigenous communities.

These differences in provincial state regulations and involvement, while important, cannot explain the variation across the three provinces in the modes of extraction, socio-economic impact, and levels

7 The Committee includes geologists and other experts from the National Scientific and Technical Research Council (CONICET) and the National University of Jujuy, who are nominated by the provincial legislature, the Environmental Management Agency and the provincial mining department (Marchegiani et al., 2019, p.15). The Committee of Experts was recently dissolved by the current governor through executive decree (Decree-Agreement No. 9194, July 17, 2019).

8 Decree No. 7626 of the provincial executive created the state-owned company JEMSE in 2011. The decree grants the company large authority in areas ranging from exploration of deposits to the commercialisation, generation, industrialisation, and transportation of mineral wealth (Puente & Argento 2015, p.123).

9 Because JEMSE lacked the necessary funds to contribute capital to the joint venture, Orocobre loaned the state-owned company the funds it needed to cover its share. JEMSE agreed to pay back the loan by transferring to Orocobre 33.33% of its shareholder dividends once the project begins to turn a profit (Slipak 2015, p.97; Argento & Zicari, 2015, pp.41-42).

6 <https://www.elancasti.com.ar/opinion/2018/1/29/litio-est-camyen-360239.html> The province of Catamarca created a longstanding state company, Yacimiento Mineros Agua de Dionisio (YMAD) in 1958. It formed a temporary joint venture with Minera Alumbra Limited (M.I.M. Holdings Ltd. of Australia, North Limited of Australia, and Rio Algom Ltd of Canada) to mine copper, gold and molybdenum. This company does not have any role in lithium.

of conflict associated with lithium mining. Firstly, within a single province, Jujuy, where the role of the provincial state does not vary, we nevertheless see sharply contrasting outcomes, with high levels of conflict resulting in aborted extraction in one area of the province (Salinas Grandes and Laguna Guayatayoc) whereas in another area (Salar de Olaroz-Cachauri) low levels of conflict led to negotiated extraction and, in turn, modest improvements in employment opportunities and public services for local residents. Secondly, while we might expect more conflict in provinces like Catamarca and Salta, where the state gives private mining companies free rein, lithium extraction proceeded in the former case for more than two decades without resistance and continues to face no resistance in the latter. Lastly, the recent emergence of protests against lithium mining in Catamarca after more than twenty years of quiescence, and without any notable change in the provincial state's role in the sector, further highlights the inability of provincial state regulations to explain the socio-economic consequences of lithium mining.

¹⁰ The nature, and visibility, of the 'threat' that different kinds of mining operations pose to communities is a crucial factor to consider. In contrast to open-pit mines, which are highly visible and may rely heavily on toxic chemicals like cyanide, the most widespread and harmful negative externality of lithium mining in Argentina is the slow, silent depletion of water supplies (depending on the processing technique, toxic chemicals may also be involved in lithium mining). In addition to being gradual, these negative effects may be more difficult to 'prove' scientifically, especially when the companies themselves are in charge of geological surveys and environmental impact assessments, as is often the case in the Argentine Puna region.

2.2. Community Stakeholders

In addition to being nested in this multilevel array of international, national and provincial rules and regulations, extraction also occurs in a local context, defined by communities of stakeholders whose interests are directly affected by the externalities, often harmful, of mining activities.¹⁰ Community organisation and mobilisation may help explain the level of local conflict and the degree of redistribution of mineral wealth (Puente & Argento, 2015; Argento & Zicari, 2015).

Depending on their cohesion, organisational strength and access to responsive state and government authorities and other key allies, communities vary in their abilities to defend their interests, including by appealing successfully to the international, and perhaps national, rules and regulations designed to protect them. Moreover, communities can have divided and evolving preferences about the desirability of mining, which, especially in remote areas, may represent both a welcome source of employment and, under the rubric of 'corporate social responsibility', a source of scarce public goods, such as schools and basic infrastructure in areas where the national and provincial

The ability of local leaders and organisations to influence the outcome of negotiations with companies depends on their organisational capacity and power for mobilisation. The ability of companies to influence the outcome depends, in turn, on the value of their sunk costs and fixed investments in relation to projected profits from the mine

'public' state is unable or unwilling to provide such goods. This is especially true in situations of extreme poverty where 'the only thing worse than being exploited is *not* being exploited'. Communities may thus face a difficult trade-off between negative public health and environmental consequences, on one hand, and positive economic and material welfare benefits, on the other. This trade-off can give TMCs a strategic opportunity to offer selective incentives in the form of jobs and private social provision that produces support among some locals which, in turn, may have a divisive, wedge-like effect on community solidarity that weakens the capacity to resist extraction.

Negotiations among community leaders, local organisations, and mining companies occur in both formal and informal arenas. When a local municipal council serves as the venue for negotiations, any resulting agreements may be relatively institutionalised, especially when municipal and provincial authorities participate, as they sometimes, though not always, do. Alternatively, bargaining among communities, local organisations and TMCs can occur informally and depend on ad hoc agreements, usually between companies and local leaders. The ability of local leaders and organisations to influence the outcome of negotiations with companies depends on their organisational capacity

and power for mobilisation. The ability of companies to influence the outcome depends, in turn, on the value of their sunk costs and fixed investments in relation to projected profits from the mine: *Ceteris paribus*, TMCs with low sunk costs and expecting modest future profits will have more leverage in negotiating the terms of mineral extraction than companies with high sunk costs and large projected profits.

3. Modes of Lithium Extraction: How Companies, Communities, and Governments Set the Terms of Mining in Catamarca, Jujuy and Salta

At the most general level, three modes of extraction can result from TMCs looking to extract minerals: non-negotiated extraction, negotiated extraction, and aborted extraction. *Non-negotiated* extraction occurs when TMCs make few, if any, concessions to local stakeholders, although the companies may still abide by existing national regulations and share revenues with host country governments as stipulated in mining regulations. *Negotiated* extraction occurs when local stakeholders are able to influence the terms of extraction, for example by getting the company to agree to provide a guaranteed number of jobs, local investments in public goods, or monetary payments. Negotiated extraction may involve a ‘social licence’ and the creation of new institutions for governance and monitoring of TMC activities through which both communities and local government participate jointly. Depending on the balance of power between local communities and TMCs, negotiated extraction can be *symmetrical*, with communities enjoying a strong influence over TMC behaviour, or, as is probably more common, *asymmetrical*, with communities having a weak influence. A third possible outcome of TMC investment is *aborted* extraction. This can occur when TMCs choose to ‘exit’ the locale, calculating that the cost of future investments outweighs the sum of anticipated profits and ‘sunk costs’, perhaps because of a drop in the international price and market for the minerals in question or an increase in the strength of resistance to the enterprise by local stakeholders. Aborted extraction can also result from a stalemated negotiation where TMCs

and local communities fail to reach an acceptable agreement over the terms of extraction.

We look at cases of lithium mining projects in *salares* across the three Argentine provinces with the highest levels of lithium mining investment: Catamarca, Jujuy, and Salta. By focusing on projects with divergent extraction outcomes in the same province, we exploit a ‘most similar systems’ design that allows us to hold constant federal as well as provincial-level factors, including the type of government and the provincial regulatory framework. In turn, by exploring cases with similar extraction outcomes *across* provinces we draw on a ‘most different systems’ design that allows us to highlight how similar causal mechanisms — the strengths and strategies of companies, communities and governments — operate across distinct institutional, political and socio-economic contexts.¹¹

3.1. Jujuy: Negotiated Extraction in the West Puna and Aborted Extraction in the East

In Jujuy, the lithium ‘white goldrush’ began in 2010 with a wave of foreign investment aiming to mine the deposits in brine beneath the province’s multiple *salares*. We focus on the sharply contrasting outcomes that occurred in the eastern and western sides of the Puna Jujeña.¹²

3.1.1. A Failed Attempt at Symmetrical Extraction in Salinas Grandes and Laguna Guayatayoc

In Salinas Grandes and Laguna Guayatayoc, Orocobre and other TMCs faced strong resistance from local indigenous communities who mobilised successfully to halt their mining projects. Before the arrival of the lithium mining companies, the sparsely populated and geographically dispersed local Kolla and Atacama settlements were weakly interconnected. However, the entry of the mining companies in 2010 triggered a process of organisation that resulted in a confederation encompassing thirty-three indigenous communities across the region (thirty-three Comunidades de la Cuenca de las Salinas Grandes y la Laguna de Guayatayoc). While not unconditionally opposed to mining, the thirty-three Communities demanded that

¹¹ A ‘most similar systems design’ compares closely matched cases which differ only in the outcome of interest, or the ‘dependent variable’. This makes it easier to identify crucial factors that explain the observed variation in the outcome. A ‘most different systems design’ compares contrasting cases which are matched only in the outcome of interest, or ‘dependent variable’. This makes it easier to identify the crucial similar factors that explain the shared outcome across otherwise quite different contexts. See Przeworski and Teune (1970).

¹² See Pragier (2019) and Marchegiani, Morgera and Parks (2019) for insightful studies of these divergent outcomes on either side of the Puna in Jujuy.

any extraction be carried out, not only with their consent, but also on their terms. With support from local environmental lawyers and a national environmental NGO, *Fundación Ambiente y Recursos Naturales* (FARN), which helped publicise their struggle, these indigenous communities drew effectively on international treaties and allies, forming a powerful Transnational Action Network (TAN) (Keck & Sikkink, 1999). In 2010, the communities filed an injunction against the governments of Jujuy and Salta demanding that mining companies respect their right to prior, free and informed consultation on lithium mining in accordance with International Labour Organization (ILO) Convention 169, which Argentina ratified in 1992. Not only did the communities succeed in bringing their case to the Argentine Supreme Court, they also managed to get the Inter-American Court of Human Rights (CIDH), based in San José, Costa Rica, to review the case (Roth, 2019). The communities also solicited successfully an endorsement and visit in 2011 from the UN Special Rapporteur for Indigenous Rights, James Anaya.

The thirty-three communities embarked on an intensive, multi-year deliberative process that resulted in a remarkable document, *Kachi Yupi* ('Footsteps in the Salt') (2015), which outlined a community-approved protocol by which mining companies could gain their consent. The protocol, which would have enabled symmetrical negotiated extraction, was submitted to the provincial government for ratification into law by an executive decree. While the provincial government of the Partido Justicialista (PJ), governor Eduardo Fellner (2011-15), might have been amenable to their proposal, the newly elected pro-business government of Gerardo Morales (2015-present) delayed review of the community-generated protocol for three years, finally rejecting it in 2018. The government's refusal to endorse the *Kachi Yupi* initiative and codify it as law through an Executive Decree signalled the failure of the initiative to achieve symmetrical negotiated extraction.

In the wake of the provincial government's rebuff of *Kachi Yupi*, a new company, the Canadian firm A.I.S., together with local investors from the neighbouring province of Salta (Ekeko, and the current Secretary of Mines of Salta), moved with the government of Jujuy's approval to end the eight year moratorium on lithium mining in the Guayatayoc area by starting exploratory drilling in its

properties without community consent. This step toward non-negotiated extraction provoked protests and highway closings by the thirty-three communities in February 2019. Having failed to achieve their goal of symmetrical negotiated extraction because of the lack of provincial government support for the initiative, and in the face of efforts by companies like A.I.S. to proceed without community consent, the preferences of community members seem to have shifted toward a maximalist position favouring 'no extraction' over 'non-negotiated extraction'. For their part, the mining companies had tried to implement a 'divide and conquer' strategy by negotiating individually with communities that might be persuaded to defect from the no extraction position, although it remains to be seen if these efforts will succeed. Meanwhile, in a move signalling a continued disregard for the demands of the indigenous communities of the region, the government of Jujuy proceeded to issue a tender for new lithium mining projects in the Salinas Grandes and Laguna de Guayatayoc regions in early 2019.

In summary, the bitter experience of failing in their efforts at symmetrical negotiated extraction, combined with the unresponsiveness to their demands for prior consultation by the provincial government, seems to have driven the indigenous communities of the region to shift toward a maximalist position of unconditional opposition to mining: 'no al litio, si al agua y la vida'. As a result, the Salinas Grandes region has yet to produce any lithium.

3.1.2. Asymmetrical Extraction in Olaroz

On the other side of the Puna Jujeña, a mere 50 miles to the west, events took a different course. In Olaroz, *Sales de Jujuy*, a consortium led by Orocobre, faced some resistance from an organisation of indigenous residents, *La Apacheta*, which opposes mining altogether. The standstill it faced in the east of Jujuy because of community resistance to its plans may have led Orocobre to see that non-negotiated extraction was not a feasible option and that negotiation, ideally asymmetrical, was its best strategy. Whether or not the company had learned this lesson from the east Puna, *La Apacheta*'s resistance surely underscored the urgency of investing in building community support in Olaroz in order both to weaken pressures for symmet-

rical negotiated extraction or, worse, a no extraction standstill as in Salinas Grande-Guayatayoc. Orocobre enlisted a local geologist and also benefited from the support of the provincial government. The company soon reached a set of agreements, negotiated on a case-by-case, 'divide and conquer' basis with local indigenous communities guaranteeing jobs, annual monetary payments, and modest public works, such as building a new school and an internet access centre. This *negotiated extraction* allowed the company to start profitably mining in 2015, making it only the second company to actually begin mining lithium in Argentina.

Following on the heels of the success of *Sales de Jujuy*, other international mining companies followed suit and launched a cluster of new lithium projects that have transformed western Jujuy into a profitable lithium mining district.¹³ One of the new entrants advertises its locational advantage in what the company's online promotional material tellingly describes as 'a well-established, pro-mining business jurisdiction [that] minimises the project's risk profile'. Moreover, the placement of this company's project in the 'prolific lithium mining district' with a strong foundation of services and infrastructure is presented as an asset that strengthens the 'prospect of a fast-track to production'. Negotiated extraction thus opened the way for the Olaroz-Cauchari region to emerge as a dynamic hub for lithium mining.

In assessing the conditions that made negotiated extraction possible in the western Puna Jujeña, it bears emphasis that *La Apacheta* was a far weaker organisation than its counterpart to the east (i.e. the thirty-three communities). Not only did *La Apacheta* have a far more circumscribed territorial reach than the thirty-three communities, it also lacked the international ties and support from an internationally funded national NGO enjoyed by its peers. Had *La Apacheta* posed a stronger threat it might have been able to achieve a more symmetrical negotiated outcome.

Finally, the asymmetrical nature of negotiated extraction can be seen in mounting frustration and 'buyer's remorse' expressed by community members in the face of increasingly evident negative environmental and health consequences of *Sales de Jujuy's* mining operations. According to Marcelo Sticco, a hydrogeologist from the University of Buenos Aires who toured the Olaroz plant in February 2019 with community members, the company's production meth-

ods involve an 'environmental sacrifice' (Roth, 2019). Local inhabitants are increasingly forced to move far away because of shortages of water suitable for human and animal consumption. It is thus not surprising that Sticco reports that community members now regret having approved the Olaroz project.

3.2. Salta: Non-negotiated Extraction

In stark contrast to Jujuy, there has been no detectable community resistance to mining in Salta. This may reflect the remote location of some of the mines in very sparsely populated areas, for example, Salar de Rincón. However, it also surely reflects the weakness of indigenous social movements in Salta. The provincial government in Salta has neither recognised local indigenous communities near the *salares* nor granted them land titles. The government's lack of recognition of indigenous rights, or even the 'right to have rights', is evident in its refusal to even send a delegate to the Supreme Court during the 2010 case filed by the thirty-three communities of Salinas Grandes and Laguna Guayatayoc, despite the fact that some of these communities were located in Salta.¹⁴ This, together with a series of consistently pro-business provincial governments, has made non-negotiated extraction the predictable outcome in Salta.

The perceptions of international mining executives validate the appeal of Salta as a 'mining friendly' place. According to one foreign executive of a large international mining company with investments in Salta's Taca Taca copper mine, 'on a relative basis to other parts of the world the permitting process [in Salta] is transparent'. Noting that a precedent had been set in Salta by the company, Mansfield Minerals, which won an environmental permit from the provincial government for a leachable gold porphyry deposit, the same executive observed, 'you hear about horror stories in various provinces of Argentina, yet here we have a mine [Mansfield's] that is going to be built as an open pit and it's going to use heap-leach and cyanide. Its EIA [Environmental Impact Analysis] was approved in a reasonable period of time'. Whereas some Argentine provinces, for example Chubut and Río Negro, have banned the use of cyanide, in other provinces, such as San Juan and Santa Cruz, mining proceeds

¹⁴ To the degree that indigenous organised resistance and mobilisation occurs at all in Salta today, it seems concentrated in the northern part of the state among the Wichí people, and near the eastern border with Chaco and Formosa provinces, where there are no lithium mining activities.

¹³ In the Cauchari *salar*, adjacent to Olaroz, the Chinese company Gan-feng and the Canadian company Lithium Americas Corporation launched the Exar joint venture, which seems to have emulated successfully *Sales de Jujuy's* strategy of asymmetrically negotiated extraction. Having cut a series of community-by-community deals, Exar is now poised to become Argentina's third lithium-producing company. Orocobre itself expanded its footprint in lithium mining in the region through a new 25/75 joint venture agreement with the Canadian firm, Advantage Lithium Corp, to develop the Cauchari JV project situated immediately to the south of the *Sales de Jujuy* facility. A fourth venture, Cauchari East, led by the Canadian mining company Millennial Lithium, is also in development.

15 <https://www.northern-miner.com/news/taca-taca-gets-bigger-and-better/1000750981/>

16 The 2019 Fraser Institute Annual Survey of Mining Companies was sent to approximately 2,400 exploration, development, and other mining-related companies around the world.

Table 1
Policy Perception Index (PPI), Argentine Provinces, 2015-19
Source: (Fraser Institute Annual Survey of Mining Companies, 2019)

Province	2015	2016	2017	2018	2019	Average Score (2015-19)
Salta	62.30	83.13	71.89	67.72	77.97	72.602
San Juan	53.61	73.50	66.96	64.76	80.21	67.808
Catamarca	44.35	59.28	70.50	79.31	68.17	64.322
Santa Cruz	40.86	62.00	61.38	65.09	63.73	58.612
Río Negro	32.58	**	**	**	70.23	51.405
Neuquén	25.43	50.33	74.99	34.42	64.98	50.03
Jujuy	42.68	37.07	54.75	56.53	57.44	49.694
La Rioja	22.15	37.96	52.66	46.76	42.44	40.394
Mendoza	35.56	34.23	43.22	50.37	36.14	39.904
Chubut	25.13	31.79	26.34	37.07	30.89	30.244

unhindered. ‘Salta is in that happy camp’, the executive noted, ‘It’s a pro-mining space...this is a great province to be in’.¹⁵

This view of Salta as a mining friendly jurisdiction is widely shared among international mining companies, as confirmed in the results of the Annual Survey of Mining Companies by Canada’s Fraser Institute. The survey, which is distributed worldwide to executives and senior managers of mining companies, serves as the basis for an index that ranks countries, states and provinces according to the extent that public policies encourage or discourage mining investment.¹⁶ As seen in Table 1, between 2015-2019, Salta earned the highest average score of the ten mineral-rich Argentine provinces included in the Fraser Institute’s Policy Perception Index (PPI). The PPI is composed of survey responses concerning policy factors that affect investment decisions, including uncertainty over the administration of regulations, environmental regulations, regulatory duplication, the legal and taxation systems, uncertainty involving protected areas and disputed land claims, socio-economic and community development conditions, labour regulations and skills availability, infrastructure, trade barriers, political stability and security. The PPI thus aims to offer ‘a “report card” to governments on the attractiveness of their mining policies’ (Stedman, Yunis & Aliakbari, 2019, p. 2).

Still, Salta poses some puzzles. If mining conditions in Salta are so propitious because of the favourable investment climate and lack of community opposition, why have none of the lithium projects actually begun producing lithium, whereas Orocobre, despite operating in the social minefields of Jujuy, has been producing steadily

since 2015? And while the Salar de Rincón project seems far along, with considerable investments by the company in building facilities and doing pumping tests and pilot production runs, it is still not in regular production. The reason for this delay has likely far less to do with local factors than with global market conditions for lithium, in addition to the imperative to create an appearance of steady progress for the purpose of satisfying company shareholders and raising investment capital. In the absence of community resistance, or even communities, companies may thus prefer to ‘stand pat’ on their reserves, which allows them to raise capital from investors based on estimated future profits, without actually mining anything. This could help explain the flurry of new and in-development lithium mining projects, more than fifty across the Argentine Puna, many with sophisticated prospecting studies exploring the quality and size of deposits, yet with only a small handful of three or four actually producing anything. Much of the current investment seems geared speculatively toward futures and options.¹⁷

3.3. Catamarca: Contestation after Twenty Years of Non-negotiated Extraction

In contrast to mining-friendly Salta, where weak indigenous movements and a pro-mining provincial government allow mining not only in lithium but in other minerals to proceed non-negotiated, in neighbouring Catamarca, mining has over the last decades, met with strong resistance from powerful grass-roots movements, especially in Andalgalá and Tinogasta (Christel, 2015). Despite this contentious context for mining gold, silver, and iron-ore in Catamarca, lithium extraction has, until recently, faced no organised resistance. This has allowed non-negotiated extraction to proceed for more than twenty years, since the Fenix project, owned by the US company FMC, first began producing in 1998. Why, until late 2019, has lithium proved an exception to the contentious pattern seen in mining of other minerals in Catamarca?

One possible answer concerns the remote location of the salars in Catamarca, with most near the border of quiescent Salta. In both Salta and Catamarca, local communities are further away from

17 The case of the French company, Eramet, with some \$150 million invested in the Centenario and Ratones Salares of Salta offers another interesting example of ‘no extraction’, not because of resistance from affected communities, but because of the Covid-19 pandemic and its effects on global demand for lithium. Eramet announced recently that it was abandoning its Salta facilities and project.

lithium extraction sites than they are in Jujuy. Moreover, lithium mining does not require a large open pit as in the cases of gold, silver, and iron ore, nor does it use highly toxic pollutants, such as cyanide, which have a visible human and environmental impact in the short term. Rather, lithium extraction in the Argentine Puna produces a slow, hidden, and insidious depletion of water in a region where it is quite scarce. Because the Fenix project in Catamarca was the first lithium mine in the country, preceding the others by more than a decade, knowledge among local communities about the creeping and pernicious hydraulic consequences of the mine may simply not have existed. The gradual drying up over recent years of the Trapiche River, the Fenix project's main source of water for processing lithium brine, may very well have been the first visible sign to local residents of the mine's harmful impact. It changed the course of events.

3.3.1. Contesting Non-negotiated Extraction: New Community Demands for a 'Social Licence'

The remarkable pattern of more than two decades of quiescence in Catamarca's lithium industry has recently come to an end. In October 2019, several members of an indigenous family, the Morales, were beaten and arrested for opposing the removal of a livestock fence on what they claimed was their ancestral property. The fence had been taken down so that a road bypass could be opened for mining company vehicles to build a new, 30 km-long aqueduct to transport fresh water pumped from the Río los Patos for use in lithium processing by the US company Livent, additionally by two start-up companies, Galaxy Lithium SA and Minera Santa Rita SRL. The provincial and municipal governments allied with the mining companies by declaring that the disputed land did not, in fact, belong to the Morales family. During the same period, local indigenous people comprising the Atacameños del Altiplano communities, together with anti-mining ecological activists affiliated with the NGO Pucará based in Antofagasta de La Sierra, began mobilising to protest against the new aqueduct, which, in apparent violation of ILO Convention 169, had not been subjected to prior consultation and community approval for a 'social licence'. The communities, who depend on the rivers to sustain their livestock husbandry in the harsh

and arid climate of the Puna, blame the mining operations for causing the Trapiche River to dry up and mobilised to prevent the same thing from happening again with the Patos river.

Thus far, Livent and the other companies have shown no signs of wavering from the position of non-negotiated lithium extraction enjoyed in Catamarca since 1998. Indeed, protests have been met with a level of repression not seen in Jujuy, with protestors beaten and arrested by provincial police forces. The provincial government had relied on police brutality to counter anti-mining protests before, both in Tinogasta and Andalgalá, with an especially high level of repression in the latter case in 2010. Moreover, vehicles were reportedly provided by the mining companies to transport provincial police to protect the construction of the aqueduct.¹⁸ Provincial government officials, notably the provincial Judge for Mining (*Juez Electoral y de Mina*) and the Minister of Mines have been unresponsive to petitions from the indigenous communities to halt construction of the aqueduct, with the Judge reportedly stating that his court is 'pro-mining'.

Despite the affiliations of both the current (Raúl Jalil, 2019-) and prior governors (Lucía Corpacci, 2011-19) with the more populist faction of the PJ, the Frente para la Victoria (FPV), the provincial government and its police forces, together with the provincial judiciary, have been responsive not to the communities but to the mining companies. The community opposition to the mining interests in Catamarca will thus likely turn to the federal judiciary to seek relief, as did their peers in Jujuy without success in 2010-11. While the communities have the support of several new organisations, most notably, Pucará: Pueblos Catamarqueños en Resistencia y Autodeterminación and Antofagasta Resiste, they have yet to achieve the international, or even national, attention and visibility of their counterparts in Jujuy.

This low profile may partly reflect the more remote location of the mines in Catamarca, more than 10 hours by car from the capital. Of equal significance, the communities of Catamarca opposed to lithium mining faced a far more tenacious and formidable adversary. In contrast to the eastern Puna in Jujuy, where the communities aimed to prevent mining companies from entering in the first place, the communities in Catamarca confronted a longstanding and rooted mining venture which had been in operation for more than twenty years. Not only did this company have a large amount of fixed capital investments

¹⁸ Darío Aranda, 'Litio: Denuncia contra un minera en Antofagasta de la Sierra', *Página 12*, March 23, 2020.

in the area, it also had established strong ties with provincial and local officials, including the ability to deploy units of the provincial police as a private force to protect the company and its investments.

Moreover, in further contrast with the lithium projects in the eastern Puna of Jujuy and most of the other forty-plus recent ventures, the profitability of Livent's operations depended not on the speculative promise of *future* production signalled by a mere concession over proven lithium, but on its ability to produce lithium currently. To sustain the profitable extraction of lithium, Livent aimed to expand the territorial scope of its operations, which in turn required a new source for the large quantities of fresh water needed to process lithium brine into lithium concentrate through the solar evaporation technique employed by the company. The previous source of fresh water, the Trapiche River, had dried up, a result, according to the local communities, of two decades of overuse by the company. To continue its operations, the company needed a new source of fresh water. In the arid Puna, the Patos offered one of the only sources, and, with the provincial government's approval, the company began building the new aqueduct that became a mobilising focal point that helps explain the recent emergence of organised resistance by indigenous communities after more than two decades of collective quiescence.

The communities in Catamarca have adopted a maximalist, 'no extraction', position demanding cessation of lithium mining. Yet they are in a weak position. Firstly, the anti-mining forces in Catamarca lack the national and international visibility and support enjoyed by their counterparts in the eastern Puna of Jujuy. Secondly, this is compounded by a geographically unfavourable location in a remote region lacking major transportation arteries vulnerable to a blockade by a small number of activists. In Jujuy, the proximity of the thirty-three communities to a vital international highway linking northern Argentina and Chile served as an effective basis for making credible threats to inflict collateral damage on economic interests far beyond the lithium industry. The indigenous communities in Catamarca, by contrast, lack a comparable source of leverage.

In Salta, where lithium mining projects have yet to face organised resistance, non-negotiated extraction is feasible without resorting to repression. And in Jujuy, neither the companies nor the government have proved willing, or able, to deploy the force that would likely

be required to impose non-negotiated extraction. In Catamarca, by contrast, perhaps because an actively producing, profitable, and entrenched mining project is involved, both the company and the local state apparatus were willing to turn to repression to sustain non-negotiated extraction. Whether this will continue remains to be seen.

Conclusion

The modes of lithium extraction vary widely across provinces in Argentina. In Salta and, until recently, in Catamarca, extraction has been non-negotiated, with mining companies imposing conditions and making few concessions to local stakeholders. In the western Puna of Jujuy, by contrast, companies negotiated with local communities and offered some benefits that may have had a modestly positive impact. In a third scenario, observed in the eastern Puna of Jujuy, extraction was aborted and companies exited. This chapter describes this variation and explores some of the factors that may help explain it.

Although federal and provincial institutional factors may be relevant, they are far from decisive. In the case of Jujuy, where we observe sharply contrasting outcomes across subregions, it is hard to explain with a focus on federal and provincial institutions because these institutions do not vary inside the province. Likewise, provincial-level institutions that have not changed over time cannot explain the recent shift from quiescence to contention in Catamarca. Other, more dynamic province-level political factors seem to play a stronger role, including alternation between incumbents of different parties and with distinct coalitions of support and leadership styles. For example, the shift in Jujuy from a populist PJ governor (Fellner), more responsive to grass-roots pressures, to a pro-business governor (Morales) may have foreclosed the possibility of a negotiated outcome in the eastern Puna. Still, Catamarca has been governed over much of the last decade by leaders affiliated with a populist PJ faction similar to the one with which the governor of Jujuy was linked, yet this resulted not in a negotiated outcome but in state-company collusion with local police forces and the provincial judiciary acting in the company's service. Provincial politics provides a fertile ground for future comparative research on mining in Argentina.

Local factors appear crucial. These include the location of mines, the capacity of communities to organise and mobilise, and links among local, national and international networks of activists seem to play an important role in determining modes of extraction. Local conflicts are more likely to emerge and escalate when mining threatens well-organised communities located near vital transportation routes that can provide leverage by being easily occupied and shut down. The potential for escalation is amplified when the communities are also connected to national and international networks of activists. Under such conditions, firms may be more likely to negotiate and offer concessions. This, in turn, may improve the local socio-economic impact of mining and mitigate its ecological damage. On the other hand, where local communities are weakly organised, less integrated into external, especially transnational, civil society networks, companies will have few incentives to negotiate. In these situations, as seen in Catamarca, mining companies may be more prone not only to seek to collude with local government but also to respond to local resistance with repression.

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