

# Industrial vs artisanal mining: The effects on local labour in Liberia

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## INTRODUCTION

Industrial mining has been a significant presence in developing countries for decades. While the literature has found mixed effects of industrial mines on the local economy, less is known about the impact of artisanal and small-scale mining (ASM). Using both quantitative and qualitative data from Liberia, this paper examines the impacts of both ASM and industrial mines on local labour markets. The analysis involves mining of all types of commodities. However, a particular focus is on gold, diamonds, and iron ore as these are the main commodities produced in Liberia.

Liberia is a country with an abundance of natural resources. The mining industry is a major component of its economy, making up 52% of GDP and 93% of exports. After a long period of civil war from 1989 to 2003, the government sees the extraction of natural resources as key in the country's reconstruction and development programme. The Mineral Policy of Liberia (2010) envisions an "equitable and optimal exploitation of Liberia's mineral resources to underpin broad-based sustainable growth and socio-economic development."<sup>1</sup>

The government of Liberia has attracted a large amount in foreign direct investment (FDI) in the natural resource sector. Over a period of approximately ten years, the FDI stock more than doubled. Through private investments in industrial mining by large multi-national enterprises (MNEs), the government expects an increase in state revenue and an increase in economic growth and development through spillovers (backward and forward linkages from industrial mines).

ASM is an important part of the mining industry, but has largely been neglected in government policies worldwide due to its bad reputation. Nonetheless, it is a crucial source of livelihood for rural populations. In Liberia, 12% of the population depend on ASM.

To date, there is no study on whether the socio-economic development from mining in Liberia has been achieved. This paper partly fills this gap by analysing the effect of ASM and industrial mining on local employment.

A priori, the effect of the opening of mines is ambiguous. On one hand, the strand of literature on backward and consumption linkages to the local economy from natural resource extraction would argue for a positive effect of mining on employment and income earning opportunities in the non-agricultural sector.<sup>2</sup> On the other hand, the 'enclave' theory of natural resource extraction suggests that mining companies do not contribute to local development.<sup>3</sup>

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<sup>1</sup> Mineral Policy of Liberia (2010), pp. 3

<sup>2</sup> Eggert, R. (2002). Mining and Economic Sustainability: National Economies and Local Communities.

<sup>3</sup> Auty, R.M. (1979). Transforming mineral enclaves: Caribbean Bauxite in the nineteen-seventies. *Journal of Economic and Human Geography*, 71, 169-179.

The study adds to the literature on local effects of natural resource extraction.<sup>4</sup> These studies mostly focus on the local effects of industrial mining, analysing only the mining of gold. The intention of this paper is to compare the local labour market effects between industrial mining and ASM, taking into account all commodities mined in Liberia. This should give a more comprehensive overview of the effects on the mining industry.

## Data and research methodology

### *Quantitative component*

This paper exploits the temporal and spatial variation in mine openings in a difference-in-difference strategy.<sup>5</sup> The difference in employment outcomes of individuals close to and far away from mines, before and after the mines opened, is compared. The impact of ASM and industrial mines on employment outcomes is estimated separately.

The household data is from the geo-referenced Liberia Demographic and Health Survey (DHS), a nationally representative cross-sectional survey containing data on employment. Respondents from three rounds of the DHS from 2007, 2013, and 2020 are combined.

The mining data was received from the Liberian Ministry of Mines and Energy. The geo-referenced dataset contains information on the location and start/end date of industrial (4) and ASM mining licenses (1047). A limitation is that the ASM data does not include illegal mining.

### *Qualitative component*

Field research in Liberia took place from October to December 2021. Data was collected in four out of five regions in Liberia, including five counties and the capital, Monrovia. Data collection in the counties involved semi-structured focus group discussions and in-depth interviews with 150 community members across 19 different villages in proximity to industrial or ASM sites. Key participants were clan chiefs, town chiefs, businesspeople, (former) miners, mine owners, and farmers. The focus of the interviews was to determine how the opening of ASM and industrial mines changed the local labour market opportunities in the communities, in comparison to the time where there was no mining.

## Results

The study shows that ASM may improve local labour market opportunities while industrial mining worsens them. The negative impact of industrial mining is due to the combination of industrial mines replacing ASM, and ASM generating more positive economic spillovers. Both the quantitative and the qualitative component show that due to the opening of an industrial mine, individuals are less likely to

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<sup>4</sup> Aragon, F. M. and Rud, J. P. (2013). Natural Resources and Local Communities: Evidence from a Peruvian Gold Mine. *American Economic Journal: Economic Policy*, 5 (2), 1-25.

Bazillier, R. and Girard, V. (2020). The gold digger and the machine. Evidence on the distributive effect of the artisanal and industrial gold rushes in Burkina Faso. *Journal of Development Economics*, 143, 102411.

Benshaul-Tolonen, A. (2019). Local Industrial Shocks and Infant Mortality. *The Economic Journal*, 129 (620), 1561-1592.

Bunte, J. B., Desai, H., Gbala, K., Parks, B., and Runfola, D. M. (2018). Natural resource sector FDI, government policy, and economic growth: Quasi-experimental evidence from Liberia. *World Development*, 107, 151-162.

Kotsadam, A. and Tolonen, A. (2016). African Mining, Gender, and Local Employment. *World Development*, 83, 325-339.

<sup>5</sup> Benshaul-Tolonen, A. (2019). Local Industrial Shocks and Infant Mortality. *The Economic Journal*, 129 (620), 1561-1592.

work in the services and sales sector and to earn cash for work, and more likely to make a living from subsistence agriculture.

A registered ASM not only increases the probability that individuals have a job, but also provides more diverse employment opportunities than industrial mining. If an artisanal mine opens, the likelihood of local communities working in the services and sales sector and the likelihood of earning cash for work (instead of in-kind) increases. In addition, the likelihood of working in subsistence agriculture decreases.

Nonetheless, the local effects on the labour market from ASM are not sustainable. Once the resources are depleted and the artisanal mine becomes inactive, the economic activity in the local area decreases. There is no longer any effect on the likelihood that an individual works in the services and sales sector or earns cash for work. In fact, the likelihood is that individuals' work decreases, compared to the situation before mining started. This is mainly due to the decrease in the likelihood of working in agriculture. During the qualitative study, it was identified that it is difficult for communities to move back to farming once a local mining boom has ended, as this type of work is a lot more strenuous.

The results show that in Liberia the linkages and spillovers from ASM, at least during the time the mine is active, are greater than those from large MNEs conducting industrial mining. This supports the 'enclave' theory,<sup>6</sup> where industrial mines do not link with the local economy but rather import goods and services or buy them in the capital. ASM is labour-intensive and performed by local labour, either from the community or other areas within the country and/or region, making the potential for a local labour multiplier strong.<sup>7</sup> The qualitative component confirms this, where a key theme identified is that local 'gold-diggers' buy all kinds of goods and services in the host community.

Policy-wise, this is an important finding. The Liberian government's Mineral Policy (2010) focuses on increasing socio-economic development through linkages and spillovers from industrial mining, not ASM. This study shows that including ASM's potential in creating local spillovers should also play a role in mining policies, ensuring that the local development effects from this type of mining become more sustainable.

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<sup>6</sup> Auty, R.M. (1979). Transforming mineral enclaves: Caribbean Bauxite in the nineteen-seventies. *Journal of Economic and Human Geography*, 71, 169-179.

<sup>7</sup> Bazillier, R. and Girard, V. (2020). The gold digger and the machine. Evidence on the distributive effect of the artisanal and industrial gold rushes in Burkina Faso. *Journal of Development Economics*, 143, 102411.



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