# A REJOINDER TO THE RESEARCH REPORT ON “ABNORMAL PRICING IN INTERNATIONAL COMMODITY TRADING: EVIDENCE FROM GHANA”

**Contents**

## 1.0: Executive Summary

- A team of researchers from the University of Ghana and the Graduate Institute of International and Development Studies published a study titled "Abnormal pricing in International Commodity Trading: Evidence from Ghana.
- The study analyzed gold exports from 2011 to 2017 and estimated the magnitude of transfer mispricing based on the legal rules of customs valuation and transfer pricing analysis.
- It erroneously found that gold exports were undervalued by USD 3.8 billion from 2011 to 2017, which translates into 11% of the total value of exports within the study period and a loss of USD 957.3 million in taxes to the state.
- The Ghana Chamber of Mines is of the view that the data used in estimating the magnitude of undervaluation was based on interim export values, which tend to overstate the volume of gold sold.
- More so, the methodology excluded the impact of the refinery process on the quantum of gold recovered and sold. In other words, the study equated gold doré (semi-refined gold) to bullion (refined gold).
- In estimating the tax loss induced by mispricing, the study overlooked the tax deductibility of royalty payments and operating costs of the mining firms in determining assessable income of mining companies.
- This omission has the tendency of making the realizable fiscal revenue from the perceived mispricing of gold exports unreliable.
- Additionally, the trade mispricing risks identified in the study are not supported by extant practices in the large-scale segment of the gold mining industry.
- The Chamber, therefore, suggests that the rigour and reliability of the study's findings could be improved by deriving the actual export price from published data on mineral revenue and mineral produced and comparing the derived price with the international market price at the relevant period.
- Alternatively, a micro-level study that compares the price paid for each consignment of refined gold with the prevailing price on the international market would be a realistic proxy for the risk of trade mispricing.

- The Chamber, however, supports the study's recommendation on the need to improve the level of cooperation and data collection capacities of parastatals involved in the production and export of gold.
- More so, the Chamber would be willing to cooperate with the researchers to refine the study to inform the design and implementation of policies that would enhance the value of the mining sector to the Ghanaian economy.

## 2.0: Introduction

- A team of researchers from the University of Ghana and the Graduate Institute of International and Development Studies published a study titled "Abnormal pricing in International Commodity Trading: Evidence from Ghana[1]."
- The study was published and publicized in the media under the collaborative auspices of the previously mentioned institutions and jointly funded by the Swiss National Science Foundation and the Swiss Agency for Development and Cooperation.
- The Chamber's response to the study's findings focuses solely on practices in the large-scale gold sector even though the report considered exports of both small and large-scale gold producers as well as the cocoa sector. [2]
- In the next section, the rejoinder presents a summary of the methods and main findings of the study. This is followed by an analysis and critique of the methodology and data used in the study.
- The penultimate section discusses the risks in trade mispricing identified in the study and concludes with suggestions on how to improve the rigour and reliability of the study's findings.

## 3.0: Overview and Summary of the Study's Findings

- The study analyzed Ghana's gold exports from 2011 to 2017 and estimated the magnitude of transfer mispricing based on customs valuation and transfer pricing analysis. The researchers computed the export price of gold from the export value reported in the database of the Customs Division of Ghana Revenue Authority (Customs).

- The derived export price was then compared with the spot price of gold on the international market (traded price) at a given time and the resulting difference was classified as either underpricing (undervaluation) or overpricing (overvaluation) depending on whether the computed export price was lower than the international market price or vice versa respectively.

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[1] Available at https://repository.graduateinstitute.ch/record/299798?_ga=2.57088810.1236040079.1650531292-913168044.1650531290

[2] The reason is not far-fetched. The Chamber represents the interest of companies operating in the large-scale mining sector.

- In a second scenario, the derived price was discounted to account for differences in purity of gold doré, freight charges, and the possibility of forward or futures contracts[3].
- This variation resulted in a situation where the discounted export price diverged from the internationally traded price and the researchers defined a tolerable price range to guide the classification of the derived export price as either undervalued or overvalued. The study found that gold exports were undervalued by USD 3.8 billion (current prices) from 2011 to 2017 based on the discounted export price. This translates into 11% of the total value of exports within the study period.
- As well, the study estimated that the mispricing led to a loss of USD 957.3 million (current prices) in taxes to the state based on a corporate tax rate of 25% (which is incorrect) and the discounted export price.
- If the study had used the correct generic mining sector corporate income tax rate of 35%, the tax loss could have been higher[4]. However, it must be pointed out that the approach used in estimating the tax loss has a bias and this is discussed further in the next sections.

**4.0: Gaps in Methodology**

From our review of the summary of the findings, the Chamber hereby makes the following responses:

- Although the study attempted to replicate how gold export revenues are determined, the methodology was not a true representative of the approach used by the large-scale gold mining firms and accepted by regulators due to the omission of parameters that reflect the refining process.
- The study considered the data from Customs' database as the final value of gold exports even though it is only a database on provisional gold exports. The database of Customs provides information on exports of semi-processed gold (gold doré) and not refined gold (bullion).
- Minerals revenue and all other associate statutory payments are made to the state based on declared refined gold. It is therefore inaccurate to use the Customs information, which is

[3] A futures or forward contract allows the export price to deviate from the traded price.
[4] The corporate income tax rate in the mining sector is 32.5% for firms with Investment Agreements and 35% for firms without an investment agreement.

an estimate based on semi-refined gold to determine the value of gold exports as underdeclared or overvalued.

- As a standard practice, mining firms undertake independent assays (either by a third-party or an in-house laboratory) of gold produced (doré)[5]. The firms use the assay values and the price of gold on the day of export to determine the interim value of exports to complete the Customs' export declaration form. This process, which describes how the export values are determined at the mine gate and recorded in the database of Customs, could be summarized by the equation below:

$$Export\ Value\ (at\ mine\ gate) = (price\ of\ gold * gold\ content * doré\ weight\ ) + (price\ of\ silver * silver\ content * doré\ weight) \quad (1)$$[6]

- However, the main deficiency of the Customs reporting framework, which was also the main estimation technique in the study, was that it overlooked the refining process and assumed that the quantum of gold recovered at the refining stage was the same as the semi-refined gold (doré) produced by the mining firms.
- The reporting framework assumes that the production of doré is the final phase of the processes related to mineral production, but it is not the case.

- While the above assumption may be practical and convenient for the record keeping functions of Customs, it does not form the basis on which the state and other interested parties assess their fiscal revenue from mining operations.

- The Domestic Division of Ghana Revenue Authority, which is responsible for collecting taxes, computes the state's share of revenue from mineral revenue and not from export revenue.

- Mineral revenue differs from export revenue. Mineral revenue is determined when the gold has been refined for sale (final stage of the production process) whereas export revenue is determined at the stage of exporting the semi-refined (raw gold).

[5] The assays are independent in the sense that it is undertaken by the mine and not the refinery.
[6] Silver is a by-product of gold and is considered part of the company's reportable mineral revenue. Taxes are also paid on the total mineral revenue, that is on the revenue derived from the sale of gold and silver.

- The large-scale mines export their raw gold (doré) to refineries to improve on its purity. A typical refining process involves smelting, assaying, and chemically isolating the gold and silver metals from the trace metals in the doré to obtain pure or refined gold and silver[7].

- Smelting leads to a slight reduction in the weight of the doré, hence the pre-export weight would be higher than the post-refined weight.

- Further, the refining process recovers less than 100% of gold and silver in the doré while the value determined at the mine gate assumes that the gold and silver content in the doré could be recovered fully.

- The recovery rate, which is also referred to as the refining percentage, is not uniform across refineries and metals. As well, there is also the possibility that the assay values reported by the refinery may vary slightly from those of a mining firm or its third-party assayer. The discrepancy in the assay values would not be problematic if it falls within a range defined in the refining contract between both parties and approved by the Minerals Commission. If the variation falls outside the defined tolerable threshold, however, an umpire laboratory undertakes a test to establish the assay values. The resulting assay values are then used to determine the mineral revenue and associated fiscal imposts.

- More so, there could be differences in the spot price used in the valuation of unrefined gold (doré) and the refined gold (bullion) due to the time lag between the export of gold doré and sale of bullion.

- The determination of revenue from the sale of gold could therefore be summarized by the following expression:

$$Mineral\ Revenue\ (after\ refining) = (price\ of\ gold * gold\ content * weight * refining\ \%) + (price\ of\ silver * silver\ content * weight * refining\ \%) \qquad (2)$$

[7] Apart from gold and silver which have economic value, the other metals are considered deleterious

- In line with the statutory requirements, the refinery report on each consignment of gold doré export is shared with the Minerals Commission, Bank of Ghana, Ghana Revenue Authority, and Precious Minerals Marketing Company (PMMC) by the respective mining firms.
- This reporting mechanism makes it possible for these state institutions to independently reconcile pre-shipment with post-shipment information.
- These state agencies have the capacity and information to autonomously update their records on export data.
- ***It is therefore inaccurate for the researchers to suggest that "any discrepancies in (assay) value noticed are likely to only be reported to the mining company and not to the state."***

**5.0: Challenges with Method for Estimating Tax Loss**

The Chamber in reviewing the report also identified the following challenges with the method for estimating tax loss.

- The study estimated the tax loss due to the perceived mispricing as a product of the corporate income tax rate and revenue loss from the undervaluation of gold exports (using the discounted export price). This could be summarized with equation three (3).

$$Tax\ Loss = corporate\ income\ tax\ rate\ (\beta) * value\ of\ undervaluation\ of\ gold\ exports(Y) \quad (3)$$

- The study's estimation approach assumed that corporate income tax is paid on gross export revenue. However, this estimation approach is inconsistent with the country's fiscal regime and precludes the right of mining firms to deduct royalties and their operational cost from any potential additional revenue (if the export price were adjusted to reflect the international market price).
- The mining sector's fiscal regime includes royalty and corporate income tax which are charged at a general rate of 5% and 35% respectively[8]. Royalty is imposed on gross revenue while corporate income tax is charged against net revenue or assessable income.

- To estimate the tax loss, the researchers should have first computed the royalty revenue due the state from the mispricing induced additional revenue. Since royalty is treated as

[8] Again, the royalty rate of mining firms with an investment agreement ranges from 3% to 5% based on the price of gold

part of the cost of production under the fiscal regime, the amount paid would be added to the cost of production.

- Subsequently, the additional revenue would be netted off by the royalty payment and any residual losses that may have been accrued over the study period within permissible limits of the law. Thus, the potential tax loss could be estimated as follows:

Let $\mu_u$ be the fiscal revenue due the state when gold exports are undervalued

$$\mu_u = \alpha X + \beta(X - \{(TC + \alpha X)\} \quad (4)^{9}$$

Where:

α is the royalty rate

β is the corporate income tax rate

X is the mineral revenue, which is assumed to be undervalued

TC is the firm's total cost of production excluding royalty payments[10]

Further, let $\mu_t$ be the fiscal revenue due the state when gold exports are not undervalued

$$\mu_t = \alpha(X + Y) + \beta\{(X + Y) - (TC + \alpha(X + Y))\} \quad (5)$$

Where:

Y is the additional mineral revenue after correcting for trade mispricing, and all other variables have the same meaning as in (4)

The potential tax loss, δ, is obtained by subtracting (4) from (5), which yields the solution:

$$\delta = (\alpha + \beta)Y - \alpha\beta Y \quad (6)$$

- Since the tax loss (δ) in (6) exceeds the comparable value in (3), it suggests that the approach used in the study, which overlooked the royalty payments and cost of production, is likely to underestimate the realizable fiscal revenue from the perceived mispricing of gold exports. This makes the estimates of the loss total revenue (fiscal) in the study unreliable.

[9] This describes the determination of fiscal revenue due the state from mining operations

[10] For purposes of analysis, we treat the royalty cost as a standalone cost item. Ordinarily, it would be part of the firm's cost of production. Also, we assume equivalence between net income and assessable income of a mine.

- In an alternative scenario, where costs are assumed to be constant, the potential tax loss would still be different from the study's conclusions. If the tax authorities were to decide that a mine has underdeclared its revenue by Y, and that its cost has been fully considered in a previous period, the additional fiscal revenue to be paid by the mine could be derived as follows:

$$\delta = \alpha Y + \beta Y(1 - \alpha) \qquad (7)$$

Where all parameters in (7) have the same meaning as in the previous equations

The estimate of tax loss in (7), which is identical to (6) would still be higher than that of the study as presented in (3), which affirms our opinion that the result of the study is unreliable.

**6.0: Risks for Trade Mispricing in Ghana's Gold Sector**

- The study identified key risks for trade mispricing in the mining sector, which in the view of the Chamber are not supported by extant practices.
- Firstly, the study suggests that the "presence of prominent multinational mining companies in Ghana with headquarters and affiliate firms across different tax and legal jurisdictions creates incentives for transfer mispricing." Although this is a well-recognized risk in the literature, the study did not demonstrate the relationship among the mining firms, refineries, and buyers of refined gold and how their interconnectedness creates risks of trade mispricing. It is inaccurate to conclude that the above case "creates incentives for transfer mispricing."
- The mining firms may either market their refined gold to a refinery or transact directly with the buyer of the refined gold. In both scenarios, the refinery charges a fee for its refining services, and the value of the fee is stated in the refining and marketing contracts, which are available to the Minerals Commission[11].
- As shown in Table 1.0, the doré of gold producing member companies of the Chamber is refined by non-affiliate firms, except for the mines operated by AngloGold Ashanti Ltd[12].
- The bullion banks and other buyers of gold produced by the producing member companies of the Chamber are not related parties.

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[11] In some cases, the explicit refinery charge may be zero. However, the refinery may recover its fees in other ways.

[12] Although Gold Fields is a shareholder in Rand Refinery, its doré is refined by MKS.

- In the absence of contrary evidence, it may be merely speculative to suggest that the mining companies engage in related-party transactions with the motive of under-declaring their exports to reduce their tax liabilities.

**Table 1.0: Refineries of producing member companies of the Ghana Chamber of Mines**

| Name of Mining Firm | Refinery | Relationship between Mine and Refinery |
|---|---|---|
| AngloGold Ashanti Obuasi Mine | Rand Refinery | Shareholder |
| AngloGold Ashanti Iduapriem Mine | Rand Refinery | Shareholder |
| Newmont Ghana Gold Ltd | MKS | Third-party |
| Newmont Golden Ridge Ltd | MKS | Third-party |
| Perseus Mining (Ghana) Ltd | MKS | Third-party |
| Adamus Resources Ltd | Metalor | Third-party |
| Asanko Gold Mines | Rand Refinery | Third-party |
| Chirano Gold Mines | Metalor | Third-party |
| Gold Fields Ghana Ltd | MKS | Third-party |
| Abosso Goldfields Ltd | MKS | Third-party |
| Golden Star Wassa Ltd | Rand Refinery | Third-party |
| Future Global Resources | Rand Refinery | Third-party |

Source: Ghana Chamber of Mines (2022)

- Another risk identified in the study relates to the regulatory infrastructure for export evaluation. In recounting the evolution of the export evaluation infrastructure, the researchers mixed up how the national assay programme started and therefore drew inaccurate conclusions that coverage of the programme was limited until 2016[13].
- Prior to 2016, the Precious Minerals Marketing Company (PMMC) engaged in the buying and selling of gold and diamond as well as licensing firms to purchase gold. In this period,

[13] The national assay programme requires all gold exports to be valued by PMMC at the point of export (for small-scale mines) and in the gold room (for large-scale mines).

there was no requirement for a state entity to assay gold doré of mining firms ahead of exportation.

- However, the Ministry of Lands and Natural Resources appointed PMMC as a national assayer in 2016 and PMMC ceased the buying and selling of gold in that year.
- It rolled out the national assay program in the small-scale sector in 2017 and extended it to the large-scale sector in 2018 after piloting and finalizing the required logistics.

- Further, the study also asserts incorrectly that the government allows the country to be used as a corridor for the transshipment of gold: "***The government of Ghana permits gold produced in neighboring countries to be brought into Ghana for assaying, documentation and onward shipment as transit gold.***"

- While there is evidence of transshipment in 2017 and 2018, the practice was declared illegal by the Minerals Commission as the terms of the license issued to gold buying companies require them to exclusively purchase locally produced gold[14].

- In the light of this development, the risk of corruption and fiscal revenue loss due to misreporting cited in the study would not be a source of concern.

**7.0: Recommendations**

- As a rule of thumb, a study on trade mispricing in the gold mining sector should contrast the actual realized export price with the traded price (reference price) on global markets such as the London Metal Exchange.
- Since it may be onerous to obtain data on the actual export price, it would be reasonable to derive the parameter from the mineral revenue and production data that are published by the mining firms, the Ghana Chamber of Mines, Minerals Commission, Ghana Extractive Industry Transparency Initiative, and other bodies.
- Mineral revenue is a better and reliable measure of the revenue realized from the production and export of gold than export revenue (which is based on provisional data) as the payment of taxes is based on Mineral revenue.

[14] In 2020, the Minerals Commission stopped Licenced Gold Buying companies from engaging in the transshipment of gold.

- All other things being equal, the resulting discrepancy between the estimated price (based on mineral revenue) and the reference price, if any, could give an indication of trade mispricing.
- Alternatively, the Chamber would be willing to collaborate with the researchers to undertake a micro-level study that will compare the price paid for each consignment of refined gold to the prevailing price on the international market.

- Lastly, we support the study's recommendation on the need to improve the level of cooperation and data collection capacities of parastatals involved in the export of gold.

- As a first step, the Customs Division of GRA should train its officers on the proper classification of gold exports and enhance supervision over the data entry process.

- Further, the GRA should invest in infrastructure that would enable it to seamlessly reconcile gold exports and sale of gold.

**8.0: Disclosure of Engagement in Research**

- The researchers engaged the Ghana Chamber of Mines as a respondent in the study and shared the preliminary findings with the Chamber.
- To the best of its abilities, the Chamber supported the researchers to understand the pre-shipment processes, how to determine the value of gold exports based on refinery returns and identify challenges with the dataset they relied upon for their study.
- Although we informed the researchers of our disagreement with their methodology and findings, we recognize that they reserve the right to publish the study.

**9.0: Media and Communications**

All inquiries should be directed to the Director of External Relations and Communications via email: anantogma@ghanachamberofmines.org.