



Mines, fields, or classrooms: Primary sector activities and local human capital accumulation

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Extended abstract

The resource curse literature concludes that resource-rich countries under-perform in terms of economic growth rated compared to resource-poor countries (Auty, 1994; Sachs & Warner, 1995). This phenomenon has been a topic for debate and empirical research since the end of the 20th century, and it has been studied for several countries (Frankel, 2010). A growing number of studies have focused on the impact of resource wealth on human capital accumulation during the last decades (Mousavi & Clark, 2021). The relevance of this interplay lies in the central role that human capital plays in triggering economic growth by driving innovation, productivity growth, and overall economic performance (Lucas, 1988; Mathur, 1999). However, resource abundance may distort the incentives and allocation of resources, potentially hindering investments in human capital (Birdsall et al., 2004).

Building upon the literature on ‘resource curse effects’ on human capital, this paper focuses on Chile. This country exhibits a high dependence on natural resources as the world’s leading copper producer. Although this economy has been able to overcome the resource curse effects derived from Dutch disease symptoms (Caputo & Valdés, 2016; Marañón & Kumral, 2021), the evidence of effects on human capital accumulation at subnational levels calls into question the long-run development of natural resource-abundant territories (Álvarez & Vergara, 2022). Additionally, there is a vivid debate about the existence of differences between the detrimental effects exerted by point-based and diffuse natural resources (Papyrakis & Raveh, 2014; Van der Ploeg, 2011). Particularly for Chile, there is no clear evidence on the specific effect of mining activity on the accumulation of human capital, and whether it differs from the impact of other primary sector activities.

This study aims to fill this gap by exploring the role of mining and non-mining activities on the distribution of highly skilled human capital following two approaches. First, we assess the effect of the municipal concentration of mining and non-mining activities on the probability of individual college degree possession of the working-age population.

This approach allows to approximate the availability of highly educated labor at the municipal level using individual level data and controlling for individual-level schooling determinants. One expected channel by which this interaction takes place is the attraction of low-education labor into resource-rich territories as a response to the high demand of this type of labor. In turn, the lower availability of job positions for highly educated workers encourages them to move towards large urban areas to access better professional opportunities. In addition, the mining sector is characterized by a high level of wages, mainly due to union negotiations during copper price booms (De Solminihac et al., 2018; Paredes & Fleming-Muñoz, 2021). Therefore, it is plausible to assume that a higher concentration of mining activities can impact on the degree of accumulation of human capital by increasing the opportunity costs of getting higher education, with respect to the option of entering the labor market, above all in periods in which the market prices of metals increase. However, we can also hypothesize that this process holds for non-mining primary activities with the result of producing again a negative impact on human capital accumulation, but on a more regular basis.

Given the relevance of the spatial dimension in the distribution of productive activities, the second approach involves exploring the existence of spatial spillover effects between municipalities concerning the concentration of primary sector activities. The concentration of productive activities can be a factor for attracting working-age population both in a municipality and in the neighboring ones. However, the formation of clusters based on low-skill activities might shape labor markets by both attracting less educated workforce and shrinking the set of labor opportunities for highly educated human capital in surrounding locations. This is the case of the increasing demand for low-specialization, non-tradable services from the Chilean mining sector (Atienza et al., 2021), or the formation of win clusters in the central zone of Chile (Coelho & Montaigne, 2019), that increases the opportunity cost of getting higher education in natural resource-rich municipalities and their neighbors. In order to explore this, we use cross-sectional data aggregated at the municipal level to estimate the direct and indirect impacts of the concentration of primary activities on the share of highly educated workforce through a series of Kelejian-Prucha (SAC) models.

Results suggest that mining concentration is negatively associated with the probability of a working-age person to hold college degree during copper price booms, while the association with non-mining primary activities is also negative, but more persistent. These patterns hold when focusing on young workers and are stronger among international immigrants. Moreover, no clear evidence emerges for an attenuating role of tertiary education supply. The exploratory spatial analysis reveals negative spillovers from non-mining activities, while the results for the mining activities are inconclusive.

The implications of this research extend beyond educational outcomes. The accretion of human capital is linked with the entrepreneurial skills of the population. Specifically, human capital stimulates both the creation and performance of early-stage businesses (Hernández et al., 2023). Human capital has been also associated with the engagement of an individual region in global value chains (Bolea et al., 2022). The evidence on

heterogeneous effects on human capital accumulation based on the nature of primary sector activities highlights the need for place-based policies addressing territorial disparities. As a general rule, diversification and investment in sectors beyond primary sector activities are crucial for mitigating the long-term, negative effects on human capital accumulation. In this line, the promotion of clusters of knowledge-intensive, complementary activities related to agriculture, fishing, and forestry would allow to attract skilled human capital into resource-intensive municipalities and neighboring areas. Concerning mining-intensive territories, the windfalls linked to peak prices in international markets can potentially be used to finance public funds for research, technology, and specialized services, increasing the local demand for skilled human capital. This, in turn, contributes to the transition toward a knowledge-based economy (Marin et al., 2015).

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