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September 2023

WORKINGPAPER SERIES

Number 584

POLITICAL ECONOMY RESEARCH INSTITUTE

Gold in Ghana: A Story of Unbalanced Exchange[1]

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August 31, 2023

Abstract

This paper presents the historical and institutional context of the development of the gold sector in Ghana, which sets the stage for examining the contribution of the sector to the economy and its exposure to capital flight. The analysis sheds light on the important role that the regulatory framework and the fiscal regime that govern the gold sector have played in perpetuating a system of unequal distribution of gains from gold exploitation in terms of tax revenue and foreign exchange earnings in favour of foreign gold companies. The statistical analysis of gold export statistics reveals substantial discrepancies between Ghana's gold exports and the recorded value of imports by its trading partners. These differences point to export underinvoicing as a conduit of capital flight, while also exhibiting a systematic lack of transparency and inconsistencies vis-a-vis established international conventions governing the recording of trade transactions, especially in the case of gold destined for South Africa which does not show up in the latter's import statistics. Overall, the analysis suggests that the gains from the gold sector remain much below potential, but that at the same time there may be room for reforms that can improve the benefits from gold exploitation for the country.

[1] This paper is a product of a research project funded by a grant from the 2021 Andrew Carnegie Fellowship (granted to Léonce Ndikumana) from Carnegie Corporation of New York, which is very much appreciated. The project examines domestic and global drivers of capital flight from Africa focusing on natural-resource rich countries with an illustration with the cases of Cameroon, Ghana and Zambia. The research team for the country case studies includes William Godfred Cantah and Kwame Adjei-Mantey (Ghana), Hans Mpenya (Cameroon), Dale Mudenda and Caesar Chelo (Zambia). The authors are grateful for generous information obtained during meetings with various government agencies and the Chamber of Mines in January 2023. They appreciate constructive comments and suggestions on an earlier draft of the paper from experts from the Chamber of Mines, the Mining Commission, and the Bank of Ghana. Excellent research assistance by Bilen Gurara is very much appreciated. Research funding from PERI is gratefully acknowledged.
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1. Introduction

Gold exploitation in Ghana originates from the pre-colonial era, where it contributed to the growth of several chiefdoms and kingdoms (including the kingdoms of Ashanti and Denkyira as well as the Fanti Confederacy) which together form part of present-day Ghana. Gold was a highly sought-after commodity by European traders at the coast of Ghana, and Arab and Hauser traders who came through the North of the country. As a result, gold mining became the main economic activity of pre-colonial states such as Bono-Manso, Denkyira, Adanse, Assin, Akyim, Ashanti, and other key Akan states in what is now known as present day Ghana (Ofosu-Mensah, 2013) . During the pre-colonial period, no complex technology was required to carry out gold mining, as most gold mined was from streams and rivers in the rain forest and coastal sands, where it had been washed down by rivers and rains (Gocking, 2005; Kimble, 1963). Despite the long history of gold mining in Ghana, there seems to be no data on the amount of gold produced before the 15th Century. However, various historical accounts (Allen, 1958; Aryee, 2001; Hilson, 2002; Ofosu-Mensah, 2013) indicate that the gold mining industry contributed immensely to the growth and development of the Ashanti Kingdom and enhanced trading between people of southern Ghana and their northern neighbours.

Today, gold is Ghana's top export product, accounting for 35 percent of total exports in 2021 (Bank of Ghana). It is, therefore, an important potential source of export earnings, tax revenue and employment. The gold mining sector includes both small-scale informal artisanal mining and large-scale industrial mining, the latter being controlled by private foreign corporations mainly from the United States, South Africa, and Canada.

The history of gold mining in Ghana is a story of alienation and unbalanced trade. From the beginning and through the colonial era, regulations were enacted to attract foreign investors and protect their interests, in the process making it difficult for indigenous people to gainfully participate in the mining activities. The failure of the post-independent nationalization experiment led to the liberalization of the mining sector, resulting in the dominance of the sector by foreign corporations. Today large-scale mining firms account for over 60 percent of gold exports, and only 2 percent of the firms are owned by Ghanaians.

The regulations of the gold sector enacted over time have consolidated a system of unbalanced exchange whereby the distribution of the gains from gold exploitation is biased in favour of large-scale mining firms (most of which are foreign owned) over small scale mining firms (which are mainly Ghanaian owned). The dominance of foreign firms is the outcome of the country's need for foreign capital, especially following the economic downturn in the 1980s. Various mining laws (e.g., PNDC Law 153) enacted prior to 2006 provided tax incentives to foreign firms to attract them into the Ghanaian economy. In addition, foreign firms were also given the privilege to keep portions of the exports proceeds offshore, consolidating the system of unbalance exchange in favour of foreign mining firms. The fiscal regime, therefore, favours rent extraction of by foreign investors, while undermining tax revenue generation and foreign exchange reserve accumulation. It is an illustration of 'legal capital flight' whereby the country's resources are extracted in a system of unequal distribution of the gains from gold

mining in favour of foreign corporations. This is in addition to illicit capital flight leaking through various channels, especially export misinvoicing, which is documented in this paper and in Ndikumana (2023).

The objective of this paper is to present the historical and institutional context of the development of the gold sector in Ghana, as a basis for examining the contribution of the sector to the economy and its exposure to capital flight. It emphasizes the importance of the regulatory framework and the fiscal regime that govern the distribution of gains from the industry in the form of tax revenue and foreign exchange earnings.

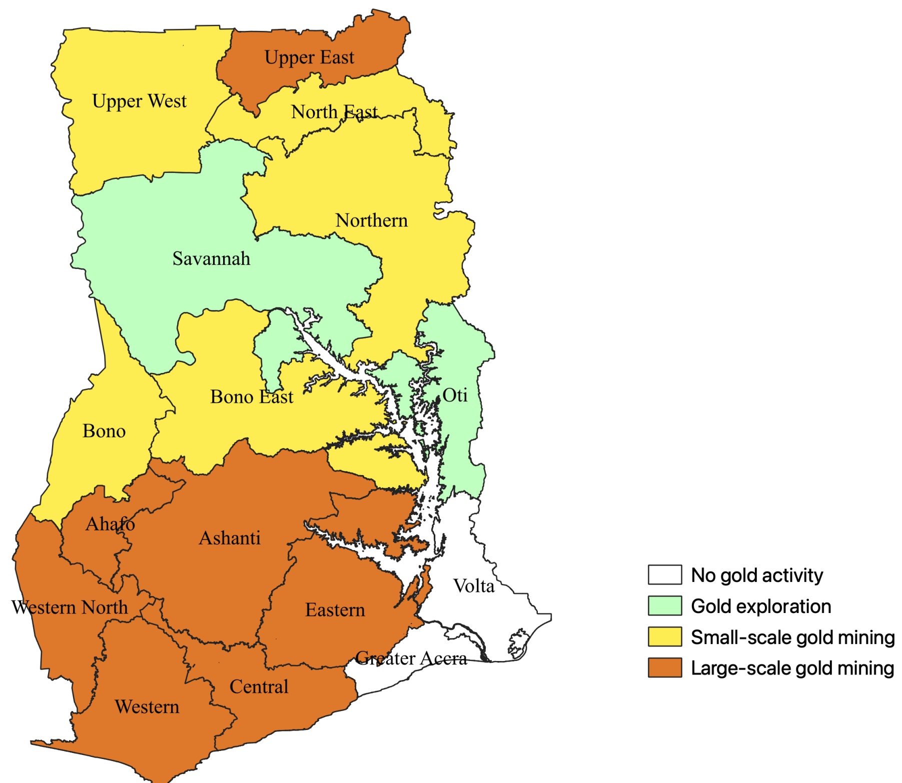
The paper specifically analyses gold trade statistics to shed light on discrepancies between Ghana's exports and its partners' imports as an indicator of trade misinvoicing, which is a mechanism of capital flight and rent extraction from the sector. The findings from this study provide insights in the complexity of the gold mining sector, and its thus far unfulfilled potential importance for the Ghanaian economy. It highlights how domestic and global regulatory and institutional mechanisms prevent the country from fully benefiting from its natural resources and perpetuate alienation of local entrepreneurship and unfair exchange. The results indicate that the gold sector is exposed to capital flight through trade misinvoicing as illustrated by substantial discrepancies between Ghana's gold exports and its partners' imports as recorded in Comtrade statistics. The evidence calls for strengthening the recording and monitoring of gold trade statistics to enhance transparency and reliability of the data as a way of minimizing the risks for capital flight through trade misinvoicing.

2. Evolution of Ghana's gold industry

The gold sector is a dominant component of the Ghanaian economy, and it has attracted attention so since its beginning. Gold exploitation is concentrated in the southern regions of the country, with some ongoing explorations in the North (Figure 1).

Gold exploitation and trade evolved through phases, from the unregulated pre-colonial era to the modern era during the colonial regime and thereafter. This section traces this evolution, documenting the trends of production and exports over time, and highlighting the role of foreign actors in the sector.

Figure 1: Location of gold exploitation and exploration



Source: Authors' design.[4]

Unregulated gold trade during the pre-colonial era (1471-1843)

The last three decades of the 15th century witnessed an influx of European traders seeking to participate in the booming gold industry. The influx was motivated by the high demand for gold as a source of wealth and power, a medium of exchange, input in minting of coins, and to back paper notes in European countries. As European countries began experiencing challenges with the integrity of their currencies due to the inadequate supply of gold (Carmichael, 1993), they sought access to gold on the west coast of Africa. The Portuguese were the first to reach the coast of present-day Ghana in 1471 and started trading gold dust near the estuary of the river Pra in present-day Shama. During this period, gold trade was mainly based on a barter system where the Portuguese supplied local ethnic groups with products such as brass, lead and pewter basins, copper bangles, tin pots, large knives, cotton cloth, wedges of iron, and others in exchange for gold (Hilson, 2002).

The Portuguese benefited greatly from gold trade due to the high demand for European goods by the local population. To monopolize the industry, they controlled various gold trade routes, maintained positive working relationships with local chiefs in the area, and constructed a castle

[4] The authors appreciate the assistance by Didier Wayoro in designing the map.

in Elmina which served as a military base to protect their interests from other Europeans. During the 16th century, Portuguese traders in the Elmina enclave were able to secure about 13,000 oz of gold, with an estimated value of about £60,000 at that time (Hilson, 2002). They were unable to maintain their monopoly on gold trade for long, as the gains from the trade attracted other European countries, notably the British and the Dutch. In fact, by 1642, the Dutch had taken over the Elmina from the Portuguese. However, the dominance of the Dutch in gold trade faded with the arrival of the British (Hilson, 2002).

Gold exports from the Gold Coast between 1471 and 1750 amounted to about 11,200,000 oz, with average annual exports of about 40,000 oz, and an estimated value of about £51.7 million (Junner, 1935). It is important to note that the monetary values of gold exports presented here are only estimates, because the chiefs and people of the Gold Coast in most cases only received European goods in exchange for gold. Towards the end of the 16th century, however, the slave trade began to dominate European trading activities on the West Coast of Africa, which resulted in a decline in gold exports. It is estimated that between 1751 and 1800 gold exports declined by over 95 percent relative to the period 1471-1750, from an average annual of 40,000 oz to about 10,000 oz (Junner, 1935). Despite the decline in gold trade, it still generated substantial revenue for Dutch and English firms, estimated at about £200,000 annually (Hilson, 2002).

Overall, gold trade prior to the official colonisation of Ghana largely benefited the Europeans to the detriment of the natives who only received manufactured goods in exchange for large quantities of gold (Allen, 1958; Carmichael, 1993; Hilson, 2002). Due to unfair trade, the country failed to realise the full benefits of the 13.7 million ounces of gold exported between 1471 and 1850 (Junner, 1935). This was largely because of the lack of regulation of gold trade before colonisation and that local leaders lacked effective capacity to gainfully manage gold trade with the Europeans.

***Gold exploitation and alienation of indigenous communities* during the colonial era (1844-1957)**

The Bond of 1844 signed between British Commander W. H. Hill and some chiefs from the coastal and forest zones of Ghana marked the official annexation of Ghana (known as the Gold Coast) as a colony of Great Britain. It also marked the emergence of the gold industry. The colonial mining policy focused on five key issues (Tsikata, 1997): (1) establishing an administrative and legal system that facilitates mining operations; (2) ensuring the security of tenure for mineral rights holders; (3) effective management of problems that may arise between mining companies and local communities; (4) generating revenue for the colonial government through export duties or income tax; and (5) contributing to the British Empire to ensure its self-sufficiency. Thus, the colonial mining policy was largely geared towards protecting the interests of the British empire. No specific attempt was made to ensure that the Ghanaian people living in mining areas benefited from the proceeds of gold trade.

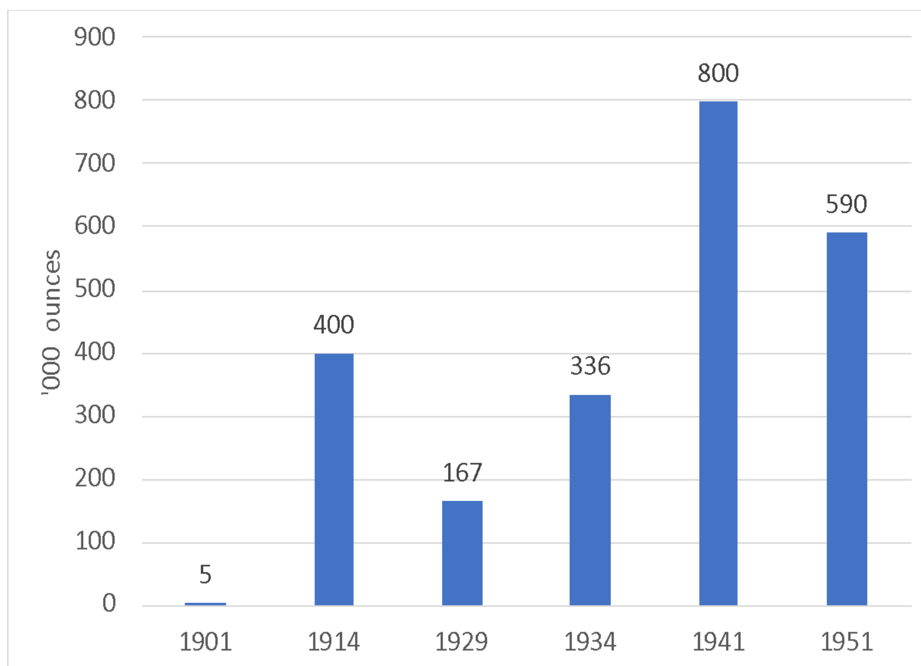
The introduction of the colonial mining policy coupled with announcements of newly discovered gold ores in Tarkwa, Abosso and Bibiani in the Western part of the Gold Coast

resulted in an influx of European capital into the mining industry starting in 1880. However, due to the unavailability of motorable roads or railway lines and the absence of appropriate laws to protect concessions, European firms faced challenges with the natives and the cost of mining gold was quite high. As a result, some European mining firms could not continue their operations and were forced to close (Allen, 1958; Hilson, 2002).

To improve the export of mineral resources from the Gold Coast to England and maximise the benefits from gold trade, the colonial administration enacted the first law to regulate the mining sector, the Concessions Ordinance in 1900. The law aimed to secure land entitlements for European firms as their mining concessions. The enactment of this law was followed by improvements in infrastructure, which facilitated the transport of gold from the countryside to the coast for onward export to England. By 1901, the railway line had reached Tarkwa from Sekondi before reaching Obuasi in 1903, and Prestea by 1910 (Allen, 1958).

These developments in the Gold Coast coupled with reports by engineers from the Transvaal region of South Africa indicating that the reefs in the Tarkwa goldfields were similar or even of higher grade than the deposits in Johannesburg, ignited interest in the industry, which had been dampened by the poor road and railway infrastructure. In addition, the end of the Anglo-Ashanti wars (of 1823 – 1900) signalled an era of peace and contributed to the increase in gold mining activities by European firms towards the end of the 19th Century and the start of the 20th Century. Between 1881 and 1882, European firms purchased more than 70 mining concessions, the most important being the Ashanti Goldfields Company (now called AngloGold Ashanti) which secured about 25,000 hectares of mining land in Obuasi in 1890. Subsequently, the country witnessed a massive increase in gold production from 5,223 ounces in 1901 to over 400,000 ounces per annum by the end of 1914. The First World War, however, contributed to a reduction in gold production, down to about 167,115 ounces per annum by 1929. Gold production picked up again, increasing to over 336,065 ounces by the end of 1934. The increase in gold production within this period was partly a result of England's decision to go off the gold standard, leading to an increase in gold price from 85 British Shillings to a peak of 135 shillings per ounce in 1934. These hikes in gold prices contributed to further increase in gold production, which rose to over 800,000 ounces of gold per annum by 1941 (Figure 2).

Figure 2: Gold production over 1901-1951 ('000 ounces)



Source: Allen (1958) and Hilson (2002)

Although the mining industry yielded high profits for foreign firms, very little benefits accrued to local mining communities, as the colonial mining policy focused on generating revenue for the colonial administration and the British Empire. The main benefits that accrued to the natives were in the form of employment in mining firms. However, despite huge corporate profits from mining activities, workers faced poor conditions and were severely underpaid. This discouraged Ghanaians from working for European firms, prompting the colonial government to enact the *Mercury Ordinance* of 1932 that made it illegal for the natives to have access to mercury (the material used in the extraction of gold), making it difficult for the natives to engage in gold mining. It is important to note that this law came into force at the back of the *Concessions Ordinance* which prevented natives from mining lands that had been allocated to European mining firms. With the *Concessions Ordinance* and the *Mercury Ordinance* in place, the local population was virtually pushed out of an industry they had controlled for several centuries. Europeans thus became the main beneficiaries of the gold industry, repatriating the majority of profits from the sector. This unbalanced system in the gold industry seems to have continued up until today.

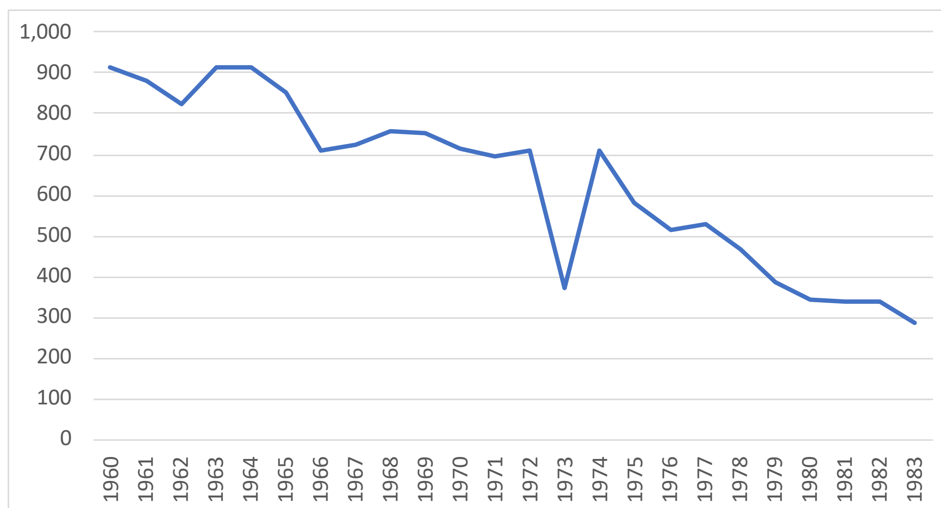
The gold mining industry began experiencing declines after the first World War following the boom of the 1920s and 1930s, partly because of the unwillingness of the natives to work for European mining companies and partly as a result of the Second World War (Hilson, 2002). By 1951, gold production had declined to about 590,475 ounces in 1951 from its peak of 885,712 ounces in 1941 (Figure 2). In fact, out of the 50 mining companies that were operating in the country in the 1930s, just about 11 were still in operation with deteriorated mines in the 1950s. At some point these companies unsuccessfully requested for loans and grants from the government to revive their operations (Acquah, 1995). As a result, the firms were forced to

either reduce their operations or close completely. As the country gained independence in 1957, the gold mining industry was experiencing rapid deterioration.

'Years of mismanagement and undercapitalization'[5] (1957-1983)

The decline of the gold industry after World War II was partly due to the lack of support from the central government, coupled with poor road and railway infrastructure in mining areas. In addition, around the same time, South Africa had developed strong gold mining capacity with better infrastructure, which attracted foreign interest from Europe, Australia, and the United States. Although there is no adequate data on FDI inflows in the mining sector prior to the Economic Recovery Programme (ERP), one can infer from total FDI data to get an idea of the inflow of FDI to the mining industry and the gold mining sub-sector. Data from the World Bank indicates that FDI inflows in the country declined by 62 percent in 1972, and a 205 percent by the end of 1977. The post-independence period witnessed a general decline in investments in the gold mining industry and a decline in gold production (Figure 3), due to a shift of FDI from Ghana's ailing mining sector to the booming mining industry in South Africa.

Figure 3: Gold production in Ghana in the post-independence period ('000 ounces)



Source: Ghana Minerals Commission

To resolve the problem of low investment in the gold sector and to help improve productivity in the sector, a Commission of Enquiry was set up by the government in 1958 to examine the terms of various mining agreements and their profitability, and to assess unexploited mining concessions in the country (Tsikata, 1997). The Commission recommended the following: the Government of Ghana should take over mineral rights from communities; royalties paid by mining firms should be a percentage of corporate profits; the government should be the regulator of the industry; the government should establish state monopoly over the export of

[5] Quotation from Hilson and Hilson (2017).

gold[6] (Tsikata, 1997). Based on these recommendations, the State Mining Corporation was established in 1961 and by 1966, it had acquired all mining companies in the country (except the Ashanti Goldfields in Obuasi)[7] (Jackson, 1992). It is important to note that all the gold mining firms that were acquired by the State Mining Corporation were ailing firms whose foreign owners were about to pull out; they were nationalised to ensure their survival (see Afrifa Taylor, 2006). The Minerals Act (Act 123) was passed in 1962 to further strengthen the government's control over the mining industry. It was similar to the Land Bills of 1894 and 1897 which gave the sole authority of granting concessions to the Governor of the Gold Coast (Ilegbune, 1976). The Minerals Act also made all mineral resources within the Territories of Ghana the property of the Government of Ghana. All these decisions were geared towards reviving the gold mining industry.

The government's interventions in the gold sector contributed to an increase in gold production from 590,475 ounces in 1951 to about 915,317 ounces in 1960. However, the trend was not sustained, and by 1970 gold production had declined by over 21 percent relative to the previous decade (Figure 3). Developments in the gold mining industry during this period affected the overall performance of the economy. In 1966, for example, GDP growth declined by 4 percent as gold production declined by 16.7 percent. The decline in gold production resulted in substantial losses for the State Mining Corporation. It lost 6.75 million Cedis in 1970 alone (Leith and Söderling, 2003).

In 1972, the government issued the Mining Operations Decree (NRCD 132, 1972), which gave the government 55 percent shares of all mining companies and demanded the payment of "fair Compensation" to the government based on 55 percent of each company's total assets (Hilson, 2002). The enactment of the decree exacerbated the already precarious position of mining companies and made it more difficult to make a profit. Gold mining was further adversely affected by a severe shortage of foreign exchange to import key inputs (Antwi, 1991). As a result, gold production declined from 714,442 ounces in 1970 to 531,084 ounces by the end of 1977 (Minerals Commission, 2014). By 1983, gold production had declined to about 285,291 ounces, less than 35 percent of production recorded in 1960.

During the 26 years of independence up to 1983, the gold mining industry experienced a general decline in production and low profitability. A report by the Minerals Commission (2014) attributed it to high government taxes and levies coupled with the implementation of strict exchange rate controls, which affected the repatriation of profits and access to foreign exchange for the replacement of old equipment. The sector was also characterised by uncoordinated and unclear fiscal and legal regimes as well as high front-end charges. For instance, royalty was levied at 6 percent, with a mineral duty of 5 to 10 percent as well as an export levy of about US$3 per ounce of gold exports exceeding 100,000 ounces. These measures discouraged private investment in the mining industry. The economic situation at the

[6] The Precious Mineral Marketing Company (PMMC) regulates the purchase of gold produced by small mining firms as well as its exports. For large-scale firms, the PMMC focuses on grading, assaying, valuing, and processing precious minerals.

[7] The State Mining Corporation later acquired equity shares in Ashanti Gold Fields (Acquah, 1995)

time also induced the exodus of skilled labour from the country, making it difficult for existing mines to operate. Hilson and Hilson (2017) characterised the period as "years of mismanagement and undercapitalisation."

Revival of the gold industry under the Economic Recovery Program (1984-2000)

The first two decades after independence were characterised by government domination in economic activities. However, due to problems associated with corruption and economic mismanagement, shortage of foreign exchange reserves, the country recorded negative growth rates and inflation reaching 123 percent by the end of 1982.

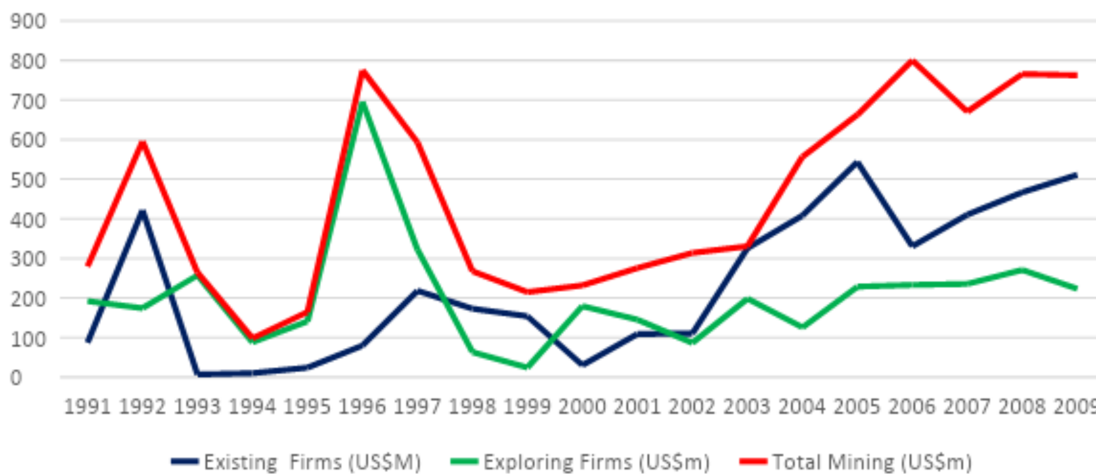
To revive the economy, the Provisional National Defence Council (PNDC) government together with the International Monetary Fund (IMF) implemented the Economic Recovery Programme (ERP) and the Structural Adjustment Programme (SAP) from 1983 to 1991. The ERP and SAP were geared toward reversing the economic decline by realigning the exchange rates and reforming the productive sectors to enhance exports (IMF, 1998; Issahaku, 2000). The implementation of the ERP and SAP resulted in the liberalisation of almost all sectors, including the financial sector and foreign exchange markets. As one of the key areas of focus of the ERP and SAP was to increase the government's access to foreign exchange, mining was identified as a key sector that could assist the government to achieve this objective (Akabzaa and Darimani, 2001). Thus, the mining industry (especially the gold sector) received a great deal of attention during this period, and the government enacted reforms and new laws aimed at liberalizing the gold sector to make it more attractive for foreign investors.

The reforms specifically aimed at increasing the net worth of existing mining firms through the rehabilitation of mines. Due to the modifications in the mining laws, some bilateral and multilateral financial institutions, including The IMF and the International Financial Corporation facilitated (with the Government of Ghana providing a guarantee) the acquisition of loans by some mining firms to finance their expansion and rehabilitation. Ailing mining companies were put on management contracts to help improve their efficiency.

The SAP reforms led to a systematic reduction in the involvement of the government in productive sectors, including the mining industry. Thus, the government sold its shares in gold mining firms to private sector players. For instance, the government reduced its shares in Ashanti Goldfield Corporation (Now AngloGold Ashanti) from 55 percent to 19 percent by the end of 1998. Foreign firms that were initially given management contracts during the implementation of the SAP were allowed to eventually acquire mining firms in their trust. Goldfields South Africa, which had a management contract to manage the Tarkwa mine from 1993 and 1994 eventually purchased it in 1995 (Akabzaa and Darimani, 2001). Similarly, the Johannesburg Consolidated Investments, which also managed the Prestea mine on a contract between 1995 and 1996 purchased it in 1997. Several state-owned enterprises were privatised through the divestiture programme. These reforms ultimately contributed to the revival of the gold mining industry.

The changes in the mining laws together with the reforms in the financial sector attracted over US$900 million in investments in the mining sector between 1983 and 1993 (Figure 4). While it is difficult to access data on the amount of FDI that goes directly into gold mining, it is estimated that about 95 percent of FDI in the mining industry in Ghana largely goes to the gold mining sector (Bloch and Owusu, 2012). During this period, Ashanti Goldfields alone underwent rehabilitation and expansion by more than US$700 million. Given the number of new start-ups of gold mines in the country during this period, most investments in the mining sector most likely went into the gold sector (Addy, 1998). Capital investments in the mining sector (especially the gold mining industry) increased from US$12.8 million in 1985 to about US$83 million in 1986 (Addy, 1998). Between 1983 and 1998 the mining industry received foreign investments to the tune of US$4 billion (Hilson, 2002), including US$90 million for the Mining Sector Rehabilitation Project in 1989 (World Bank, 1995).

Figure 4: FDI flows into the mining sector

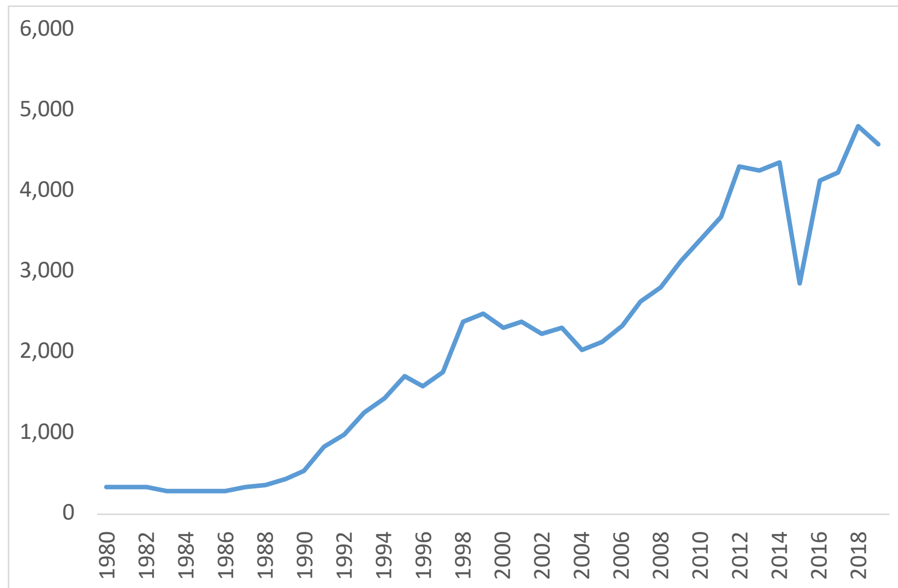


Source: Bloch and Owusu (2012); Twerefou et al. (2007)[8]

The reforms in the gold sector resulted in a gradual increase in gold production from 282,299 ounces in 1984 to about 373,937 ounces by the end of 1988. From 1988 the country experienced a consistent increase in gold production (Figure 5), mainly as a result of the increase foreign investments in the mining industry (Sutto-Pratt, 1996).

[8] The data in those papers was sourced from: Ghana Minerals Commission; Twerefou et al. (2007); Ghana Investment Promotion Centre (GIPC).

Figure 5: Gold production in Ghana over 1980-2018 (‘000 ounces)



Source: Ghana Minerals Commission

3. Institutional framework for the management of the gold mining sector

Over the years the government enacted a series of legal instruments to regulate the gold mining industry with the aim of maximizing the country’s benefits from mining. One of such initiatives was the establishment of the Minerals Commission of Ghana under the Minerals Commission Law (PNDCL.154) of 1986, which was later replaced with the Minerals Commission Act (Act 450) of 1993. The Commission has the responsibility of coordinating and developing policies for the mining sector and monitoring the implementation of policies by other government agencies. This section examines the institutional framework for the management of the gold mining industry, and the extent to which various laws and regulations have effectively helped to maximize the country’s benefits from the gold sector.

The legal and regulatory framework of Ghana’s mining industry was largely influenced by the country’s economic situation between 1983 and 1992. Almost all sectors of the economy, including the mining sector, were on the verge of collapsing, prompting the need for external capital to revamp key sectors of the economy. Thus, under the liberalisation agenda of the Structural Adjustment Programme of 1986, mining industry laws and regulations were enacted to make Ghana’s mining sector attractive to foreign investors.

The Minerals Commission Law of 1986 was passed with the goal of reducing the number of State agencies responsible for granting mining concessions in Ghana. This was later amended in 1993 by the Minerals Commission Act (Act 450). By this Act, the Commission was expected to recommend policies for the exploration and exploitation of mineral resources with specific reference to national objectives and priorities. The Commission also had the responsibility to monitor the implementation of various government policies on mining and bodies with linkages to the mining sector, to receive, examine, and negotiate leases as well as various public

agreements related to mining, and report to the Parliament. The enactment of the Minerals Commission Act reduced bureaucratic constraints to the acquisition and operation of mining licenses, notably by establishing a one-stop investment centre for mineral resources (Barning, 2005).

Since its establishment, the Minerals Commission has largely focused on attracting foreign investors with little effort made at developing local capacity in mining. It is therefore not surprising that over 82 percent of mining firms operating in Ghana are foreign owned (Adu, 2018), including the largest ones notably AngloGold Ashanti, Goldfields Ghana Limited, Newmont Ghana, Golden Star Resources, Redback Mining Limited, and Central Africa Gold.

As part of the 1986 Structural Adjustment Programme, the Government of Ghana developed the country's first and probably the very first consolidated mining regulation in Africa, the Minerals and Mining Law (PNDCL 153). This law provided several financial incentives to foreign mining firms to attract Foreign Direct Investment, notably generous investment and capital allowances and exemptions from customs duties for some equipment (Rutherford and Ofori-Mensah, 2011). The specific incentives provided by PNDCL 153 include the following:

1. Mining firms received exemptions from duties on machinery, plants and accessories imported for mining.
2. Staff of mining firms were exempted from income tax related to furnished accommodation at the mine site.
3. Expatriates were given a tax-free quota for outward remittances.
4. Mining firms were exempted from the alien employment tax under the Selective Alien Employment Tax Decree, 1973 (NRCD 201).[9]
5. Mining firms could apply for the deferment of the payment of registration and stamp duties up to five years.

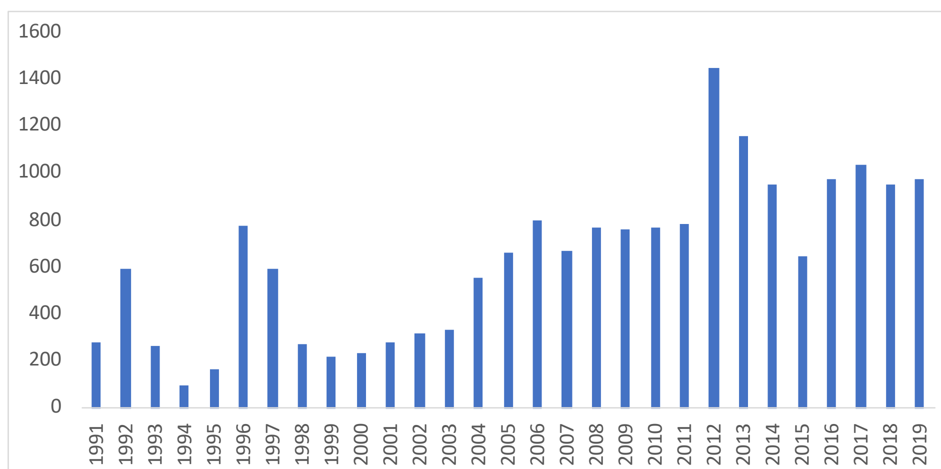
In addition to these incentives, the law also reduced corporate income tax and provided specific fiscal allowances to reduce the tax liability of mining firms (Akabzaa and Darimani, 2001). For instance, corporate tax was reduced from 55% in 1975 to 45% in 1986 and later to 35% by the end of 1994. The capital allowance (which was expected to help investors to recoup their capital expenditure) was also increased from 20% and 15% in the first and second years of operation in 1975 to 75% and 50%per annum in the first and second years of operation in 1986. The royalty payment rate was also reviewed to establish a sliding scale between 3% to 12% (Biney, 1998; Rutherford and Ofori-Mensah, 2011). Although the Mining Law officially allowed the government to secure up to 30 percent stake in mining firms, in practice the government kept its interest at just around 10 percent.

[9] A special tax imposed on expatriate workers in the private sector.

As part of reforms and the restructuring of the mining sector, the government enacted the Small-Scale Gold Mining Law (PNDC Law 218,1989), which gave authority to the Minerals Commission as the main supervisory body for small-scale mining.

Established during the recovery period, as part of the SAP, the Minerals and Mining Law provided substantial incentives to foreign mining companies, which aimed at improving the performance of the gold mining industry. These incentives contributed to increased flows of equity shares into existing firms as well as in the exploration of new gold mines. Investment inflows into the mining sector continued to grow at the start of the 21st century (Figure 6), driven by the increase in demand for gold in the world market as investors looked for alternative means to store their wealth in the context of loose monetary policy, the talks of Greece exiting in the European Union, the elevated sovereign debt of several advanced economies, and the need for emerging markets to diversify portfolios away from major currencies (Ghana Chamber of Mines, 2013).

Figure 6: Foreign direct investment flows in the mining sector (million US$)



Source: Aryee (2001); Barning (2005); Ghana Chamber of Mines

The implementation of the Minerals and Mining Law was lauded by the International Council on Mining and Metals (ICMM) and the World Bank for improving the performance of the gold industry, with production increasing by 800% between 1992 and 2007. Analysts noted, however, that Ghana failed to derive the full benefits of the growing participation of multinational companies and the influx of foreign direct investments in the mining sector (Hilson and Maconachie, 2008). Although mining firms produced over US$5.2 billion worth of gold between 1990 and 2002, reports from the Bank of Ghana indicate that the government received only US$68.6 million and US$18.7 million in royalties and corporate income tax, respectively (Bank of Ghana, 2003 as cited by Hilson and Nyame, 2006). Over time, the mining laws have clearly made gold mining more lucrative for foreign investors than for the country.

In addition to reducing corporate tax liabilities, the mining laws also allowed mining firms to retain most of the foreign exchange earned from gold exports in their home countries, arguably

to pay for mining equipment, spare parts of mining equipment, mining materials which were not readily available in the country, dividends, and remittances for expatriate workers (Campbell, 2009). Thus, most of the gold produced in Ghana between 1990 and 2000 was sold directly to refineries in Switzerland and the revenue accruing from such sales was held up in bank accounts there (Akabzaa and Darimani, 2001). Table 1 provide details of the share of export proceeds that individual companies were allowed to retain offshore, which varies substantially by firm, from a low of 45% (Associated Goldfields) to a high of 95% (Goldfields Gh Ltd).[10] It is not clear whether these large disparities reflect actual variations in the cost structure, or simply variations in negotiation abilities across firms.

Table 1: Percentage of export earnings authorized for retention offshore, 1990-2000

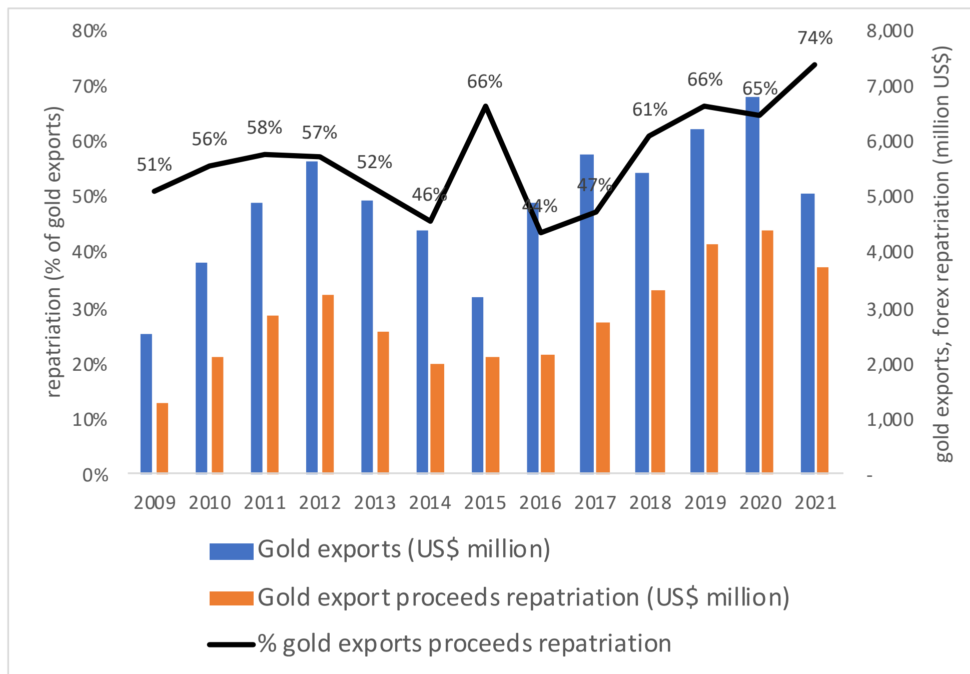
Firm	minimum	maximum
Associated Goldfields	25%	45%
Takoradi Goldfields	25%	45%
Ghana Australia Goldfields	55%	80%
Abosso Goldfields Ltd	55%	80%
Ghana Gold Mines Ltd	60%	69%
Goldfields (Gh) Ltd	60%	95%

Source: Akabzaa (2000)

Because of the long duration of mining agreements signed by foreign firms, and the binding nature of the clauses, mining firms continue to benefit from the privilege of holding portions of foreign exchange earnings from gold exports abroad. These contracts have prevented the country from realising the full benefits of its mineral resources. The actual amount of gold export earnings repatriated in Ghana varies substantially each year; it has been as low as 44 percent in 2016, with a peak of 74% in 2021 (Figure 7). This regulatory framework undermines the contribution of gold mining to the country's import capacity and minimizes the spill over effects of gold exploitation on the rest of the economy. Ultimately, the potential of the country's endowment in gold is never realized. In other words, the country is punching below its weight when it comes to leveraging is natural resource endowment in the case of gold. Hence, even though gold contributes about 41 percent of Ghana's total exports (average over 2016-2020), its contribution to GDP is only 2-6 percent due to its limited effects at the sectoral level and macroeconomic level.

[10] At the time of writing, the authors have not been able to access information on the post-2000 period.

Figure 7: Repatriation of forex earnings from gold exports[11]



Source: Authors' construction with data from the Bank of Ghana

Despite the inability of Ghana to derive the full benefits of FDI into the mining sector, other resource-rich African countries (including, DR Congo, Niger, etc.) followed the legal and institutional framework established by Ghana through the Mineral Commission Act and the Minerals and Mining Law with all the generous incentives to attract foreign firms into their mining industries. Thus, the adoption of Ghana's mining regulatory framework by other countries seems to have reduced Ghana's competitiveness in terms of attracting FDI into the mining sector. The government therefore amended the Minerals and Mining Law of 1986 and replaced it with the Minerals and Mining Act of 2006 (Act,703), with the aim of adjusting the clauses that seem to have made Ghana less competitive in attracting FDI while maintaining all fiscal incentives contained in it. The new law restricts the government's participation in mining firms to a maximum of 10 percent stake, one-third of the initial ceiling of 30 percent. The additional profit tax[12] which was imposed by the PNDCL 122 (1985) was also repealed. The new law further reduced the range of royalty payment rates from 3-12 percent to 3-6 percent.

Following concerns expressed by Ghanaian citizens regarding the unbalanced distribution of the gains from the country's natural resources, notably as companies systematically tend to pay the lower rate in the range, in the 2010 Budget Statement, the government replaced the range of royalty rates with a fixed royalty rate. The government engaged all mining firms in the country to address the challenges associated with dividend payment, tax and import duty exemptions and the entire fiscal regime governing the mining sector. The process culminated

[11] The percentage of export proceeds repatriation is simply the ratio of total foreign earnings repatriated by total gold exports obtained from the Bank of Ghana.

[12] This law imposed a 25 percent extra tax on profits over a certain level (like a windfall profit) (Rutherford and Ofori-Mensah, 2011).

in the amendment of the Mining Act and the enactment of the Minerals and Mining (Amendment) Act of 2010 (Act 794). The Act 794 abolished the sliding scale system of royalty payment and fixed the royalty rate at 5 percent across the board. These changes did not have an immediate impact on existing large scale mining firms due to the stability clauses in the agreements signed with the government in the past, which covered up to 15 years. Thus, changes in the law affect only new mining firms.

As part of efforts to increase national benefits derived from the booming gold sector in the early 1990s, the government legalised small scale mining through the Small-Scale Gold Mining Law (PNDCL 218, 1989), which was amended by the Minerals and Mining Act (Act 703). Small-scale mining was made the preserve of Ghanaians only, subject to obtaining a licence from the Ministry of Lands and Natural Resources. The law (PNDCL 218,1989) exempted small-scale miners from income tax and royalties for three years. Unlike the large-scale mining industry where firms are authorised to sell their gold anywhere they choose, small-scale miners could only sell their gold to authorised buyers (in most cases, the Precious Minerals Marketing Company). Unlike the laws that govern the large-scale mining industry (where mining firms can have a long-term license) small-scale miners are given a maximum five-year license which could only be renewed when various government agencies have verified that the small-scale miner has followed all laid-down procedures. The main laws are presented in Table 2.

Ultimately, the mining laws provide greater incentives to mining firms that operate in large-scale mining, which are predominantly foreign, relative to companies which are in small-scale mining which are all domestic. This is because most of the incentives in the mining industry have been structured around the size of the investment. This creates an environment where foreign firms (which are able to raise the required capital threshold to trigger these incentives) benefit more than their domestic counterparts. Moreover, unlike large scale firms that can sell directly to firms outside the country, small-scale gold mining firms can only sell their gold to a licensed gold buying firm in Ghana. The difficulty in acquiring a small-scale mining license, coupled with the inability of small-scale mining entities to sell the gold they produced freely, has resulted in an expansion of illegal small-scale mining across the country and illegal export of gold (Adu-Baffour et al., 2021). In a symposium organised on illegal gold mining in January 2018, the President of Ghana pointed out discrepancies in gold trade statistics between Ghana and the United Arab Emirates (UAE). This, he noted, came to the attention of the government after a visit by a Senior Minister to the UAE. While the UAE's indicated that it had imported US$7 billion worth of gold from Ghana in 2017, Ghana's official records showed only US$2 billion dollars of gold exports to the UAE (Citinews, 2018; Nwokolo, 2019). The statistical discrepancies in gold exports and imports are examined in detail in Section 7.

Table 2: Major mining laws and regulations in Ghana

Law/Regulation	Date/Period	Key elements (objectives)
Concessions Ordinance	1900	To secure land entitlements for European firms as their concessions for mining activities
Mercury Ordinance	1932	Made it illegal for the natives to have access to mercury (the raw material used in the extraction of gold)
Minerals Act (Act 123)	1962	To enhance Government control over the mining industry. It also made all mineral resources in Ghana the property of the Government of Ghana.
Mining Operations Decree (NRCD 132)	1972	Allowed the Government of Ghana to own 55% shares in all mining firms in Ghana.
PNDCL 154/Act 450	1986/1993	To provide one-stop investment centre for all mining related investments to reduce the burden of bureaucratic processes associated with the acquisition and operationalisation of mining licenses.
PNDCL 153	1986	Ghana's first consolidated mining code which provided a range of incentives to attract Foreign Investors into Ghana.
Act 703	2006	To address the lack of competitiveness of Ghana in attracting FDI to the mining sector.
PNDCL 218	1989	To legalise small-scale gold mining activities in Ghana.

Source: Authors' compilation from government records

4. Foreign companies in the gold sectors

Between 1957 and 1983, Ghana's mining industry was largely dominated by state mining companies. The implementation of the Economic Recovery Programme and the Structural Adjustment Programme in the 1980s resulted in a shift from state led mining to private sector led mining as part of the general effort to liberalise the Ghanaian economy. This shift resulted in foreign firms dominating the mining industry, especially large-scale mining that requires lar capital investments. Today Ghana's mining industry is dominated by firms that originate from the USA, Canada, Australia, South Africa and more recently from China (United State International Trade Administration, 2022). It is important to note, however, that by the mineral laws of the country, the Government of Ghana is automatically entitled to 10 percent of the equity interest in mineral operations by any firm without any form of financial contribution or commitment by the government.

Currently there are 11 large-scale mining firms with some having subsidiary firms in the same industry. Table 3 presents the nationality and ownership structure of gold mining firms. Goldfields Ghana Limited, AngloGold Ashanti and Newmont Ghana Limited which are all foreign owned mining companies operate at least two different mining concessions in the country.

Table 3: Gold mining firms: nationality and ownership

Firm	Company's nationality (country of majority shareholder)	Ownership (private or public)
Abosso Goldfields Limited	South Africa	Public
Adamus Resources Limited	Ghana	Private
AngloGold Ashanti (Ghana) Limited	South Africa	Public
AngloGold Ashanti (Iduapriem) Limited	South Africa	Public
Asanko Gold Ghana Limited	Canada	Public
Chirano Gold Mine Limited	Canada	Public
Gold Fields Ghana Limited	South Africa	Public
FGR Bogoso Prestea Limited	Britain	
Golden Star (Wassa) Limited	China	Public
Newmont Ghana Gold Limited	America	Public
Newmont Golden Ridge Limited	America	Public
Perseus Mining (Gh)Limited	Australia	Public
Prestea Sankofa Gold Ltd	Ghana	Private (owned by GNPC)

Source: Authors' compilation from various sources

Abosso Goldfields Limited (AGL) is owned by Goldfields Limited, a South African based mining firm. Goldfields Limited owns about 71 percent shares in AGL, whilst IAMGold, an American firm based in Ontario owns 18.9 percent of the total shares of AGL with the remaining 10 percent owned by the Government of Ghana. Although AGL has operated in the country since 1882, Goldfields Limited obtained a mining lease in 1995 and began operation in 1997. AGL accounts for 9.4 percent of the total gold produced by large-scale mining firms in the country. Goldfields Ghana Limited also has mining leases in Damang and Takwa in the Western Region of Ghana. Goldfields owns 90 percent of the shares in each of the two mining concessions whilst the Government of Ghana owns 10 percent. These two gold mines accounted for about 19 percent of total gold produced in 2021. Apart from these mining concessions which are wholly owned by Goldfields Ghana Limited, it is also joint owner of Asanko Gold Ghana Limited, a mining firm with concession at Manso Adubia in the Ashanti Region of Ghana. They jointly own this concession with Galiano Gold, a US-based gold mining firm. The Government of Ghana still owns 10 percent of the total shares whilst each of the two firms own 45% of the shares. Gold production by Asanko Gold Ghana Limited accounts for a little over 9 percent of total gold produced in 2021. Thus, including all its four mining concessions (including the one jointly owned with Galiano Gold), Goldfields accounted for over 36 percent of total gold produced in 2021.

Other important players in Ghana's mining industry are Newmont Ghana Gold Limited and Newmont Golden Ridge Limited, which are both owned by Newmont Limited, an American based mining firm (note that the Government of Ghana owns 10 percent shares in these two companies by law). Newmont Ghana Gold Limited and Newmont Golden Ridge Limited accounted for about 18 percent and a little over 14 percent of the total gold production in 2021, respectively, meaning 32 percent for Newmont. This clearly shows that gold production in Ghana is dominated by two main foreign firms, Goldfields and Newmont, which together account for nearly 70 percent of the total gold produced by large-scale mining firms.

Although AngloGold Ashanti used to be a major player in Ghana's gold mining industry, the closure of the Obuasi gold mine in 2014 (which was their main production point) reduced its share in the industry significantly. Despite the resumption of production in 2019, the firm is yet to reach its pre-closure production levels. Apart from the Obuasi mine, AngloGold also operates in Iduapriem (a mining concession formerly owned by Ghanaian-Australian Goldfields Limited) in the Western Region. Production of gold by South African Companies – Abosso Goldfields Limited, AngloGold Ashanti (Ghana) Limited, AngloGold Ashanti (Iduapriem) Limited and Gold Fields Ghana Limited – accounted for about 40 percent of total gold produced in Ghana for the year 2021. This was followed by American owned Newmont Ghana Limited with about 33 percent of total gold produced. Ghanaian owned mining firms accounted for just about 2 percent of the total gold exported in 2021 (Table 4). The data clearly shows that Ghana's mining industry is firmly in the hands of foreigners.

Table 4: Share 2021 of gold exports by company's nationality

Exporting companies' origin	Share of gold export
South Africa	39.6
America	32.6
Canada	13.2
China	5.8
Australia	5.5
Ghana	2.3
Britain	1.0

Source: Ghana Minerals Commission

5. Taxation of gold mining in Ghana

This section discusses the tax regime that governs the gold mining industry in Ghana with a focus on the collection of taxes and royalties.

The fiscal regime governing the mining industry in Ghana is quite generous, with an explicit objective of attracting private investors into the sector. In fact, the tax laws and other provisions of the fiscal regime generally benefit the private sector at the expense of the Ghanaian economy (Ayee et al., 2011). For example, until 2010 mining firms paid the minimum royalty of 3% of gross revenue and until 2012 mining firms paid the same corporate tax rate of 25 percent just as firms operating in other sectors of the economy. According to a report by the Price Waterhouse Coopers (2010), the average corporate tax rate in the mining industry across countries is about 40 percent. Clearly, the tax regime operated in Ghana is on the lower end of the corporate tax spectrum from a global perspective.

The depreciation rule which is embedded in mining agreements has been quite generous as well. While it is reasonable to provide accelerated depreciation on the capitalised value of prospecting, exploration and development costs, Ghana has extended this rule to all assets including buildings, machinery, and equipment (Ayee et al., 2011). The generosity of the fiscal regime extends to giving income tax exemptions on furnished accommodation to company staff

on site as well as concessionary tax rates for overtime income. Moreover, even when gold prices reach record highs, the contribution of gold mines to tax revenue does not increase proportionally. The generous depreciation laws together with other incentives were expected to attract foreign direct investment into the mining industry in a competition with other resource-rich African countries. Whether this works in practice remains an empirical question worth investigating.

Corporate profit tax and royalty in the mining sector

Corporate profit tax and royalty are the two main revenue collecting instruments used in the gold mining industry in Ghana. Whereas profit tax feeds directly into government revenue streams, royalties are primarily meant to compensate local communities affected by mining operations. Prior to 2010, the effective royalties paid by mining firms were largely based on the profitability of their operations, as measured by the operating ratio, which is the ratio of the operating margin (i.e., obtained by subtracting operational costs from total revenue) to total revenues. In case the operating ratio was less than 30 percent, then the royalty was set at 3 percent. Thus, mining firms took advantage of this specific loophole to maintain the effective royalty payment at 3 percent, half the maximum rate of 6 percent as provided in Minerals and Mining Act of 2006. They specifically reported high operational costs to reduce taxable profits (see Ofori-Mensah and Rutherford, 2011).

Operational costs include current expenditures (which includes the cost of transporting, processing, and sale of gold) as well as capital allowances and interest payments for the year. The inclusion of capital allowances and interest payments significantly increased costs, reducing the profit margin below the 30 percent threshold for the payment of 3 percent royalty. Furthermore, mining firms could push forward excessive operating costs into future years, which contributed to substantially reduce the overall collection of royalties. This practice enabled mining firms to remain below the 30 percent threshold even during periods of high gold prices and windfalls in the gold mining industry (Ayee et al., 2011).[13] The continued exploitation of loopholes in the mining Act meant that no gold mining firm in the country effectively paid any royalty above 3 percent. This was the main motivation for the amendments in the Mining Act in 2010 which fixed royalties at a flat rate of 5 percent of total revenue earned from gold production. The amendments eliminated the uncertainty associated with the payment of royalties and made the process relatively more transparent. The existence of various stabilisation clauses in mining agreements between the government and mining firms means that this change does not have effect on mining firms that were operating before the amendment as some of these stabilisation clauses last up to fifteen years[14](Ofori-Mensah and Rutherford, 2011).

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[13] The authors were informed that the carry forward of losses is an economy-wide practice (comment from experts from the Chamber of Mines).

[14] In a recent interview (in April 2022), an official of Ghana's Minerals Commission indicated that the Minerals Law is expected to be amended to reduce the stabilization clause to just five years. At the time of writing, information on when that amendment is likely to happen was not available.

Apart from the payments of royalties to the government, mining firms are required by law to pay corporate income tax of 25 percent as applied to firms operating in other sectors. Gold mining firms are allowed to carry losses forward for up to five years just as firms in other sectors of the economy. Mining firms received additional concessions such as the accelerated depreciation which allowed a rate of 80 percent of assets in the first year, then 50 percent in the subsequent years. Moreover, five percent of the cost base of the firm is added to its recorded value of assets during the second year prior to any granting of depreciation allowance in the year (Ayee et al., 2011). Effectively, investors could recover up to 105 percent of their investment costs. To reduce the loopholes in the mining tax regime, the government raised the corporate income tax rate for mining firms from 25 percent to 35 percent in 2012. In addition to the increase in the tax rate, the government also imposed a uniform capital allowance rate of 20 percent on mining assets which is based on the straight-line method for a period of five years (Minerals Commission, 2012).

Mining firms also get additional incentives for employing fresh graduates from a Ghanaian university: tax deductions of 10%, 30% and 50% of fresh graduates' salaries and wages in the situation where the fresh graduates comprise up to 1%, more than 1% but less than 5% and more than 5 percent of the workforce, respectively.

Mining firms are also given a concessionary rate for custom duties on plant and equipment that are imported exclusively for the purpose of mining based on a mining list approved by the Ministry of Finance. It is important to note that royalties paid by mining firms are tax deductible. The provision on retention of a portion of export proceeds in external accounts to finance the purchase of inputs is still in place.

In addition to these general tax incentives that apply to all firms in the gold mining industry, per the Minerals and Mining Act, 2006 (Act 703) the government signs specific agreements with individual mining firms under special circumstances.[15] For instance, to get AngloGold Ashanti Ghana (AGAG) to reopen its operations in Obuasi after it closed in 2014, the government provided incentives and concessions to the firm in 2018 to start operations in 2019. AGAG received a reduction of corporate income tax from 35 percent to 32.5 percent, withholding tax from 10 percent to 8 percent over the concession period which is expected to end in 2027, a waiver of import duties for all goods (including plants and machineries), a refund of VAT, and special arrangements for the payment of royalties, which were pegged against the movement of gold prices rather than the firms' gross revenue as indicated in the amended Mining Act of 2010 (see Table 5).

[15] A minimum threshold of $500 million of investment is required for a firm to qualify for these tax incentives.

Table 5: Payment of royalty based on gold price

Gold price per ounce[16]	Royalty rate
Up to US$1,300	3%
US$1,300 to US$1,449.99	3.5%
US$1,450 to US$1,749.99	4%
US$1,750 to US$1,999.99	4.5%
US$2,000 and above	5%

Source: Tax Concession Agreement (2017)

Ghana and other resource-rich countries across Africa engage in tax competition to give foreign investors the best tax deals to attract them into the mining sector. Otoo (2019) argues that there is no need for fiscal concessions in the natural resource sector where it is almost certain that investment will occur. The author maintains that multinational corporations would only mine gold where there is gold, hence there is no need for large tax incentives to be profitable. He concluded that investors end up gaining more at the expense of the citizens. A study by Andoh and Cantah (2020) on tax obligations and foreign direct investment revealed that when it comes to the natural resource sector, investors tend not to care about the amount of tax they pay, given the high profitability in the sector.

Apart from the tax incentives enjoyed by mining firms, foregone tax revenue may arise from discrepancies in the reporting of gold production and export values. This puts a heavy premium on the technical capacity of government agencies in charge of overseeing gold production and export processes, notably Customs, Excise, and Preventive Services (CEPS) and the Precious Minerals Marketing Company (PMMC).[17] In an interview with CEPS officers attached to gold mining companies, Ayee et al. (2011) found out that these officers were not present in the bullion rooms of these mining firms to authenticate the shipment documents; they are contacted to validate the records only at the time of sealing the boxes for exports. Interestingly, mining firms get the value of gold from refineries outside Ghana to determine royalty payments. This poses a challenge of independent verification of the weight and quality of gold exported, making it difficult for the Large Taxpayer Office of the Ghana Revenue Authority to monitor production figures and assess profit tax liability and royalty payments. Another challenge is the ability of the Large Taxpayer Offices to verify the cost of mining operations accurately and systematically, cashflow and market prices reported by firms, as these items are essential for the assessment of profit tax.

The loopholes in the tax administration system, the various agreements signed by the government with mining firms as well as various 'underground' dealings of mining firms (Ayee et al., 2011) have prevented the country from reaping the expected benefits from mining

[16] As determined by the London Bullion Market Association

[17] Precious Minerals Marketing Company (PMMC) is the authorised body, legally permitted to grade, assay, value, process buy and sell precious minerals and to license agents in Ghana (https://www.pmmc.gov.gh/).

activities. A study by Albertin et al. (2021) revealed that payments of royalties and corporate taxes constituted about 40 percent of total payments from the mining sector. The study found that in Ghana, taxes on mining companies' goods and trade (i.e., exercise tax, customs duties, and exports taxes) were less than 15 percent of total payments from the mining industry. This is one of the lowest earnings in terms of taxes on goods from the mining sector in Africa (Albertin et al. 2021). About 38 percent of total payments came from payments received from state participation as shareholders in various mining companies. The evidence suggests that over the years Ghana has recorded the lowest mining revenue to GDP in Sub-Saharan Africa at less than one percent on average over the 2010-2016 period. Average mining revenue as a percentage of government's total revenue was below 3% during the same period, which was one of the lowest recorded in sub-Saharan Africa (Albertin et al., 2021).

6. Contribution of gold mining to the Ghanian economy

Gold mining accounts for about 95 percent of Ghana's mineral revenue (United States International Trade Administration, 2022), clearly underscoring the potential importance of the sector for the country's economic development. This section examines how the gold mining sector has performed over the recent past in terms of production and contribution to exports, GDP and employment.

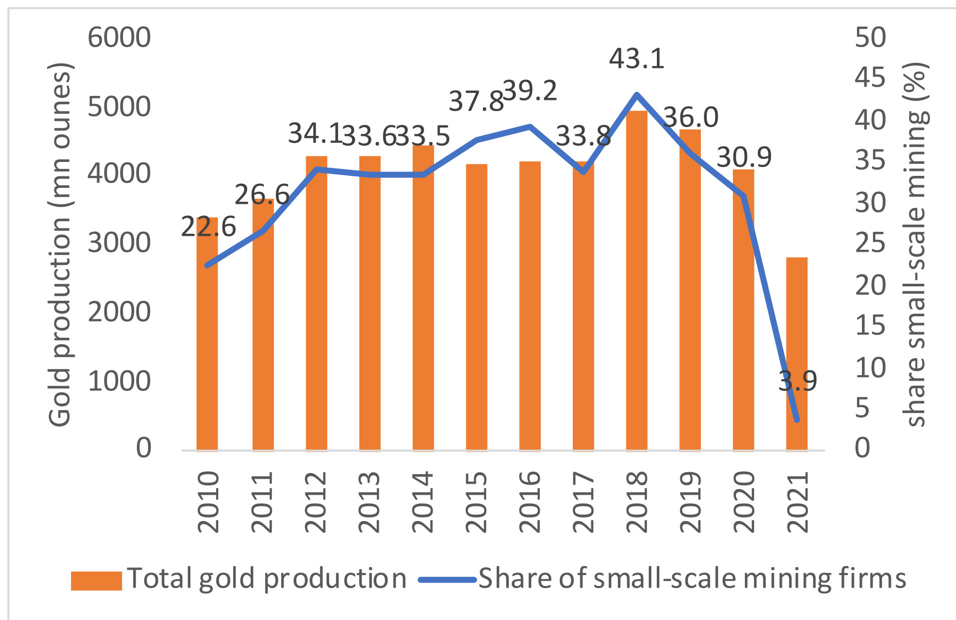
Gold production and employment in Ghana over the last decade

Between 2010 and 2021 Ghana produced 49.2 million ounces of gold, with over 67 percent being produced by foreign-owned large-scale mining firms. The rest (32 percent or 15,978,548 ounces) was produced by small-scale mining firms that are largely owned by Ghanaians. The quantity of gold produced by small-scale mining firms as a share of total gold produced rose consistently, peaking at 43.1 percent in 2018. However, following the government's fight against illegal mining (popularly, known as *galamsey*), production by legally registered small-scale mining firms declined. This was partly due to the inability of officials in charge of "operation vanguard" (the main operation to stop illegal mining activities) to differentiate between legal and illegal small-scale gold miners. This contributed to the reduction in the production share of the small-scale mining sector from 43 percent to 31 percent by the end of 2020. Table 6 presents production by individual large-scale mining firms as well as small-scale mining firms as a group over the 2010-2021 period.

The country witnessed a decline in gold production between 2019 and 2021, due to a reduction in production by small-scale mining firms by 21.2% and 24.7% in 2019 and 2020, respectively (see Figure 8). This was largely a result of the fight against illegal mining which affected the production activities of legally registered small-scale mining firms. The COVID-19 pandemic also contributed partly to reduction of production by large-scale mining firms in 2020. [18]

[18] Experts from the Chamber of Mines brought to our attention the introduction of a 3% withholding tax on the gold output as a potential factor of the decline in ASGM production in 2020. They also note a ban in small-scale gold production in 2018.

Figure 8: Gold production: total and share of small-scale mining



Source: Authors construction using data from the Minerals Commission

Table 6: Gold production (thousands of ounces) by firm over 2010-2021

Firm	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Abosso Goldfields Limited	227.8	217.7	166.4	153.1	177.7	167.6	147.7	143.6	180.9	208.5	223.0	254.4
Adamus Resources Limited		88.0	103.7	103.2	106.4	110.3	87.4	115.6	103.7	84.2	70.6	60.9
AngloGold Ashanti (Ghana) Limited	316.6	312.6	280.1	239.0	287.8	51.5	3.1				128.3	106.9
AngloGold Ashanti (Iduapriem) Limited	185.5	199.0	180.2	212.5	187.6	190.8	214.2	227.8	253.5	274.7	274.5	201.7
Asanko Gold Ghana Limited							163.5	205.0	223.2	251.0	249.9	210.2
Chirano Gold Mine Limited	240.2	261.9	292.5	274.7	285.8	255.4	211.4	245.5	226.4	201.0	166.3	154.4
Gold Fields Ghana Limited	735.0	718.6	718.9	632.2	558.2	586.1	568.0	566.4	524.9	519.1	509.0	521.7
FGR Bogoso Prestea Limited	171.0	139.5	172.1	145.0	148.0	119.1	90.9	130.0	75.2	48.5	29.8	28.0
Golden Star (Wassa) Limited	183.9	160.6	161.0	185.0	112.8	108.3	104.4	137.2	144.4	156.2	167.6	155.4
Med Mining Company	1.9	1.2	1.5	0.8	0.4	0.5						
Newmont Ghana Gold Limited	545.3	566.3	561.4	570.2	442.0	331.5	348.9	344.5	436.1	643.1	480.2	479.7
Newmont Golden Ridge Limited				129.2	471.7	472.6	470.3	473.4	419.3	418.6	371.5	389.0
Perseus Mining (Gh)Limited		12.7	193.9	202.4	182.0	191.5	151.0	206.0	220.9	180.7	153.9	146.4
Prestea Sankofa Gold Ltd	17.2	18.9					5.1					
Small scale mining firms	***767.2***	***978.6***	***1464.8***	***1441.5***	***1489.7***	***1573.2***	***1656.8***	***1424.4***	***2130.2***	***1679.2***	***1264.0***	***109.0***
TOTAL	**3391.6**	**3675.6**	**4296.4**	**4288.9**	**4450.1**	**4158.3**	**4222.7**	**4219.5**	**4938.5**	**4664.8**	**4088.7**	**2817.8**
Share of small-scale mining firms	22.6	26.6	34.1	33.6	33.5	37.8	39.2	33.8	43.1	36.0	30.9	3.9

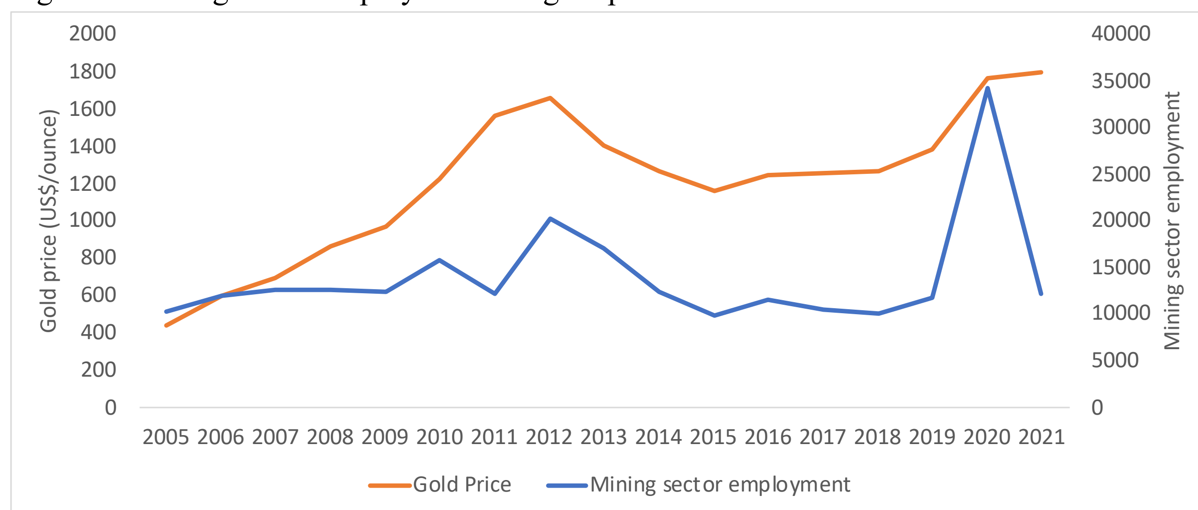
Source: Ghana Minerals Commission

Employment in the gold sector

The gold mining sector contributes very little to employment in the country, and most of it is in the informal and small-scale sub-sector due to its labour-intensive nature. According to a study by Baah-Boateng (2018), the mining sector accounts for about 1% of total employment in Ghana. The sector employs about 120,000 people, although some government documents put the figure at 500,000 (Baah-Boateng, 2018). Out of this figure, the small-scale mining industry (which is largely informal) employs over 73 percent of workers in the sector. It is important to note that most workers in the informal sector do not have any form of contract and are laid-off whenever a firm wishes without any form of severance package. Thus, most mining sector workers are in vulnerable employment.

Large-scale mining firms employed about 15,427 workers between 2010 and 2020 – of which 98% are Ghanian – with employment peaking in 2020 at 35,000 (Chamber of Mines data). Historical data shows a strong correlation between employment in the large-scale mining industry and gold price in the world market. Periods of high gold prices tend to be associated with high rates of employment in the mining industry (Figure 9). When world prices of gold increase, firms in the large-scale mining sector tend to employ more workers to increase their production to cash in on the rising market prices to increase their profitability. Note that following a seemingly outlier spike in 2020 from 11.9 thousand to 43.3 thousand), employment in the sector reverted to its trend in 2021 (12.2 thousand workers).

Figure 9: Mining sector employment and gold price movements



Source: Chamber of Mines and Bank of Ghana

Contribution of the gold mining to exports

Over the last decade, large-scale mining firms have accounted for over 75 percent of total gold exports from Ghana (Table 7). Interestingly, the share of small-scale mining firms in total gold exports is relatively lower than their share in total production. Whereas the average share of small-scale mining firms in total gold production averaged over 31 percent of total production, their share in total exports averaged 24.6 percent. This difference could be attributed to two

main factors. First, there may be a lag between end-year production and export values. Second, small-scale mining firms may not sell all the gold produced to the Precious Mineral Marketing Company (PMMC) and other licensed gold buying companies as required by law, but through informal illicit channel.

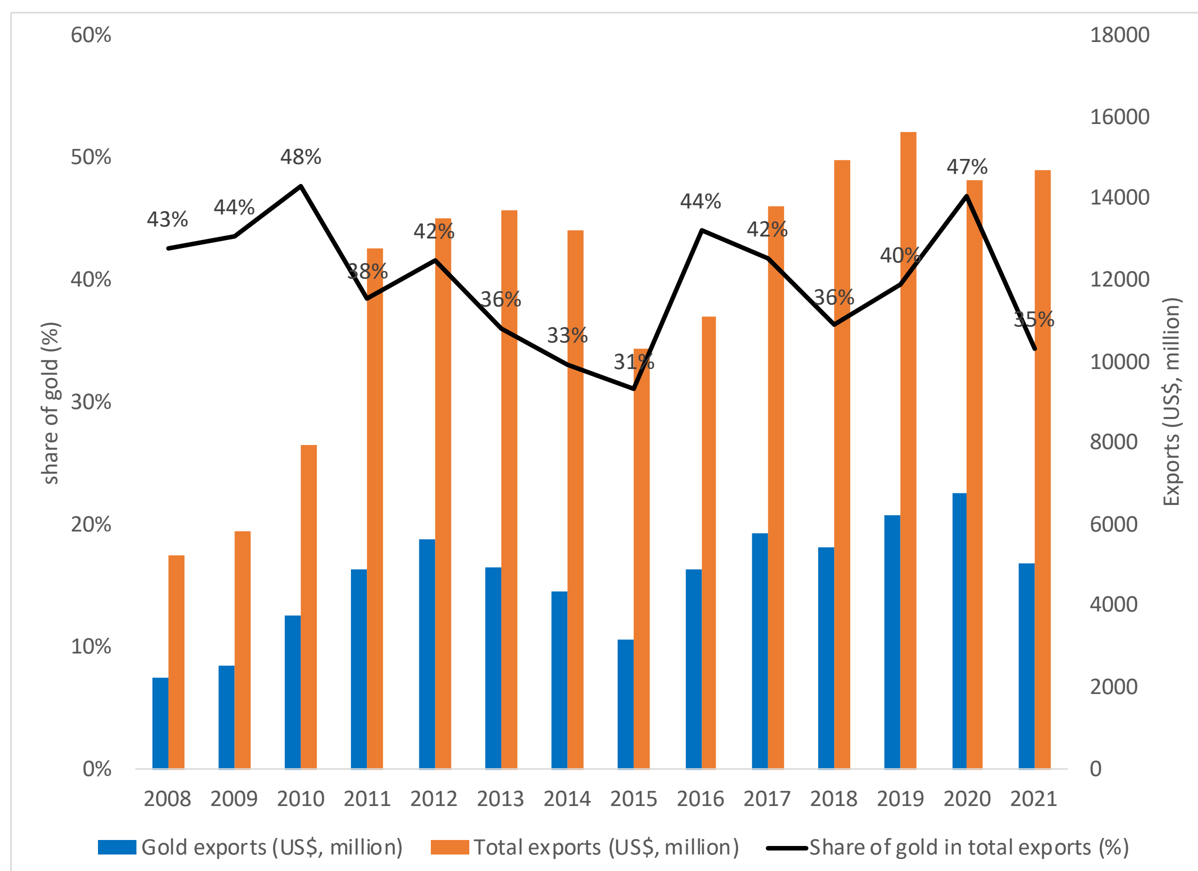
Table 7: Gold export, production and price (2010-2020)

Year	Production by LSF (thousands of ounces)	Export by LSF (thousands of ounces)	Price (in US$)	Exports by LSF (in US$ million)	Exports by SSF (US$ million)	Total export (US$ million)	Share of SSF in exports
2010	2,624.4	2,596.7	1,224.5	3,179.7	623.8	3,803.5	16.4
2011	2,697.0	1,944.5	1,572.5	3,057.7	1,855.2	4,912.9	37.8
2012	2,831.6	2,633.8	1,668.4	4,394.2	1,249.1	5,643.3	22.1
2013	2,847.4	2,803.0	1,411.5	3,956.4	1,009.3	4,965.7	20.3
2014	2,960.4	3,052.7	1,266.8	3,867.0	521.1	4,388.1	11.9
2015	2,585.1	2,566.6	1,160.6	2,978.7	233.9	3,212.6	7.3
2016	2,565.9	2,563.9	1,248.1	3,200.1	1,719.4	4,919.5	35.0
2017	2,795.2	2,808.0	1,258.4	3,533.6	2,252.5	5,786.2	38.9
2018	2,808.4	2,794.1	1,269.3	3,546.7	1,889.0	5,435.7	34.8
2019	2,985.6	2,964.5	1,296.6	3,843.7	2,385.8	6,229.5	38.3
2020	2,824.7	2,803.9	1,767.5	4,956.0	1,862.2	6,818.1	27.3
2021	2,708.8	2,663.4	1,800.0	4,794.1	289.1	5,083.2	5.7

Source: Minerals Commission (2022), Bank of Ghana (2022).
Note: LSF = large scale mining firms; SSF = small scale mining firms

Over the last two decades, gold exports have been a major contributor to Ghana's export earnings despite the discovery and production of oil in commercial quantities. Between 2010 and 2020 gold exports accounted for close to 40 percent of Ghana's total export earnings. In 2020, gold exports accounted for close to 47 percent of Ghana's total merchandised exports (Figure 10). The high share of gold exports in total exports puts the country in a vulnerable position, as a reduction in gold production or price has serious implications for the foreign exchange earnings.

Figure 10: Gold exports and total exports, 2010-2020



Source: Authors' construction using data from the Bank of Ghana

In analysing the data on gold, it is important to note that there is a major difference between the volume of gold exports and the amount of the country's earnings in foreign exchange from gold trade. Gold exports are dominated by large-scale mining firms which enjoy agreements that entitle them to keep portions of the gold export revenue in foreign bank accounts (see Table 1 in Section 3). There may be, therefore, a disconnect between the volume of gold exports and additions to the country's stock of foreign exchange reserves. Moreover, the domination of the sector by foreign-owned firms puts the country in a vulnerable position when a firm decides to wind-up its operations in the country. This is possibly one of the reasons why the government gave AngloGold Ashanti so much tax incentives to resume operations at their Obuasi mines.

Contribution of gold to GDP

Over the last decade, the contribution of the gold mining industry to GDP in Ghana has averaged GDP 6.8 percent, recording its highest contribution of 8 percent in 2014 (Table 8). The gold mining industry itself accounts for an average of 15-24 percent of the total value added from the mining and quarrying sub-sector.

Table 8: Contribution of gold mining industry in Ghana

	Contribution of gold to GDP	Contribution of gold to mining and quarrying	Contribution of gold to industry
2013	7.1	54.1	19.8
2014	8.0	51.6	21.4
2015	6.5	64.0	19.2
2016	7.1	85.4	23.7
2017	6.4	59.6	19.9
2018	7.1	51.8	21.2
2019	7.0	49.4	21.1
2020	7.6	67.3	24.0
2021	4.5	45.9	15.1

Source: Ghana Statistical Service

Data from Ghana Chamber of Mines indicates that the mining sector contributed 17.4 percent of total revenue over the 2010-2020 period, with the highest ratio recorded in 2011 at 27.6 percent of total revenue (Table 9). Most of the revenue earned from the mining industry comes from corporate taxes which on average accounts for over 48 percent of total taxes paid by the industry. Mineral royalties accounted for an average of 28 percent of total tax revenue from the mining industry.

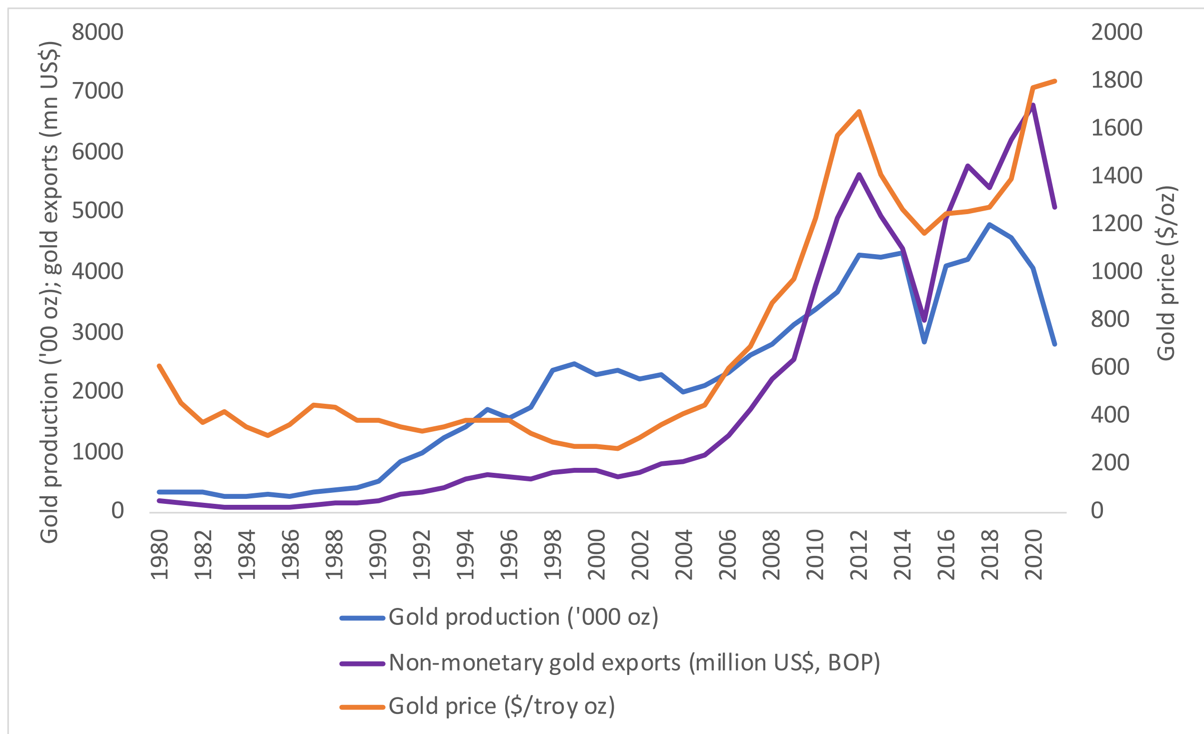
The data shows a positive relationship between the long-term trends of gold exports, gold price and tax revenue from gold mining (Figures 11 and 12). This indicates that the country has the potential to cash in on international commodity booms, to the extent that the fiscal regime is effectively set up to achieve this objective. In practice, however, the leniency of the mining tax regime through generous individual firm agreements compromises the country's ability to achieve its potential tax revenue mobilization from the mining sector. This is exacerbated by the fact that besides foregone tax revenue through tax incentives, the country also fails to leverage its gold endowment to mobilize foreign exchange earnings as part of it is held offshore by foreign-owned large-scale mining firms that dominate the sector.

Table 9: Contribution of mining to tax revenue

	Corporate tax (million, Ghana Cedis)	Mineral royalties (million, Ghana Cedis)	PAYE (million, Ghana Cedis)	Total mining tax (million, Ghana Cedis)	Total IRS (GRA) (million, Ghana Cedis)	Share of mining revenue in total revenue	Gold price (US$ per ounce)
1990	0.3	0.2		0.5	5.3	8.9	383.7
1991	0.1	0.3		0.4	6.2	6.3	362.3
1992	0.1	0.5		0.5	7.5	6.7	343.9
1993	0.4	0.8	0.3	1.5	11.3	12.8	360.1
1994	0.7	1.3	0.5	2.5	16.7	14.9	384.2
1995	2.0	2.1	0.8	4.9	27.6	17.9	384.1
1996	0.9	3.6	1.7	6.2	42.5	14.5	387.7
1997	1.0	3.5	2.5	7.0	60.6	11.5	331.0
1998	1.5	5.0	3.1	9.5	78.5	12.1	294.1
1999	3.1	4.9	2.8	10.8	90.2	11.9	278.9
2000	1.6	11.9	5.9	19.4	140.9	13.8	279.3
2001	2.5	12.7	7.6	23.3	195.0	11.9	271.2
2002	2.4	15.4	10.2	30.5	275.8	11.1	310.1
2003	6.8	19.4	14.1	42.0	382.4	11.0	363.8
2004	10.0	21.6	13.4	48.7	533.3	9.1	409.5
2005	27.0	23.6	19.4	72.3	644.6	11.2	445.0
2006	40.4	31.6	21.7	74.8	733.4	10.2	604.3
2007	47.4	40.9	34.6	123.0	901.2	13.7	696.4
2008	73.6	59.0	47.1	180.0	1222.3	14.7	872.4
2009	124.6	90.4	103.1	319.0	1731.6	18.4	973.7
2010	241.6	144.7	132.5	519.7	2441.3	21.3	1226.7
2011	649.9	222.0	161.8	1034.2	3746.0	27.6	1573.2
2012	893.8	359.4	207.5	1461.2	7461.2	19.6	1668.9
2013	518.6	364.7	220.1	1104.1	5900.1	18.7	1409.5
2014	441.2	470.4	259.5	1172.1	7622.6	15.4	1266.1
2015	463.1	137.7	404.7	1354.4	9091.5	14.9	1158.9
2016	697.0	550.7	399.9	1648.2	10425.1	15.8	1251.9
2017	970.0	702.4	488.0	2298.5	19637.8	11.7	1260.4
2018	1199.6	705.3	457.2	2499.7	24442.9	10.2	1268.9
2019	2269.8	1006.7	736.3	4013.4	21838.4	18.4	1393.3
2020	2139.23	1391.24	641.87	4172.89	23022.9	18.12	1773.73

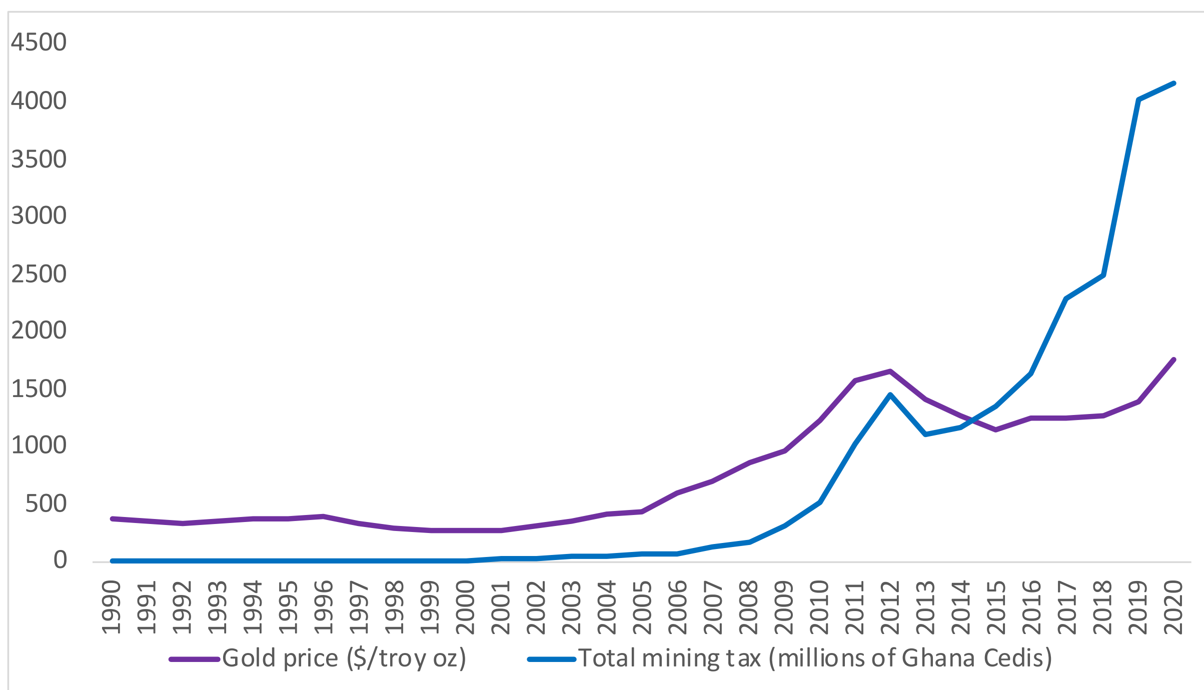
Source: Ghana Revenue Authority

Figure 11: Gold production, exports and prices



Source: Balance of Payments (exports); Mining Commission (gold production); World Bank Pink Sheets (gold price).

Figure 12: Gold price and mining tax revenue



Source: Ghana Revenue Authority (tax); World Bank Pink Sheets (gold price)

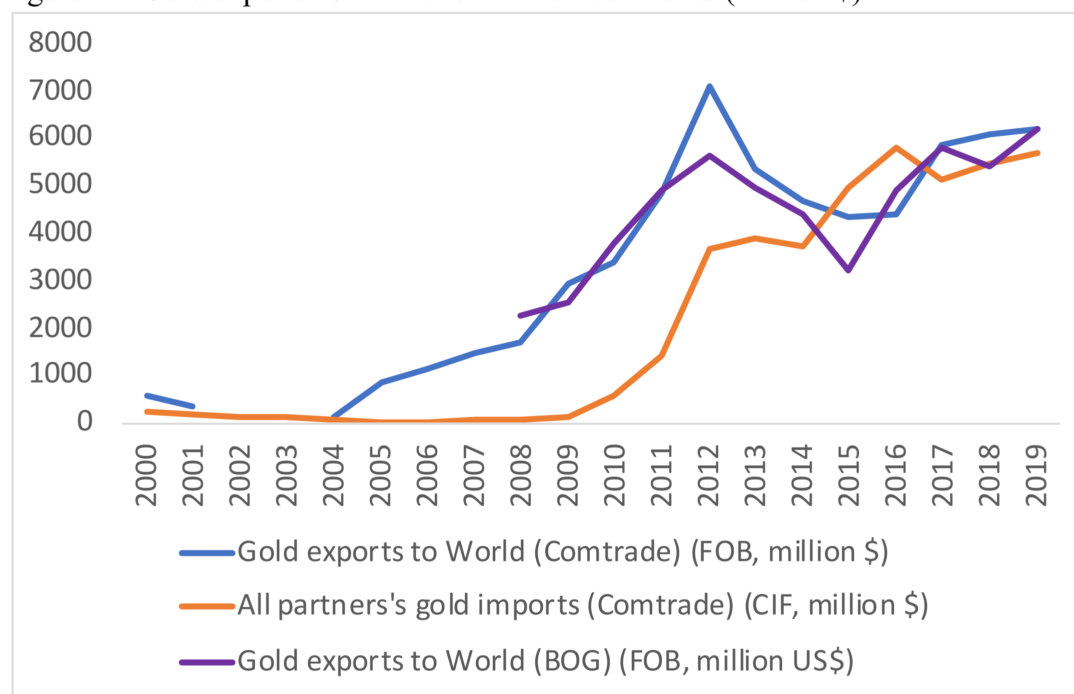
7. On the 'gold trail': opaque gold export statistics and export misinvoicing

This section examines gold trade statistics with a view to shed light on potential signs of export misinvoicing, which is an important channel of capital flight. The analysis begins with a comparison of the trend of gold exports as recorded by Ghana and gold imports from Ghana as recorded by its partners. This is followed by a statistical estimation of trade misinvoicing by incorporating the cost of insurance and freight in comparing exports and imports, focusing on the most important trading partners.

Disparities in gold trade statistics

The analysis of gold trade statistics reveals substantial discrepancies between the value of exports as recorded on the Ghana side in the Comtrade database and the value of imports as recorded on the side of Ghana's trading partners. The data plotted in Figure 13 show a large gap from 2004 to 2014, suggesting strangely that Ghana sold more gold than its partners bought from it! This is even more counterintuitive given that the partners' import values include the cost of freight insurance (c.i.f.) while Ghana's export values are on a free on board (f.o.b.) basis. This suggests that some partners under-report or simply do not report the gold received from Ghana, which is inconsistent with established international conventions on recording of trade statistics. If Ghana is recording a transaction as an export to a particular partner, that partner is supposed to report it as an import from Ghana. Note that the series from the Bank of Ghana (Balance of Payments) and those from Comtrade are similar, except for 2012 where the latter shows a higher value.

Figure 13: Gold exports: Ghana's vs. Partner's statistics (million $)



Source: Comtrade database; Bank of Ghana.

Further exploration of the data reveals that the opaque node of the chain is the Ghana-South Africa link. As can be seen in Figure 14, when South Africa is excluded from the set of partners as both an export destination and an importer, even when there are differences, they are in the expected direction where partners' imports are larger than Ghana's exports due to the cost of freight and insurance. This is the case for the period 2012-2016. This indicates that South Africa is not recording gold coming from Ghana as gold imports.

The observed discrepancies, whereby the reported exports by Ghana exceed the reported imports by partners are even more intriguing when we consider the process of valuation of gold exports by the Ghanaian authorities and the Chamber of Mines.[19] The gold export statistics reflect the value of gold at the point of sale in Ghana, typically to a refining company abroad. This is the case for gold handed to Rand Refinery in South Africa, 'the refining hub of Africa'[20]. The value of the gold bars at that stage – *gold* d*oré*[21] – is a percentage (normally 85-90%) of the value of the gold bullion at the exit of the refining factory. While the final value of the gold is assessed and recorded for tax purposes, the export statistics themselves are not revised upward to incorporate the value addition from refining. We would therefore expect that the value of imports recorded by the partners, which are based on the bullion price plus the cost of insurance and freight, would be larger than the value of exports recorded by Ghana. Therefore, situations where the reported values of Ghana's gold exports exceed the reported values of partners' imports are at odds with the normal value chain in the gold industry.

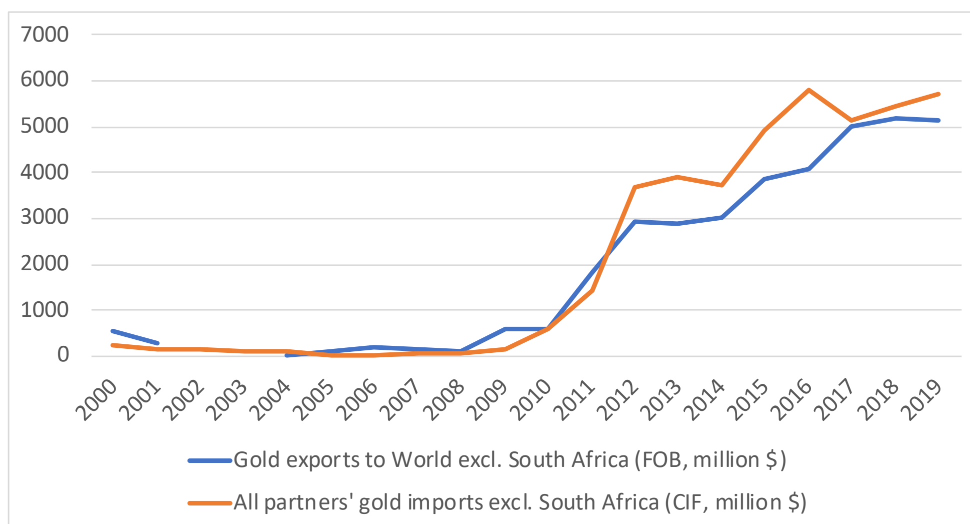
Important questions emerge from these observations. The first question is how is gold from Ghana treated in South Africa's trade statistics? The second is about the destination of the gold from Ghana that goes to South Africa. The price of Ghana's gold at its destination determines the actual world market value of Ghanaian gold. This in turn enables us to assess whether the price paid at the exit from Ghana is a fair value of the gold in terms of tax base valuation and remuneration of labour and capital used in the exploitation of gold in the country. Transparency over the entire value chain is essential for determining whether each player in the chain is receiving a fair value in the trade and especially whether Ghana is obtaining a fair market price for its gold. These issues deserve further consideration.

Figure 14: Gold exports: total and excluding South Africa (million US$)

[19] This description draws from information received from the authors' consultations with officials in the Chamber of Mines.

[20] https://www.randrefinery.com/services/#Refining. Rand Refinery is the only gold refinery in Africa that is accredited by the London Bullion Market Association. It is also accredited by COMEX, TOCOM, and SGE.

[21] *Gold doré* is "a bar of newly Mined Gold metal alloy, generally originating from extensive processing of ores and smelting at mines to a high concentration (normally of 85% – 90% purity)." To reach commercial quality such gold must be refined through chlorination and electrolysis.
https://www.lbma.org.uk/publications/responsible-gold-guidance-v9/definitions



Source: Comtrade database

Estimates of trade misinvoicing

The observed discrepancies in gold trade statistics above call for further examination of potential export misinvoicing as a mechanism of capital flight. We characterize gold export underinvoicing as incidences where the c.i.f.-augmented value of gold exports recorded by Ghana is significantly less than the dollar amount of gold imports as reported by Ghana's trading partners in Comtrade. We obtain the c.i.f. factor from the OECD's International Transport and Insurance Costs of Merchandise Trade (ITIC) database,[22] using categories HS 7108, 7109, 7112. We apply the methodology developed by Ndikumana and Boyce (2022)[23] to estimate gold export misinvoicing using data from Comtrade over the period from 2000 to 2019, the latest year with available data in the database. Since the cost of insurance and freight varies over time, product and trade route, we use annual cif/fob ratios rather than an average ratio over the sample period as in previous studies. This enables us to address the usual critique of the trade misinvoicing methodology in the literature about using a single average ratio as a proxy for the cost of freight and insurance.

Relative to Ghana's trading partner j in year t, gold export misinvoicing DX is estimated as follows:

$$DX_{Gj,t} = M_{jG,t} - cif_{Gj,t} * X_{Gj,t} \qquad \text{eq. 1}$$

where $X_{Gj,t}$ is Ghana's gold exports to partner j as recorded in Ghana's data in Comtrade, $M_{jG,t}$ represents gold imports by Ghana's trading partner j as recorded by partner j, and $cif_{Gj,t}$ is the cost of insurance and freight. When *DX* is positive, we infer that there is export underinvoicing implying capital flight; we conclude that there is export overinvoicing when the value negative.

[22] The database can be accessed online here: https://stats.oecd.org/BrandedView.aspx?oecd_bv_id=itcs-data-en&doi=9c638cb6-en
[23] Also see Ndikumana and Boyce (2010).

Three main motives of export misinvoicing that have been identified in the literature, namely financial motives, circumventing foreign exchange controls, and reducing administrative burdens (Buehn and Eichler 2011; Buehn and Farzanegan 2012; Patnaik, Gupta, and Shah 2012; Storti and de Grauwe 2012).[24] All three motives are quite likely in the case of gold exports from Ghana. Unlike cocoa, gold is produced and exported by private companies and is therefore not as well monitored by the government. Temptations and opportunities for export underinvoicing to obtain undeclared foreign exchange earnings are therefore more likely in the gold sector than in the cocoa sector.

The analysis focuses on Ghana's top ten trading partners for gold exports, which account for nearly all Ghanaian gold exports. If we exclude years where reporting is not matched, the 10 countries still represent 79 percent of total gold exports by Ghana. The leading destinations of Ghanian gold are South Africa and Switzerland, which account for 42 percent and 23.9 percent of total gold exports, respectively. Next are India (16.3%) and the United Arab Emirates (14.9%).

According to the results presented in Table 10, the dominant scenario is apparent export overinvoicing. In practice, export overinvoicing occurs in rare situations where exporters have financial incentives to over-declare the value of their exports. This would be the case when the government provides substantial fiscal incentives to promote exports. In this scenario, an exporter would weigh whether the benefits from the export promotion incentives exceed the value of the extra foreign exchange which they would have to surrender to the central bank. No such export promotion scheme has ever existed for the gold sector in Ghana. The discrepancies therefore reflect under-declaration on the partner side, primarily in the case of South Africa.

The results show that Ghanaian gold exports to the United Arab Emirates are under-invoiced by a cumulative total of $3 billion over the 20-year period. Underinvoicing of gold exports to the Emirates has been documented in other studies (Lewis, McNeill, and Shabalala 2019). This is a matter of concern considering the emergence of the UAE as a dominant destination of gold exports from Africa. The results also show that the negative values are not offset by positive values, implying that the unrecorded gold imports in South Africa are not likely recorded in third party countries as imports from Ghana. So, the treatment of movements of gold from Ghana to South Africa is indeed intriguing and is worth further investigation.

[24] See Kellenberg and Levinson (2016) and UNCTAD (2016) for further discussions of the motives for trade misinvoicing, with a focus in the latter on primary commodities exports from resource-rich developing countries.

Table 10: Gold export misinvoicing: Total over 2000-2019 (million, constant 2019 US$)

	Matched years only			All years		Share in Ghana's exports (%)	
Partner	Export misinvoicing	Ghana's exports	Partner's imports	Ghana's exports	Partner's imports	All years	Matched only
China, Hong Kong SAR	-76.1	369.1	308.7	369.1	342.7	0.5%	0.5%
India	1,205.8	11041.0	12770.1	11041.0	12770.2	16.3%	16.3%
Lebanon	-11.3	351.8	357.5	351.8	364.2	0.5%	0.5%
Netherlands	-271.7	259.5	0.6	293.2	0.7	0.4%	0.4%
South Africa	-16,223.7	15249.1	6.8	28369.9	9.8	42.0%	22.6%
Switzerland	-989.4	15272.6	15027.1	16183.0	15027.7	23.9%	22.6%
Turkey	258.9	298.3	568.9	298.3	591.5	0.4%	0.4%
United Arab Emirates	2,995.2	10073.3	13700.5	10077.7	13726.2	14.9%	14.9%
United Kingdom	988.8	344.2	1351.8	344.2	2045.3	0.5%	0.5%
USA	31.5	61.1	96.8	61.1	107.4	0.1%	0.1%
Top 10	**-12,092.0**	**53320.1**	**44188.8**	**67389.5**	**44985.7**	100%	79%
World	**-27,019.3**	**67617.9**	**44305.8**	**67617.9**	**44305.8**	100%	100%
Excluding South Africa	***-10,795.6***	***52368.8***	***44299.0***	***39248.0***	***44296.0***	***58%***	***77%***

Source: Authors' computation using data from Comtrade.
Note: Non-monetary gold is reported under HS 7108 and STIC 971

8. Conclusion

The analysis in this paper indicates that since its beginning, gold exploitation has been entirely dominated by foreign actors, and this has implications for the distribution of the gains from the sector. In the pre-colonial and colonial eras, the indigenous populations were explicitly prohibited from any gainful business in gold exploitation. Unknown amounts of gold (who was counting?) were bought by European traders in exchange for low-value foreign goods handed to the local populations. In the modern era, foreign companies still dominate gold exploitation and export, perpetuating an unequal exchange that benefits foreign corporations to the detriment of the Ghanaian nation.

The industrial organization of the gold sector described in the paper is quite different from that of the cocoa sector where a government agency, COCOBOD, has control over the commercialization and export of cocoa (Ndikumana and Adjei-Mantey, 2023). In the case of cocoa, this organizational structure enables the government to control the determination of the producer price with the goal of promoting farmers' wellbeing, and to control and repatriate the proceeds of cocoa exports in foreign exchange earnings. The analysis in this paper indicates that things are vastly different for the gold sector. Foreign gold companies enjoy agreements with the government that enable them to keep fractions of the foreign exchange earnings abroad, at a rate that is determined on a company-by-company basis, varying between 25% and 95%.[25] The absence of a standard repatriation rate creates avenues for gaming the system to minimize the foreign exchange earnings that come back to Ghana.

Regarding the rewards to the producers, things are also different in the gold sector than in the cocoa sector. In the case of artisanal and small-scale gold mining, which is dominated by Ghanaians, no one is regulating what is paid to the producers. The bulk of the value is recuperated at higher levels in the trade value chain to the detriment of the local populations. Unlike in the cocoa sector, there is not even a minimum price that is guaranteed to the artisanal gold producers. A detailed study of the case of small-scale gold mining would provide useful insights into the distribution of gains from gold mining throughout the value chain.

The substantial opacity of gold trade statistics is a major concern. There are large gaps between the values recorded by Ghana as gold exports and the amounts recorded as imports by its partners. The discrepancies are not accounted for by the cost of freight and insurance, and they are mostly attributed to gold recorded in Ghana as exported to South Africa. It so happens that South African companies account for a substantial share of gold exports and that South Africa hosts a major gold refining house. The two factors combined suggest further investigation to understand how the gold entering South Africa coming from Ghana is recorded in South Africa's books, and then how that gold, once refined, is recorded when exiting South Africa in terms of origin, value and destination. Other studies have noted that there are also discrepancies

[25] These figures refer to 1990-2000 (Table 1). At the time of writing we have not been able to obtain data for more recent periods.

between South African gold exports as recorded by South Africa and the values of gold imports recorded in its partners books (Ndikumana, Naidoo and Aboobaker, 2022). This further strengthens the need for further investigation of the Ghana-South Africa gold trade.

Overall, the country's benefits from gold exploitation are much below potential because of the organizational structure of the sector, the lenient fiscal regime that governs the sector, and the lack of transparency in gold trade. The dominance of the sector by foreign companies, weak regulation, a generous fiscal regime maintaining low effective taxation[26] and enabling foreign companies to retain abroad substantial portions of foreign exchange earnings from exports, and wide disparities in gold export statistics are major factors that limit the country's gains from gold exploitation. Investigating all these dimensions and taking appropriate corrective measures will be essential for increasing the country's gains from gold exploitation and trade.

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[26] Commenting on the earlier draft of the paper, experts from the Chamber of Mines claimed that the effective taxation regime in the mining sector exceeds 60%, and that the proportion of forex repatriated in practice averages 70%. As of the time of writing, we have not been able to obtain data that generate these average ratios.

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