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The Role of the Extractive Sector in Ghana's Comparatively Low Public Sector Revenue Mobilization[1]

1.0 INTRODUCTION

The government of Ghana has long sought to mobilize adequate revenue through a series of tax and non-tax policy and administration reforms, particularly starting from 1983. Yet, studies have found that, measured as a share of GDP, Ghana's public sector revenue has performed very poorly relative to most other countries in the developing world. The government often cites three main factors as being the main causes of the problem. These are: (1) the large informal sector, which has proven difficult to tax; (2) weak real property taxation; and (3) the country's generous tax exemption system. However, credible estimates of untapped revenues from these sources fall far short of the identified gaps in the total revenue to GDP ratios between Ghana and its peers. A number of researchers and commentators have argued that the various extractive sector agreements signed between the government of Ghana and the multinational corporations are skewed in favor of the multinational corporations, which negatively affects government revenue generation capacity of the sector. Yet, no study has sought to ascertain how much Ghana's entire extractive sector may be lacking in actual revenue generation when compared with peer countries. This paper therefore seeks to ascertain (1) how much Ghana earns from its extractive resources compared with other countries, (2) whether the extractive sector is the main source of the poor performance of Ghana's public sector revenue or not, and (3) how the sector can be repositioned to improve its revenue generating capacity.

[1]This is a policy brief on IFS Occasional Paper No. 24 by Dr. Said Boakye. For full treatment of the topic, see the occassional paper.

2.0 A GENERAL OVERVIEW OF THE IMPORTANCE OF THE EXTRACTIVE SECTOR TO ECONOMIC GROWTH AND DEVELOPMENT AND REVENUE GENERATION FROM THE SECTOR

2.1 Importance of the Extractive Sector to Economic Growth and Development

Extractive resource endowments, when appropriately managed, are one of the major sources of economic growth and development. It is well known that countries like Norway, Chile, the United Arab Emirates, Qatar, Saudi Arabia, Botswana, Trinidad and Tobago, and many others have achieved rapid economic growth and high income levels mostly through the exploitation and export of extractive resources. In fact, well-managed natural resource endowment has been found to be one of two main routes (the other being industrialization) to economic prosperity in modern times. Studies have found that even the industrialization route to economic prosperity of many nations, including United Kingdom, Germany and United States, was itself based on extractive resources, since it was revenues from the extraction of these resources that were used to fund the industrialization process. Nevertheless, the extent to which countries can use their natural resource endowments to achieve accelerated growth and development depends upon their ability to capture sizable proportions of revenues from the sector.

2.2 Government Revenue Generation from the Extractive Sector

The extractive sector is different from the other sectors of the economy. The reason is that for the other sectors, productive resources are mostly privately owned, which implies that incomes that accrue to the employment of these resources are privately earned. Therefore, governments rely on imposition of taxes (compulsory transfers of portions of the value of privately-earned incomes, -acquired commodities or -held properties to the government) for the purpose of revenue mobilization from these sectors. However, for the extractive sector, the resource endowments beneath the soil or offshore are not privately owned, but are rather held in trust by the government for the collective benefit of the people – they are publicly endowed resources. This implies that, in principle, net revenues (revenues less costs, including normal return to capital), called economic rent, generated from the extraction of these resources belong to the government for public benefit. It therefore does not make any rational sense for a government to adopt what is called 'extractive resource taxation' as a means of mobilizing revenue from the extractive sector. This is because, irrespective of the rate applied, by using taxation, the government is implicitly treating the extractive resources as privately owned, and the net revenues or rents from their extraction as privately earned, just like the other sectors. By extension, if a government employs royalty/tax approach to mobilizing revenue from the extractive sector through concession arrangements, it implies that the government has transferred the ownership of the extractive resources to private entities at the price of the royalty rate, which is normally a very small percentage of the value of the extracted resources (usually below 10%). It simply beats imagination why any government interested in the development of their country would transfer the ownership of these lucrative resources at such a low price.

Because of the unreasonableness of the royalty/tax approach to government revenue generation from the extractive sector, and the poor economic bargain it normally entails from the perspective of the government, many governments of developing countries that are unable to exploit their own extractive resources for maximum benefit (or do not want to do so because of the risk involved) rely on

[2] Viewed differently, if the government still believes that it owns the extractive resources, then the application of tax amounts to the government taxing only a portion of its own net revenues and giving the rest to entities that have not earned them, if even such entities were involved in the extraction of the resources.

production sharing agreements (PSAs) with private companies. PSA was first employed by Indonesia in 1966 as the oil exploitation contract with the international oil companies (IOCs). This was done because the government of Indonesia wanted to continue to retain the ownership of the produced petroleum, since the royalty/tax method implies the loss of ownership by the government of the produced petroleum, as pointed out above. Currently, PSA is among the most common types of contractual arrangements for petroleum exploration and development.

3.0 REVIEW OF GHANA'S PUBLIC SECTOR REVENUE PERFORMANCE

We review the performance of the government of Ghana's revenue by comparing it with those of 34 other developing economies. For a better understanding, we have grouped the sample economies under: (1) All sample economies -- 35 in number; (2) Middle-income economies -- 25 in number; (3) Sub-Saharan African economies -- 14 in number; and (4) Middle East and North African economies -- 7 in number. Ghana's total government revenue as a ratio of GDP has substantially underperformed the averages for all the developing country groups (see Figure 1). While Ghana's total government revenue as a ratio of GDP stands at only 15.8%, averages for all the developing, middle-income and sub-Saharan African economies in the sample stand at 22.6%, 22.0% and 20.5% respectively. The average for the Middle-East and North African economies stands at as high as 30.6%.

Therefore, the gaps between Ghana's total government revenue ratio and averages for the sub-Saharan African and middle-income economies, for example, stand at 4.7 and 6.2 percentage points respectively. For the Middle East and North African economies, the gap is as large as 14.8 percentage points. In fact, of the 35 developing economies in the sample, Ghana's total government revenue ratio ranks 32nd, implying that Ghana's total revenue ratio is larger than only 3 economies among the 35 economies.

4.0 PERFORMANCE ASSESSMENT OF THE GOVERNMENT OF GHANA'S REVENUE FROM THE EXTRACTIVE SECTOR – COMPARATIVE ANALYSES

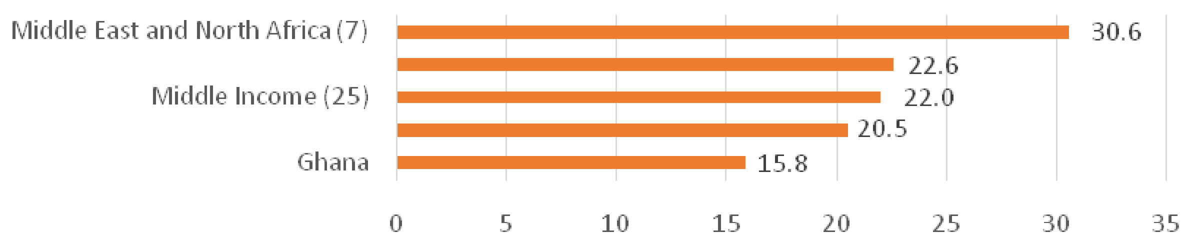
Compared to other sectors, the extractive sector contributes a far bigger share of total government revenue in most developing economies than any other sector relative to their shares of GDP. This is because:

(1) The extractive sector is characterized[2] by huge economic rents;

(2) Net revenues from the extraction of extractive resources belongs to the government, since these resources are publicly endowed; and

(3) At the initial stage of economic development, privately earned incomes are not large enough to enable the government to generate sizeable revenues from the

Figure 1: Total Government Revenue as a Percent of GDP: Ghana's VS. Averages for Different Groups of Developing Economies, 2018 or Most Recent data



taxation of these incomes from the other sectors.

Therefore, governments of developing economies strongly depend on revenues from extractive resources to fund their development. After all, it is fairer for the government to mostly depend on the resources it is endowed with for revenue mobilization purposes rather than on what poor citizens have privately earned. For these reasons, any government of a developing economy that is unable to generate sizeable revenue from its extractive resource endowments is bound to struggle in terms of revenue generation.

4.1 Comparison with Developing Economy Groups

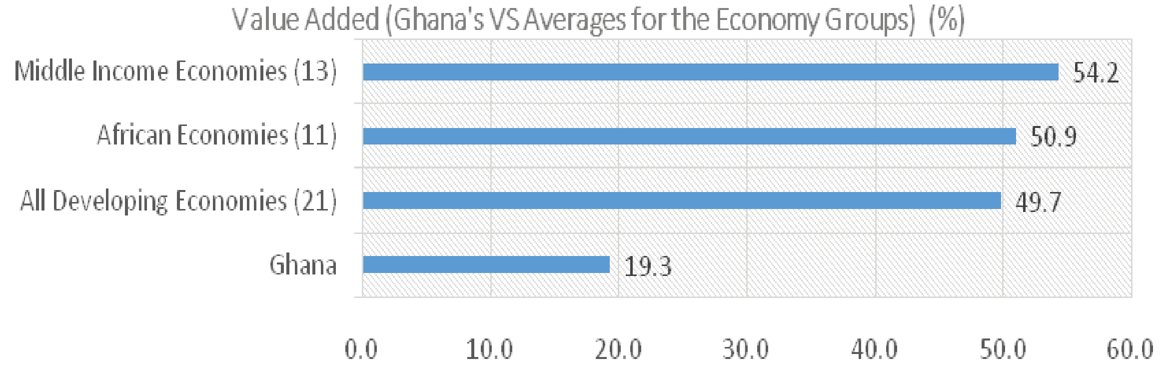
Here, we compare the performance of the government of Ghana's revenue from the extractive sector with those of governments of 21 economies across all regions of the developing world. It is important to note that, in relative terms, the size of Ghana's extractive sector is bigger than averages for different developing economy groups in the sample. This implies that Ghana's extractive sector is big enough to attract the attention of the government of Ghana to position the sector for strong revenue generation as other developing economies do.

Yet, as Figure 2 shows, government revenue from Ghana's extractive sector relative to the size of the sector is way below the average for its peer countries in the developing world. Ghana's government revenue from the extractive sector as a share of the sector's value added stands at only 19.3%. However, the averages for the African, middle income and all the developing economies in the sample stand at 49.7%, 54.2% and 50.9% respectively. In fact, of the 21 developing economies in the sample, Ghana's ratio is the lowest. Clearly, the government of Ghana falls far short of its potential in terms of revenue generation from the extractive sector.

4.2 Assessment by the Subsectors: Comparison with Nigeria and Botswana

Unlike in the previous subsection, we assess here the performance of the government of Ghana's revenue from the oil and mining subsectors separately. We do this by comparing Ghana with two of its African peers as case studies: Nigeria and Botswana in terms of the oil and mining subsectors respectively.

Figure 2: Government Extractive Sector Revenue as a Ratio of the Extractive Sector Value Added (Ghana's VS Averages for the Economy Groups) (%)



[3] Government revenue here includes revenues received by all government units. However, unlike in the previous subsection, the receipts from the extractive companies on behalf of third parties (pay as you earn (PAYE), value added tax (VAT), and withholding tax (WHT)) are not treated as part of government revenue (except otherwise stated).

4.2.1 The Performance of Ghana's Revenue from Oil Compared with Nigeria's, 2015-18

Government revenue from oil in Ghana increased from US$401.5 million in 2015 to US$549.3 million in 2017, after declining to US$257.2 million in 2016. In 2018, it increased to US$986.8 million. Therefore, from 2015 to 2018, revenues from oil to the government averaged US$548.7 million. As a share of the value of oil production, government oil revenue declined from 18% in 2015 to 15.5% in 2016 before increasing to 16.0% in 2017 and 22.0% in 2018. Therefore, government revenue from oil from 2015 to 2018 as ratios of the values of oil production averaged 17.9%. Compared with Nigeria, Ghana's average ratio of 17.9% is very small. This is because, from 2015 to 2018, the Nigerian government's revenues from oil averaged as high as 51.6% of the values of oil production in Nigeria during the period. Thus, Ghana earns far less in oil revenue than Nigeria not only because it produces oil in lesser quantities but also because, sadly, the government of Ghana's earnings from its oil production is far less in proportionate terms.

Indeed, cost considerations should not be the reason for the government of Ghana to settle for such a low share of the oil revenue. Average cost of producing oil in Ghana (in terms of both development and production costs) stood at US$16.52 per barrel in 2015-18. This compares favorably with average cost of producing oil in Nigeria, which currently stands at US$23 per barrel, according to the Nigerian National Petroleum Corporation (NNPC). In fact, despite the relatively low international price of oil since the second half of 2014, average cost of producing oil in Ghana has been much lower than the price of oil, implying that the oil business remains a highly profitable venture in Ghana. The average international price of oil (using the Brent Crude price) stood at US$55.40 during the period. Therefore, on average, markup and gross profit margin ratios for Ghana's oil in 2015-18 stood at as high as 235.4% and 70.2% respectively.

4.2.2 The Performance of Ghana's Revenue from Mineral Production Compared with Botswana's

Compared with revenue earned by the government of Botswana, the performance of the government of Ghana's revenue from the mining subsector is unbelievably poor. On average, the government of Botswana earned as high as 51.8% of the value of minerals produced in Botswana from 2015-18. However, on average, the government of Ghana received only 6.5% of the value of minerals produced in Ghana as revenue during the same period. In fact, while the government of Ghana received an average amount of only US$370.3 million in mineral revenue out of average mineral production of US$5.68 billion from 2015 to 2018, the government of Botswana received as much as US$1.87 billion in mineral revenue out of average mineral production of only US$3.60 billion during the period. Differently put, even though, on average, the value of minerals produced in Ghana represented as high as 157.7% of the value of minerals produced in Botswana in 2015-18, the government of Ghana's mineral revenue represented only 19.9% of the mineral revenue of the government of Botswana during the period. This, indeed, is unbelievable.

The question here is, are the costs of extracting minerals in Ghana so high that there is limited economic rent (or net revenue[3] after taking care of all costs, including normal return to capita), which has resulted in the low revenue ratio received by the government of Ghana? Mineral rents from mineral production in Ghana increased from US$3.19 billion in 2015 to US$3.71 billion in 2018. The average amount of mineral rents stood at US$3.53 billion during the period. Given that the average value of minerals produced in the country stood at US$5.68 billion in 2015-18, the average amount of mineral rents represented as high as 62.1% of the average value of minerals produced in the country during the period. Because the government of Ghana earned in revenue from mineral production an average amount of US$370.26

million in 2015-18, it means that the government of Ghana earned only an average of only 10.4% of the total amount of mineral rents during the period. Comparatively, mineral revenues received by the government of Botswana stands as high as 95% of the country's mineral rents (Keith Jefferis, 2016), thus completely dwarfing the 10.4% of the mineral rents received by the government of Ghana as revenue from the mining subsector. How can the government of Ghana settle for such unbelievably low amounts of revenues from the extractive sector? How can the government continue to lament about inadequate revenue when so much is given away to private investors from publicly endowed resources it holds in trust?

4.3 To What Extent Would the Identified Total Revenue Gaps Close If Ghana's Extractive Sector Revenue Ratios Matched those of Its African and Middle-income Peers?

Based on the extractive sector revenue ratios obtained by the governments of Ghana and the peer countries, we have calculated that the additional revenue the government of Ghana would have received from the entire extractive sector if it had obtained the middle-income average ratio in 2018, for instance, to be US$2.89 billion or GH 13.26 billion. This represents 4.4% of GDP. Also, the additional revenue the government of Ghana would have received in 2018 if it had obtained both Nigeria's and Botswana's average earnings ratios from the oil and mining subsectors respectively has been calculated to be US$4.32 billion or GH 19.82 billion. This represents 6.6% of GDP. Recall from Section 3 that total revenue gaps between Ghana and the African economies and between Ghana and the middle-income economies are respectively -4.7% and -6.2% of GDP. Therefore, matching the middle-income economies' average earning ratio in the extractive sector would have covered, on average, about 94% and 71% of the total revenue gaps between Ghana and its African and middle-income peers respectively. However, if the government of Ghana had earned average revenue ratios as those of the government of Botswana in the mining subsector and the government of Nigeria in the oil subsector, the additional revenue that would have been received from the extractive sector would have more than covered, on average, the total revenue gaps between Ghana and its African and middle-income peers. These imply that Ghana's extractive sector is the main source of the comparatively low public sector revenue mobilization in the country.

5.0 CAUSES OF THE LARGE SHORTFALL IN GHANA'S EXTRACTIVE SECTOR CONTRIBUTION TO PUBLIC SECTOR REVENUE

Despite the argument that, in principle, its fiscal instruments can be mathematically structured to achieve the same results like those of any other arrangement in terms of government revenue generation, concession normally results in the government receiving only a small part of the rents in practice because of the following reasons:

a) After receiving royalty payments, the government normally relies on corporate income tax on the extractive companies' declared profits. Even though a government may employ rent taxes to get additional revenues when profits exceed certain thresholds, there is the challenge of information asymmetry. This is because under concessions, the extractive companies (foreign or local) tend to have free rein and complete control over their operational activities because the ownership right to the extractive resources gets transferred after the concession right is granted to the company. Therefore, it is out of place for a government to try to monitor or supervise the day-to-day operational and financial activities of the extractive companies under concessionary arrangements. For these reasons, the government finds it difficult to know the true financial positions or profitability of the companies. In fact, it is a common understanding that extractive companies under concessionary arrangements employ all sorts of means to conceal production and profits due to the absence of active monitoring and supervision from the side of the government.

b) It is also unusual to place restrictions on the extractive companies' costs and expenses, such as interest and administrative/overhead costs, under concessions because of the transfer of ownership rights after the concession is granted.

For these reasons, declared profits for tax purposes by companies holding concession rights are usually small in practice. However, assuming costs of extraction to be the same, when a government avoids concessions and extracts these resources itself, it then enjoys the entire rent from these lucrative resources. Even when a government decides to avoid the risks associated with direct extraction and uses production sharing agreements (PSAs), it can overcome many of the practical weaknesses associated with concession. This is because:

i) Under PSAs, the government is able to exercise an appreciable degree of control over the operations of the extractive company, called the contractor, thereby overcoming, to a large extent, the information asymmetry problem. This is usually done through the establishment of a management committee, which supervises the operational and productive activities of the extractive company/contractor. The government is able to do this because, under PSAs, it maintains the ownership rights over the extractive resources before, during and even after they are extracted until the production sharing takes place and the contractor receives their share of the products. The management committee approves annual work plans and budgets of the contractor. It is normally composed of representatives of both the government and the contractor(s).

ii) After portions of the products are used for cost recovery, which is normally not allowed to exceed certain thresholds out of the total production in a given year, the government usually takes the bigger share (typically between 60% and 85%) of the remaining products (called profit oil in the oil industry).

iii) Royalties and corporate income tax, which are the two main income generating instruments under concessions, also apply under PSAs. Royalties are normally deducted first before the contractor's costs are deducted, while corporate income tax is applied on any profit accruing to the extractive company after receiving its share of the products. Like concessions, PSAs also usually allow for additional rent tax when the contractor's profit increases beyond certain thresholds due to higher prices.

iv) Restrictions are also normally placed, in part or in whole, on certain expenses such as interest/financing costs and certain overhead costs, particularly those related to corporate headquarters, from being counted as part of the cost, so as to ensure maximum benefit to the government.

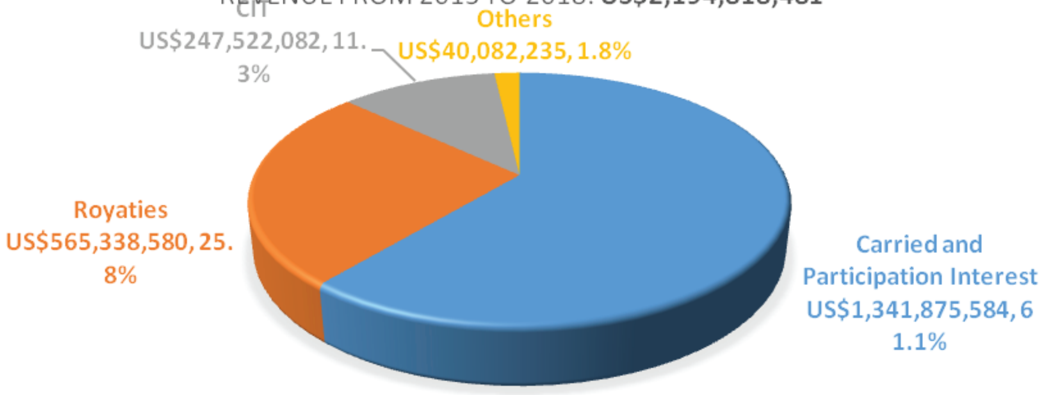
For these practical reasons, governments normally receive much more revenue from the extraction of their extractive resource endowments under PSAs than under concessions. It is, however, important to point out that even under concessionary arrangements, governments are able to receive appreciable amounts of revenue from the extractive sector if they get actively involved through large participation interests under joint venture arrangements. These offer governments the opportunity to get actively involved in the operational and management processes, thereby circumventing the problem of information asymmetry. Also, with these active involvements, governments are able to take in greater share of the extractive rents, beyond the royalty and corporate income tax, through shares of dividends (in the case of profit-sharing joint venture arrangements) or product entitlements (in the case of product-sharing joint venture arrangements).

Against this background, we find that the main causes of the government of Ghana's comparatively low revenue generation from the country's oil and mining subsectors are: (1) the government over-relies on the use of fiscal instruments (royalties and corporate income tax) under concessionary arrangements, with very limited direct involvement in terms of participating interests, and (2) production sharing agreements, which are able to help overcome many of the practical problems associated with concessionary arrangements as explained above, are not used in the country. To substantiate these statements, we compare below (A) Ghana to Nigeria (with regard to the oil subsector); and (B) Ghana to Botswana (with regard to the mining subsector).

A) The Oil Subsector:

Ghana's oil subsector is characterized by a concession-based or royalty/tax fiscal regime, with small ownership interests held by the state in the oil joint ventures. Simple average of ownership interest held by GNPC in the name of Ghana stands at only **16.2%**. The international oil companies (IOCs) in Ghana therefore hold as high as **83.8%** as their average ownership interests in the oil joint ventures. This is far below international standards, as globally, national oil companies (NOCs) control as large as 75% of production. Nevertheless, the country's small ownership interests in the oil joint ventures is the biggest source of oil revenue. We can see from Figure 3 that total government revenue from the oil subsector from 2015 to 2018 amounted to US$2.19 billion. Of this, US$1.34 billion, representing as high as **61.2%**, came from the country's small average carried and participation interests of 16.2%. Let us, therefore, imagine how much Ghana would have earned if its ownership interests in the oil joint ventures had matched the international average of 75% for national oil companies. In fact, we can see that from 2015-18, Ghana's corporate income tax of 35% with the additionally scheduled rent taxes fetched the country as little as US$247.5 million, representing only **11.3%** of the total, which is even less than half of what the little royalty rate of 5% fetched the country. In fact, revenue from corporate income tax in 2015-18 represented as little as **2.6%** of the total value of oil and gas lifted by the IOCs during the period. Clearly, without large ownership stakes in Ghana's oil joint

FIGURE 4: COMPOSITION OF THE SUM OF TOTAL GOVERNMENT OIL SUBSECTOR REVENUE FROM 2015 TO 2018: **US$2,194,818,481**



ventures, the country cannot benefit much from its oil endowments.

In contrast, the government of Nigeria is able to generate such a large ratio of revenue from the oil subsector because, in addition to relying on production sharing contracts (PSCs) to, for instance, produce an average of 41.3% of oil in 2017-18, it holds comparatively large ownership interests in the country's oil joint ventures. The ownership interests held by the Nigerian National Petroleum Corporation in the name of Nigeria in the 6 main oil joint ventures range from 55% to 60%, with the simple average of the interests standing at as high as **59.2%**, implying that the IOCs hold an average of only 40.8% interests in the oil joint ventures in Nigeria.

B) The Mining Subsector:

What makes the system of revenue generation from the mining subsector in Ghana fundamentally different from Botswana's is that government participation in the mining subsector is comparatively too small in Ghana. This is because, with the exception of Ghana Bauxite Company Limited, whose contribution to the value of mineral production in Ghana is miniscule and in which it holds 20% equity interest, the government of Ghana only retains a non-contributing equity interest of 10% in the various mining companies. For Newmont Golden Ridge Limited and Newmont Ghana Gold Limited, the government of Ghana retains a 10% interest in net cash flows. The government holds as little as 0.01% equity interest in the global operations of AngloGold Ashanti Limited with no equity interest in the company's local operations (GHEITI, 2019). In contrast, the government of Botswana has huge ownership interests in the country's mining sector. According to Botswana's Ministry of Minerals, the government of Botswana's mining investments are as follows: 50% interest in Debswana (the main diamond producing firm in Botswana); 50% interest in Botash (soda ash producer); 15% interest in Tati Nickel Mining; 15% interest in De Beers (the country's diamonds producing partner in Debswana); 94% interest in BCL Limited (copper-nickel mine); 50% interest in Diamond Trading Company Botswana; and 80.8% indirect beneficiary shareholding in Morupule Colliery (a subsidiary of Debswana).

Consequently, in addition to the inability of the government of Ghana to know the true financial positions of the mining companies for tax and royalty purposes, making these revenues comparatively small in Ghana, the government of Ghana is also unable to enjoy any significant share of the mineral rents through dividends. Therefore, while dividend is the biggest source of mining revenue to the government of Botswana, it is negligible in Ghana. Indeed, despite Ghana's mineral rents in 2015-18 alone representing about 98% of the entire value of minerals produced in Botswana in 2015-18, the government of Ghana received a total amount of only US$44.22 million as dividend in 2015-18. In contrast, the government of Botswana earned as large as US$3.55 billion in dividend in 2015-18.

6.0 POLICY RECOMMENDATIONS

The government of Ghana should aim at receiving not less than 50% of the values of oil and minerals produced in the country as revenues, similar to what the governments of Nigeria and Botswana generate as revenues from their oil and mining sectors respectively. This will enable the government of Ghana to capture at least 80% of the oil and mineral rents generated in the country. To achieve these, we recommend that the government should do the following:

1. Purchase Controlling Interests in the Ghanaian Operations of the Large-Scale Mining Companies: The government of Ghana should, as a matter of urgency, purchase controlling interests of not less than 55% in the Ghanaian operations of all the large-scale mining companies. This should not be done in terms of mere equity holdings. Rather, the large-scale mining companies' operations in Ghana should be turned into joint venture arrangements between the government of Ghana and the foreign investors, either in terms of profit sharing or preferably production sharing. This will enable the government of Ghana to get actively involved in the management of these companies, thereby getting around the problem of information asymmetry. As we saw with the case of Botswana, this will not only enable the government of Ghana to have greater shares of dividend, but it will also lead to substantial increases in the other sources of revenues (royalties and corporate income tax).

2. *Increase the Paid and Participation Interests in All the Ghanaian Operations of the Oil Companies in order to increase Ghana's interests to at least 55%:* The government should increase Ghana's paid and participating interests in the existing oil joint ventures by purchasing additional interest so that the country's interest in each joint venture increases to at least 55%, while maintaining the production sharing arrangements.

3. *Renegotiate with the Oil and Mining Companies:* To implement recommendations 1 and 2 above, the government of Ghana has to renegotiate with the oil and mining companies before effecting these proposed changes. Admittedly, unilateral cancellations of the existing oil and mining contractual agreements will be interpreted as breaches of trust on the part of the government of Ghana, which is why we are calling for renegotiations with the companies involved. However, what is worse than unilateral cancellations of the contracts is continuous implementation of agreements that are skewed in favor of companies extracting resource endowments of the poor while repatriating the lion's share of the accrued rents to rich nations, even though, in principle, the rents are supposed to be entirely for the government. This should not be allowed to continue to stand, since it contradicts basic human values and the principle of fairness. Therefore, the government of Ghana should not mind unilaterally cancelling these contracts and thus nationalizing the assets of these companies while paying fair compensation to the foreign investors, if they choose not to enter into renegotiations or unnecessarily drag their feet.

4. *Aim at Having Fully State-Owned Firms Operating in the Oil and Mining Subsectors:* The government of Ghana stands to receive the entire net financial benefits from the extraction of oil and mineral resources in Ghana if these resources are fully extracted by state-owned oil and mining firms. This is because in addition to the government itself enjoying the normal return to investment, no part of the rents accruing to oil and mineral production in this case can be captured by anyone else. As was pointed out in Section 2, this is what the Gulf States like Saudi Arabia and Qatar have been doing, using Saudi Arabian Oil Company (Saudi Aramco) and Qatar Petroleum respectively. Indeed, this approach has enabled these countries to receive huge revenues from their extractive sectors to fund their economic development, making them have very high levels of per-capita incomes. The government of Ghana should therefore aim at having fully state-owned firms extracting oil and mineral resources. Strong funding, supervision, monitoring and strategic guidance by the executive branch of the government would be essential. Also, biting incentive mechanisms, which fruitfully reward successful managers and punish reckless and corrupt managers, should be instituted and made to work. In line with this, GNPC should be strengthened and strategically supported by the government to take the leading role in oil

exploration and production in the country. The executive branch of the government should get actively involved in shaping the vision and direction of GNPC.

5. *Treat Investment in the Oil and Mining Subsectors as if they are Investments in Infrastructure:* To be able to fund the recommended investments in the oil and mining subsectors as discussed under the above points, the government should treat these investments in a similar way it treats investments in infrastructure. Therefore, the government should follow the same steps it uses to raise funds for infrastructure investments. In fact, since investments in the extractive sector will lead to higher levels of revenue for further development, including infrastructure development, God willing, the government can even decide to scale back its currently planned investments in infrastructure and redirect such funds to the oil and mining subsectors so that more money could be generated in the future for accelerated infrastructure and other developments.

6. *Use Production Sharing Agreements (PSA) for New Oil and Mining Contracts When Funds are Unavailable:* As explained earlier, production sharing agreements (PSAs) are able to deliver to governments appreciable amounts of revenues from the extractive sector in practice because of (1) their ability to overcome, to a large extent, the problem of information asymmetry through the establishment of joint management committees (JMCs), and (2) their ability to exclude some costs, including interest costs and overhead costs that are not directly related to production and development. The government of Ghana should therefore use PSAs for new oil and mining operations, in case funds cannot be secured for new joint venture arrangements in which the government has controlling interests.

7. *Turn All Small-Scale Mining Operations in Ghana into a Gross Production Sharing Scheme:* Data show that government revenue from small-scale miners is comparatively very small. Yet, from 2015 to 2018, small-scale miners produced 5.72 million ounces of gold valued at US$7.29 billion, representing 33.3% of the total value of gold produced in Ghana during the period. Given that mineral resources are collective endowments, a few individual Ghanaians should not be allowed to unduly benefit from them at the expense of the majority. The government should therefore establish a production sharing scheme for the small-scale miners, using a ratio of, say, 50% for the government and 50% for the miners, or 40% for the government and 60% for the miners. Because of the high degree of informality that characterizes the operations of these miners, the production sharing should be in terms of gross production as opposed to the regular net production that deducts development and production costs. Yet, efforts should be made to understand a typical cost structure of the small-scale miners before the actual gross sharing ratio is decided. To ensure an effective implementation of this policy, a management committee, comprising of representatives of the government and of, say, the Ghana National Association of Small-scale Miners (GNASSM) should be put in place to monitor, supervise and track government's share of the minerals produced by the small-scale miners in the scheme.

8. *Secure Collective Political Backing for these Recommended Policies before Implementation in Order to Ensure Policy Continuity:* The above recommended policies should be pursued with a national focus, and should thus be devoid of partisanship. Indeed, the need to sharply increase revenue generation from the extractive sector through these recommended solutions should be seen as a national fiscal rescue mission, due to

the poor fiscal state of the country. Therefore, there is the need for collective commitment to the proposed policies by all the political parties before beginning their implementation. This will ensure policy continuity, contrary to the current practice whereby new governments discontinue the implementation of policies began by previous ones, thereby wasting national resources and undermining the country's development.

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