

Assessing the Fiscal Regime in Ghana's Lithium Agreement

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Key messages

- NRG1 modeling indicates that the Ghanaian government has negotiated a government take for the country's first lithium mine that is higher than Ghana's legislated fiscal regime and the regimes of many other current and imminent lithium hard rock producers, such as Australia, the Democratic Republic of Congo and Zimbabwe.
- Modeling suggests an average effective tax rate (government revenues as a share of mine profits) of 58 percent (excluding paid state equity).
- 70 percent of these government revenues depend on the profits that mine leaseholder Barari DV Ghana reports. To limit the risk of tax avoidance reducing government take, the agreement should define the process for pricing the lithium, limit the deductibility of interest from taxable income, ensure state equity is non-dilutable and establish rules in the shareholders' agreement about dividend payments.
- Given that modeling indicates an after-tax internal rate of return for investors in the Ewoyaa mine of around 102 percent (after debt financing), the government may be able to negotiate an even higher take in future deals for similarly profitable mines. A variable rate royalty could help achieve this higher take.
- To increase the prospects for a lithium refinery in Ghana –the government's other key objective–the government should ensure Barari conducts a rigorous feasibility study, publish it and then hold a multistakeholder consultation to agree on subsequent actions.

Introduction

Amid increasing global demand for minerals needed for the energy transition, the Ghanaian government has signed a deal for the country's first lithium mine, Ewoyaa. The government signed this mining lease agreement with Barari DV Ghana Ltd, a subsidiary of Atlantic Lithium, in October 2023.¹ Parliament has started reviewing the agreement, and will soon decide whether to ratify it.

Ghana has a long mining history, primarily as a gold producer. The government is aiming to leverage the global race for transition minerals to increase how much the country benefits from the sector. The Barari deal is the first the government has negotiated in this context. Debate between government officials, civil society and the wider public about whether the government has got a good deal has therefore been particularly intense.²

The government is aiming to collect more revenue from the sector through higher taxes and increased state participation. Another key objective is increasing the amount of mineral processing ("value addition") in Ghana to retain greater value for the economy via more government revenue, jobs and, in the case of some minerals, cheaper inputs for other sectors. The government hopes Barari, or other companies, will construct a lithium refinery in the country.

We understand that Barari has submitted to the government a "scoping study" of such a refinery's viability, as required by the terms of the mining lease.³ This study has not yet been disclosed publicly. The government should ensure the study contains a rigorous feasibility assessment. It should then publish the study to enable parliament to consider the prospects of a refinery as it reviews the mining lease agreement.

For now, we set out our analysis of the fiscal regime the government has negotiated for the Barari deal. We hope this analysis informs public understanding of the deal and parliament's deliberations as to whether to ratify it. The economic model and data we used for this analysis are available on the Natural Resource Governance Institute's [website here](#).

The fiscal regime for Ewoyaa

The fiscal regime the Ghanaian government has negotiated with Barari is largely set out in the mining lease agreement.^{4 5} As Table 1 shows, this regime has a higher royalty rate of 10 percent and higher free state equity of 13 percent than the fiscal regime currently in legislation. Barari will also pay 1 percent of revenue into a community development fund, which is not provided for in legislation. (For simplicity, we refer to all these fiscal instruments as “taxes” in this briefing.)

The government, through its Minerals Income Investment Fund (MIIF), has purchased an additional 6 percent of equity in the Ewoyaa mine for USD 27.9 million. We analyze the regime with and without this paid equity. While it gives the government a larger share of the mine’s profits, the government is acting like an investor in paying for it upfront. It should therefore not be viewed as a tax. MIIF has also purchased 3.06 percent in the parent company, Atlantic Lithium, for \$5 million. We do not include this parent company equity in the fiscal regime that we analyze, given these shares are available to anyone and MIIF purchased them on market terms.

Table 1. Main components of Ghana's fiscal regime for the Ewoyaa mine and in legislation

<i>Fiscal term</i>	<i>Ewoyaa</i>	<i>Legislation</i>
Value added tax (VAT)	12.5%, refunded for exports	12.5%, refunded for exports
Ghana Education Trust Fund (GETFund)	2.5% on inputs liable for VAT, not refunded	2.5% on inputs liable for VAT, not refunded
National Health Insurance Levy (NHIL)	2.5% on inputs liable for VAT, not refunded	2.5% on inputs liable for VAT, not refunded
Growth and Sustainability Levy	1% on revenue	1% on revenue

Royalty	10% on gross sales revenue	5%, on gross sales revenue
Corporate income tax	35%	35%
Depreciation of capital	20% per year across five years	20% per year across five years
Loss carry-forward	Can be carried forward for 4 years	Can be carried forward for 5 years
State participation	Free carried interest of 13%; ⁶ paid equity of 6% purchased for \$27.9 million	Free carried interest of 10%
Interest withholding tax ⁷	8%	8%
Dividend withholding tax	8%	8%

Assessment of the Ewoyaa fiscal regime

We reviewed the Ewoyaa fiscal regime against the typical objectives of a fiscal regime: maximizing government revenue without deterring investment; reliable revenues; flexibility as profits change; and simplicity to limit tax avoidance risks. As part of this, we compared its performance to the legislated regimes of other current and imminent lithium hard rock producers in Africa and elsewhere.⁸ Ghana is competing with these countries for investment. This benchmarking therefore provides one indicator of whether the government has got a good deal.

Typical objectives of a fiscal regime

Maximizing government revenue without deterring investment. A government should set the highest taxes a mine can bear without discouraging investment. The country's wider investment climate determines what this tax level is. Investors often place greater weight in their investment decisions on several non-fiscal factors, such as a country's geology and policy predictability, than on the tax level.⁹

Reliable revenues. Many governments want a regime that generates some revenue for their budget each year irrespective of whether a mine is making low or high profits. Governments tend to achieve this reliability through production-based taxes, such as royalties. Countries that depend heavily on the mining sector to finance the budget place particular importance on reliability. However, high taxes when a mine is making no or low profits can prevent it from being developed or surviving downturns. A regime must therefore balance reliability with ensuring a mine is viable across different scenarios.

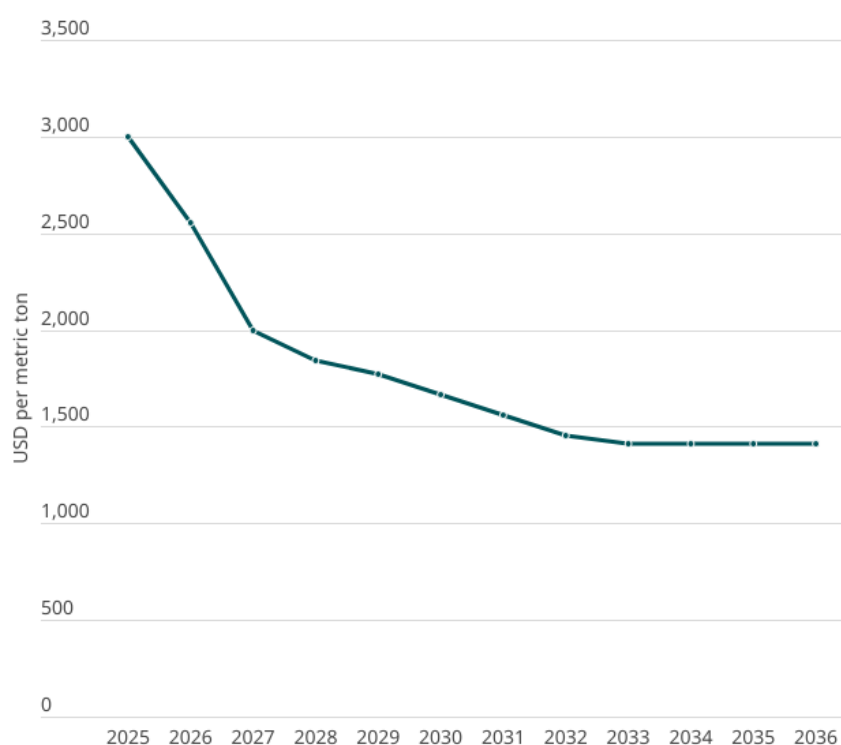
Flexibility as profits change. A government should aim to capture any profit above the investor's minimum return, with flexible (or "progressive") taxes significantly increasing government take once this threshold has been reached.¹⁰

Simplicity. Governments are often concerned about tax avoidance. Production-based taxes are easier to measure than profit-based taxes, which makes them less susceptible to company manipulation. Governments therefore tend to want the regime to contain at least some of these simpler taxes, depending on their tax administration capacity.

No fiscal regime can be fully reliable, flexible and simple. Not only are reliability and flexibility opposites, but, as noted above, the profit-based taxes required for flexibility are difficult to measure. A simple regime could function in a flexible way if it is frequently changed to respond to changing conditions. However, it then becomes unpredictable, which deters investment. There is no practical way to avoid these trade-offs. As a result, most countries' fiscal regimes include a mix of production-based and profit-based taxes. The country context determines the optimal mix.

We modeled the economics of the Ewoyaa mine using the data set out in Atlantic Lithium's feasibility study.¹¹ This includes a development cost of \$185 million and a lithium concentrate price that averages \$1,587 per metric ton (t) over the project lifetime. This price is the weighted average for the mine's production of spodumene concentrate containing 6 percent lithium oxide ("SC6") (Figure 1) and concentrate containing 5.5 percent lithium oxide ("SC5.5").¹²

Figure 1. Assumed lithium spodumene concentrate (6%) price in feasibility study



Source: Atlantic Lithium, Ewoyaa Definitive Feasibility Study, 2023.

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We also analyzed the implications of different economics for the performance of the regime. Mining projects typically experience development cost overruns of around 40 percent.¹³ Prices might also differ to projections, as the last few years of lithium price volatility have highlighted. Goldman Sachs has forecast prices to 2027. It currently expects the SC6 price to average \$978/t in 2026, Ewoyaa's first year of exports—considerably lower than the \$2,557/t Atlantic Lithium envisages in its feasibility study.¹⁴ We provide further information on our modeling approach in the appendix.

Metrics referred to in this assessment

Average effective tax rate (AETR). The ratio of the net present value of government revenue to the net present value of the pre-tax net cash flows of a mine (both discounted to account for the time value of money). In other words, it is government revenue as a percentage of the mine's profits—often described as “government take.”

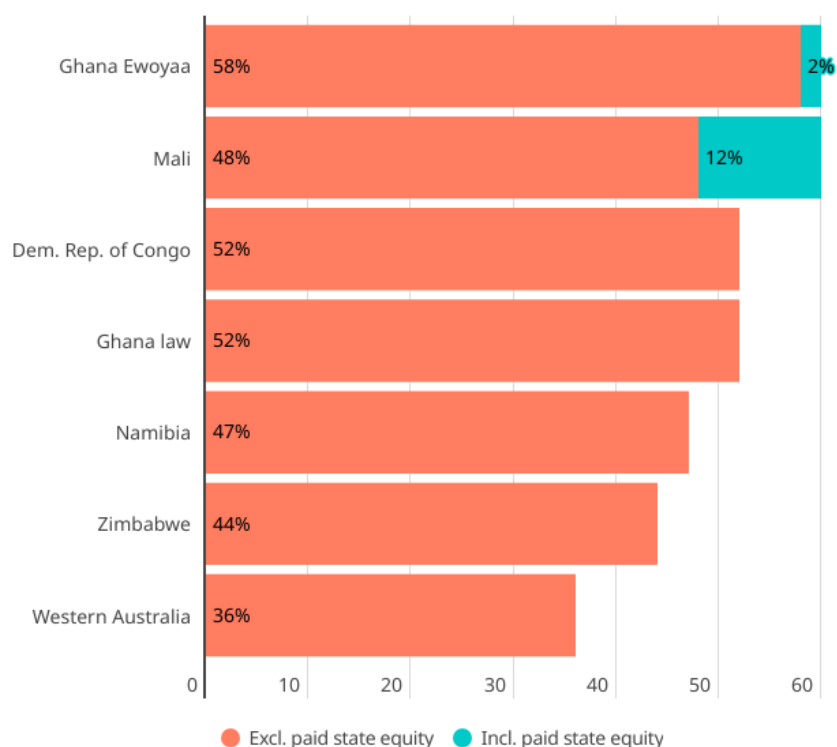
Post-tax internal rate of return (IRR). The investor's return on its investment in a mine. Companies tend to report this metric assuming that 100 percent of this investment is equity financing. However, a significant proportion of financing tends to be from debt. Given debt financing reduces tax payments, the post-tax IRR with the likely financing structure is also important.

Payback period. The length of time it takes for the investor to recover its investment. This occurs when the cumulative net cash flow of the mine turns positive.

Government revenues and investor returns with feasibility study assumptions

The Ewoyaa fiscal regime has a high government take but still enables Barari to earn large profits. We estimate the Ewoyaa fiscal regime has an average effective tax rate (AETR) of 58 percent (excluding paid state equity) at the lithium concentrate prices used by the Ewoyaa mine feasibility study. If the government had applied the legislated regime instead, the AETR would have been 52 percent. As Figure 2 shows, the Ghanaian government has negotiated a higher government take than current and imminent African lithium producers and Australia, the world's largest producer.

Figure 2. Average effective tax rate with feasibility study assumptions



Notes: With a discount rate of 10 percent.

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Parliamentarians and some civil society organizations have raised concerns the government may have granted concessions to Atlantic Lithium that are not in the mining lease agreement or law. These concerns include a 10-year tax holiday. The government has denied this allegation, and in the absence of evidence that it has granted this holiday, we did not include it in our modeling.¹⁵ The company has also referenced, in public documents, that it will benefit from electricity tariffs of 30–50 percent below standard industrial rates.¹⁶

Such concessions appear unnecessary. Atlantic Lithium estimates a post-tax internal rate of return (IRR) of 94 percent and a payback period of 17 months.¹⁷ We estimate that, once likely debt financing and paid state equity is accounted for, the post-tax IRR could be 102 percent.¹⁸ This high profitability results largely from the mine's relatively low costs. The company not only expects it to have modest development costs, but also anticipates its average operating cost of \$377/t to be lower than most other spodumene concentrate projects across the world.¹⁹

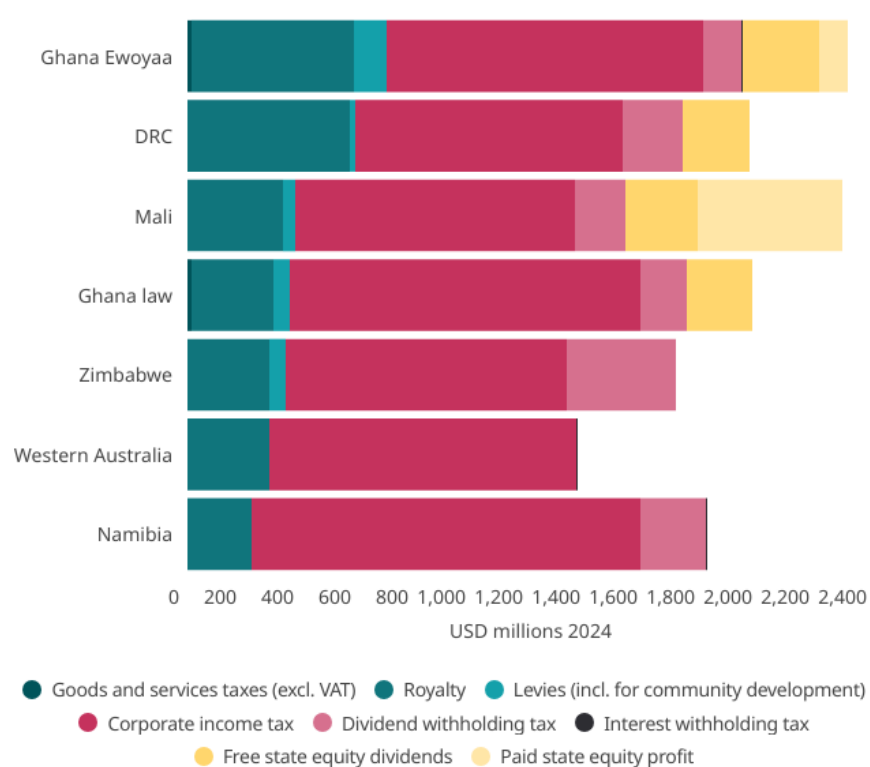
Ewoyaa's high profitability suggests the government may have had scope to negotiate an even higher take without deterring investment—particularly given other factors that appear to be in the government's favor. Atlantic Lithium currently has a limited portfolio of investment opportunities outside of Ghana (though it is possible Piedmont Lithium, which has a 40 percent stake in the project and is providing most of the initial investment, had other prospects).

Despite higher taxes than other countries in the region, Ghana offers other advantages. Ongoing exploration of the Ewoyaa lease area suggests expansion potential.²⁰ The mine is located next to relatively good power, road and port infrastructure. While the Fraser Institute survey of mining companies indicates some concerns about Ghana's policy predictability, the country scores better than the Democratic Republic of Congo (DRC), Mali, and Zimbabwe.²¹

Protection against tax avoidance

The Ewoyaa fiscal regime provides reasonable protection against tax avoidance, but risks remain. As Figure 3 shows, it results in larger royalty and levy payments than the other regimes we look at (in addition to the goods and services taxes, in the form of GETFund and NHIL, that are not payable in other countries).

Figure 3. Government revenues with feasibility study assumptions



Notes: The DRC regime has an excess profits tax that is triggered for a mine when the realized price is at least 25 percent higher than the price in its feasibility study. Because these government revenues are based on the feasibility study assumptions materializing, the excess profits tax is not triggered.

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Given the royalties and levies in the Ewoyaa regime are based on sales revenue, they are relatively simple for the government to measure. The regime should therefore provide reasonable protection against tax avoidance compared to the regimes of other countries.

A clear process for pricing the lithium concentrate for tax purposes is needed, however. With Piedmont holding a 40 percent stake in the project and buying 50

percent of Ewoyaa's production, there is a significant risk of underpricing to minimize even royalty and levy payments. The government should specify in the mining lease agreement that prices will be based on a pricing benchmark, such as the Spodumene Concentrate Index (CIF China).

Risks also exist in other parts of the regime. While royalty and levy payments will be considerably larger than under the regimes of other countries, 70 percent of government revenue in this scenario is linked to the mine's reported profits. The government has faced challenges in effectively assessing profits in the mining sector and more generally. It must continue building up its capacity to rigorously audit costs. It should also consider introducing rules into the mining lease agreement that limit the scope for tax avoidance.

Stakeholder discussions suggest excessive debt financing from related parties is a particular concern. The government would benefit from considering additional debt financing limits to the thin capitalization limit currently in the law. It could replicate the approach of countries such as South Africa and limit the amount of interest companies can deduct in any given year irrespective of the debt-to-equity ratio.²² The simplest approach is to base this limit on some measure of operating profit: for example, earnings before interest, tax, depreciation and amortization (EBITDA).²³

The government may also face challenges in collecting the revenues it expects from its equity in the Ewoyaa project. This equity is currently at risk of dilution if the company issues additional shares. The government must introduce language to the mining lease agreement about its equity being "non-dilutable." However, even if this equity is not diluted, dividends might disappoint—as the government has already experienced with several of Ghana's mature gold projects.²⁴ Even when a project is profitable, company management may decide to pay off debts or reinvest funds in the project rather than distribute dividends. Dividends are also more at risk of profit shifting than other taxes. Like other countries, Ghana's debt financing limits protect only corporate income tax. They do not protect state dividends.²⁵

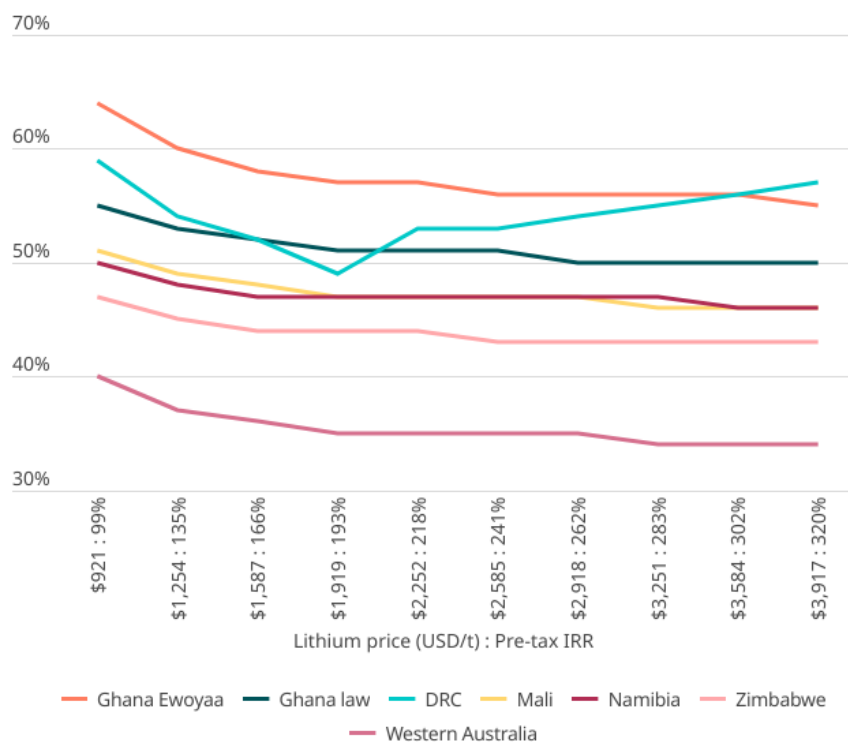
The government's ability to benefit from the state equity will therefore depend on the rules included in the shareholders' agreement, and its capacity and commitment to implement them.²⁶ The government should submit the shareholders' agreement to parliament if it has not already done so. It should also consider publishing the agreement, given it meets the criteria of agreements requiring disclosure under the Extractive Industries Transparency Initiative (EITI).²⁷ Countries such as Mongolia have disclosed shareholder agreements that are particularly crucial for understanding the terms upon which the government has granted a license.²⁸

Reliable revenues vs mine viability at lower profit levels

The Ewoyaa fiscal regime will provide investors with little relief if profits are lower than the feasibility study envisages, but this should not threaten the mine's viability. The flexibility of the regime in response to Ewoyaa's profitability depends on its composition.

As noted above, the taxes in the Ewoyaa regime that are not linked to profitability are higher than in the other regimes we looked at. The Ewoyaa regime is more "regressive" than the other regimes because of this tax mix: it has higher taxes when profits are low. As Figure 4 shows, Ghana's legislated regime is also regressive. However, Ewoyaa's higher royalty and community development fund contributions result in greater regressivity.

Figure 4. Average effective tax rate at different profit levels



Notes: With a discount rate of 10 percent. The AETR excludes paid state equity. The results with paid state equity included can be found in our model.

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Significant royalties and levies mean the regime should generate reliable revenues for Ghana's budget. They also increase the risk of a mine being unviable when prices are low and/or costs are high. This does not appear to be a significant risk for the Ewoyaa mine given its high profitability, however.

Even if we assume the Goldman Sachs SC6 price forecast for 2026 of \$978/t applies for the mine's lifetime (equivalent to \$921/t for both SC6 and SC5.5 production, as shown in Figure 4) rather than Atlantic Lithium's assumed \$1,587/t, our modeling indicates a pre-tax IRR of about 99 percent and a post-tax IRR of about 49 percent. If development costs overrun by the industry average as well, the post-tax IRR is still around 35 percent. Our modeling suggests the economics become challenging in this scenario only if operating costs are also significantly higher.²⁹

Government share of windfall profits

The Ewoyaa fiscal regime has higher taxes than the other regimes we have considered, except for that of DRC, when the mine generates larger profits than the feasibility study envisages. However, as Figure 4 shows, government take does not increase to capture a larger share of these windfall profits.

To increase government take at times of particularly high profits, some civil society organizations have suggested replacing the fixed rate royalty with a variable rate royalty that will reach more than 10 percent at higher prices. This proposal merits consideration.

A variable rate royalty can make a regime more responsive to a mine's profitability while still generating reliable revenue and being relatively simple to measure. Because Ghana allocates 13 percent of its royalty revenue directly to mining communities, a variable rate royalty would also ensure the people most exposed to the mine's social and environmental disruption benefit from any windfall.³⁰ The government has already incorporated a variable rate royalty in the agreements it has renegotiated for Ghana's gold mines.³¹ Several other African countries, including Burkina Faso, Côte d'Ivoire, Mauritania and Zambia, also implement variable rate royalties.

Prices are not a perfect proxy for profits, however. Costs also roughly follow the commodity cycle.³² A rise in mineral prices stimulates more mining activity and therefore greater demand for inputs, which then causes costs to rise. Since profits will not perfectly track prices, and the Ewoyaa regime already imposes high taxes

during periods of low profits, if the government were to pursue a variable rate royalty, any increase in rates at higher prices would need to be moderate.

A resource rent tax is another way to capture a larger share of windfall profits. The government could design this tax to be triggered only once investors have received the minimum return required to make their initial investment. However, the effectiveness of this tax depends on the government's efforts to improve its capacity to assess profits. Without such improvements, this tax may generate little revenue, especially as the higher tax level could further incentivize tax avoidance.

Conclusion and recommendations

The Ghanaian government has negotiated a fiscal regime for the Ewoyaa mine that has a higher government take than the regime currently in legislation and the regimes of many other lithium hard rock producers. This is commendable.

However, to reduce the risk that government revenues will disappoint, the government should:

- Require prices to be based on a pricing benchmark for tax purposes to reduce the risk of underpricing
- Limit the amount of interest the mining company can deduct from taxable income irrespective of the debt-to-equity ratio of the project to reduce the risk of profit shifting
- Introduce language to the mining lease agreement about its equity being “non-dilutable” to eliminate the risk of dilution if Barari or Atlantic Lithium issues additional shares
- Establish clear rules in the shareholders’ agreement to reduce the risk of underpayment of state dividends, and disclose the shareholders’ agreement to ensure effective oversight
- Continue building the capacity of its tax and regulatory authorities to effectively audit costs

The high profitability of the Ewoyaa mine has led to civil society calls for the government to negotiate an even higher government take. As parliament reviews the agreement, it should weigh the trade-offs between renegotiating key tax terms and the time this process will take, which will delay benefits from the project.

Parliament must also consider the implications of higher taxes for Ghanaian ambitions of constructing a lithium refinery in the country. If Barari makes less profit, it is less likely to be able or willing to finance a refinery. However, for parliament and other stakeholders to effectively assess this interaction and the wider deal, there should be a rigorous and public feasibility study of a refinery.

Otherwise, they will not be able to fully consider the prospect of a refinery being developed, the impact of the Ewoyaa fiscal regime, or the trade-offs between the two. After publishing the feasibility study, the government should consult with industry, development partners, governments of other prospective lithium producing countries in the region and civil society on the next steps in its pursuit of lithium refining.

With Barari and other companies currently exploring other mineral prospects across the country, the government could look to negotiate a higher government take from any future mines of similarly high profitability. As part of this, it should consider the civil society proposal for a variable royalty rate that slightly increases at higher prices.

By taking these steps, the government will have a better chance of generating the benefits that it expects, and Ghana needs, from the Ewoyaa mine and the wider sector.

Appendix. Modeling approach

We modified the public version of the International Monetary Fund's Fiscal Analysis of Resource Industries (FARI) economic model to conduct this analysis.³³

We modeled the economics of the Ewoyaa mine primarily using the data in Atlantic Lithium's feasibility study. Table 2 sets out our key assumptions.

Ewoyaa will primarily produce lithium spodumene concentrate, but may also produce some feldspar as a by-product. Given the feasibility of feldspar production is still being determined and the lack of public data on the potential economics, we did not include this component in our modeling. We assumed the project has the maximum debt-to-equity ratio currently considered for income tax purposes by Ghanaian law and that it borrows at an interest rate around the current cost of debt for the mining sector.³⁴

Table 2. Key assumptions for the modeled Ewoyaa mine

Parameter	Assumption
Total lithium concentrate produced	3,585,000 metric tons
Production life	12 years
Average sales price	\$1,587 per metric ton
Development cost	\$185 million
Replacement capital cost	\$112 million

Transport, treatment and refining charges (TC/RC)	\$30 per metric ton
Debt-to-equity ratio	75%
Real discount rate of equity shareholders	8%
Real interest rate on debt	5%
Inflation rate	2%

We applied the fiscal regime in the Ewoyaa mining lease agreement and the comparative regimes to this mine profile. To keep the model and our analysis as simple as possible, we did not include taxes that are likely to comprise a relatively small proportion of total government revenue, such as annual license fees. We also did not model employment taxes that are ultimately paid by the mine employees rather than Barari.

About the authors

Thomas Scurfield is an Africa senior economic analyst at the Natural Resource Governance Institute (NRGI). Denis Gyeyir is an Africa senior program officer and leads the Ghana program at NRGI.

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Notes

- 1 Government of Ghana and Barari DV Ghana Ltd, Mining Lease Agreement (2023), www.mincom.gov.gh/wp-content/uploads/2023/11/BDL_ML-AGREEMENT_102023_31.pdf
- 2 See e.g. Kizito Cudjoe, "IEA flags 'historical mistakes' in lithium agreement," B&FT Online, 30 November 2023, thebftonline.com/2023/11/30/iea-flags-historical-mistakes-in-lithium-agreement; Bright Simons, "Ghana's lithium deal: Separating fact from fiction," The Africa Report, 22 December 2023, www.theafricareport.com/331005/ghanas-lithium-deal-separating-fact-from-fiction; Kofi Ansah and Fui Tsikata, "Why Ghana's lithium agreement is good," Graphic Online, 11 December 2023, www.graphic.com.gh/features/opinion/why-ghanas-lithium-agreement-is-good-kofi-ansah-fui-tsikata-shares-opinion.html.
- 3 This requirement is set out in provision 1.b. of the second schedule: Government of Ghana and Barari DV Ghana Ltd, Mining Lease Agreement.
- 4 Government of Ghana and Barari DV Ghana Ltd, Mining Lease Agreement.
- 5 As indicated in the agreement, provisions in laws such as the Minerals and Mining Act 2006 as amended, Income Tax Act 2015 as amended and Value Added Tax Act 2013 as amended also apply to the Ewoyaa mine.
- 6 The strict definition of "free carried interest" involves the government paying for its share from the future dividends or profits that would otherwise have been distributed to it—as is the case with carried interest—but with no interest accruing on the amount payable by the government. However, in many countries it is interpreted as free equity, for which the government does not incur any cost either at the time of acquiring it or in the future. We understand that the government is currently interpreting the Ghanaian provision in this way.
- 7 Depending on the multinational structure of a company, double taxation treaties between Ghana and other jurisdictions may significantly reduce the effective rates of withholding taxes. Government officials have indicated that existing treaties do not currently impact the applicability of the fiscal regime for producing mines. It remains to be seen whether they will impact the Ewoyaa mine. For a summary of withholding tax limits in existing treaties, see PWC, "Worldwide Tax Summaries—Ghana," accessed 12 June 2024, taxsummaries.pwc.com/ghana/corporate/withholding-taxes.
- 8 Lithium is currently produced from two main sources: hard rock and brine. The known lithium deposits in Africa, including Ghana, are hard rock. The "Lithium Triangle" in Latin America of Argentina, Bolivia and Chile has brine deposits. Extraction of lithium from hard rock uses conventional mining techniques, while extraction from brine involves pumping the brine to the surface before concentrating it through evaporation. The economics of brine operations are different to those of hard rock operations. We therefore do not include the fiscal regimes of countries with brine operations as comparators.
- 9 The Fraser Institute survey of mining companies estimates that, unless there are extremely harmful policies, around 60 percent of an investment decision tends to be based on a country's geology. The other 40 percent comprises several other factors, including political stability and policy predictability (given they affect the risk that investors will not be able to secure future returns generated by their investments), a conducive business environment and the tax level. See Julio Mejia and Elmira Aliakbari, Fraser Institute Annual Survey of Mining Companies 2023 (Fraser Institute, 2024), www.fraserinstitute.org/studies/annual-survey-of-mining-companies-2023.
- 10 Information gaps make it difficult for taxes to be designed to capture all excess profit. See Jean-François Wen, Progressive Taxation of Extractive Resources as Second-Best Optimal Policy (International Monetary Fund, 2018), www.imf.org/en/Publications/WP/Issues/2018/06/13/Progressive-Taxation-of-Extractive-Resources-as-Second-Best-Optimal-Policy-45923.
- 11 Atlantic Lithium, Ewoyaa Definitive Feasibility Study (2023), static1.squarespace.com/static/61711d27ed0db12cacbcfb5a/t/649d3f851c02121fcf7bffcd/1688027016483/2023.06.29+-Project+Update+-Ewoyaa+Definitive+Feasibility+Study+%28ASX%29.pdf.
- 12 Spodumene concentrate pricing tends to be based on 6 percent lithium oxide content. Atlantic Lithium has priced its SC5.5 production using the formula $(5.5/6) * SC6 \text{ Price} * 0.95$.
- 13 Wood Mackenzie found in 2017 that four out of five mining projects are over budget by an average of 43 percent; an EY study of large mining projects in 2021 found an average cost overrun of 39 percent: Mark Kuvshinikov, Piotr Pikul and Robert Samek, "Getting big mining projects right: Lessons from (and for) the industry," Wood Mackenzie, 8 February 2017, www.mckinsey.com/industries/metals-and-mining/our-insights/getting-big-mining-projects-right-lessons-from-and-for-the-industry; EY, How rethinking project management can boost mining's capital productivity (2021), assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/mining-metals/ey-how-better-project-management-can-boost-minings-capital-productivity-final.pdf?download.
- 14 James Mickleboro, "Here's the lithium price forecast through to 2027," The Motley Fool, 23 January 2024, www.fool.com.au/2024/01/23/heres-the-lithium-price-forecast-through-to-2027.
- 15 Kabah Atawoge, "We've not given Barari DV 10-year tax holiday—Minerals Commission CEO," Citi Newsroom, 16 December 2023, citinewsroom.com/2023/12/weve-not-given-barari-dv-10-year-tax-holiday-minerals-commission-ceo.

- 16 Atlantic Lithium, "Project development update," 22 November 2023, www.investgate.co.uk/announcement/rns/atlantic-lithium-limited-npv-di---all/project-development-update/7895763. Energy costs tend to account for around 15 percent of the operating expenditure of hard rock lithium mines (according to S&P Global data). With a simplifying assumption that all this energy is provided as electricity, an electricity subsidy of 50 percent would result in a 7.5 percent reduction in operating expenditure. On this basis, we estimate that the government could lose around \$100 million in electricity revenues but, with effective tax administration, gain around \$50 million from higher profit taxes and state dividends: a net loss of around \$50 million.
- 17 On a 100 percent equity basis, i.e. before accounting for any debt financing: Atlantic Lithium Limited, "Mining Lease Granted for Ewoyaa Lithium Project," London Stock Exchange, 20 October 2023, www.londonstockexchange.com/news-article/ALL/mining-lease-granted-for-ewoyaa-lithium-project/16174954. Our reliance on publicly available information means that our model suggests a slightly different post-tax IRR of 90 percent on a 100 percent equity basis.
- 18 The AETR measures only the proportionate split of mine profits between the government and investor, not the magnitude of profits. A high AETR may therefore still provide the investor with a large profit in absolute terms. If so, and particularly if the investor makes only a modest initial investment, a high AETR will not necessarily prevent a high post-tax IRR.
- 19 This operating cost is net of secondary product credits: Atlantic Lithium, "Charging the Change," February 2024, www.rns-pdf.londonstockexchange.com/rns/6891B_1-2024-2-1.pdf.
- 20 Sabrina Jardim, "Atlantic achieves positive drilling results at Ewoyaa target," Mining Weekly, 7 May 2024, www.miningweekly.com/article/atlantic-achieves-positive-drilling-results-at-ewoyaa-target-2024-05-07.
- 21 For example, only 11 percent of survey respondents said that current implementation of the legal system would be a strong deterrent to investment in Ghana, compared to 67 percent of respondents in relation to DRC; 5 percent of respondents said that regulatory uncertainty would be a strong deterrent to investment in Ghana, compared to 52 percent of respondents in relation to Zimbabwe: Mejia and Aliakbari, Fraser Institute Annual Survey of Mining Companies 2023.
- 22 Alexandra Readhead, Preventing Base Erosion: South Africa's Interest Limitation Rules (NRGI, 2017), resourcegovernance.org/sites/default/files/documents/preventing-base-erosion-south-africa-limitation-rule.pdf.
- 23 The specific limit needs to balance the objective of protecting the tax base and ensuring companies can deduct legitimate financing costs. Consultations, including with companies, will be required to ensure an appropriate limit is set. For further discussion of this approach, see Dan Devlin, Limiting the Impact of Excessive Interest Deductions on Mining Revenue (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development and Organisation for Economic Co-operation and Development, 2018), www.igfmining.org/resource/limiting-the-impact-of-excessive-interest-deductions-on-mining-revenue. Another approach, taken by Senegal, is to limit the interest rate on loans between related parties; however, this relies on effective identification of related parties: PWC, "Senegal—Corporate deductions," accessed 12 July 2024, www.taxsummaries.pwc.com/senegal/corporate/deductions.
- 24 Alexander Malden and Edna Osei, Ghana's Gold Mining Revenues: An Analysis of Company Disclosures (NRGI, 2018), www.resourcegovernance.org/analysis-tools/publications/ghanas-gold-mining-revenues-analysis-company-disclosures.
- 25 The Income Tax Act has a thin capitalization limit that prevents interest payments for any debt above 75 percent of the project capital to be deducted from the corporate income tax base. However, it will not protect state dividends. A company can pay back any loan and interest payments before the government receives any dividends. Debt financing from related companies could therefore be used to reduce dividend payments to the government.
- 26 For example, the government has responded to the challenge of limited dividends by requiring advanced payments in some of the renegotiated development agreements. In years when the government does not receive any dividends from a mine, a higher rate of royalty or corporate income tax is levied (though the terminology in the agreements is slightly different).
- 27 EITI requirement 2.4, which requires contract disclosure, defines a contract as "any contract, concession, production-sharing agreement or other agreement granted by, or entered into by, the government which provides the terms attached to the exploitation of oil, gas and mineral resources": EITI, "EITI Requirements," 12 June 2023, eiti.org/eiti-requirements.
- 28 See e.g. Erdenes MGL LLC, Ivanhoe Oyu Tolgoi (BVI) Ltd, Oyu Tolgoi Netherlands BV and Oyu Tolgoi LLC, Amended and Restated Shareholders' Agreement (2011), www.resourcecontracts.org/contract/ocds-591adf-4472360738/view#/pdf.
- 29 Our modeling suggests that if, in addition to these lower prices and higher development costs, operating costs are more than 15 percent higher than Atlantic Lithium assumes, the post-tax IRR is still sufficient to secure investment in Ewoyaa; but the mine could reach its economic limit, and therefore Barari could stop producing, before the reserves are exhausted.
- 30 The Minerals Development Fund Act 2016 (Act 912) provides for 20 percent of royalty revenue to be deposited in the Minerals Development Fund; 50 percent of this amount is to be allocated to the Office of the Administrator of Stool Lands (OASL, which retains 10 percent of this) and 20 percent to the Mining Community Development Scheme. The remainder is to be distributed to various central government entities.
- 31 These agreements contain a royalty rate schedule that ranges from 3 percent to 5 percent depending on the price. Civil society has proposed a schedule for Ewoyaa that has 10 percent as the lowest rate.
- 32 Anna Fleming, David Manley and Thomas Lassourd, Variable Royalties: An answer to volatile mineral prices (African Tax Administration Forum and Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2022), www.igfmining.org/wp-content/uploads/2022/11/variable-royalties-an-answer-to-volatile-mineral-prices.pdf.
- 33 A template of the FARI model and a paper that explains the concepts and workings of the model are available at IMF, "Fiscal Analysis of Resource Industries," www.imf.org/external/np/fad/fari.
- 34 Aswath Damodaran, "Damodaran Online," accessed 19 June 2024, pages.stern.nyu.edu/~adamodar/.

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