COST-BENEFIT ANALYSES OF TWO POLICIES LINKED TO GHANA'S INDUSTRIALIZATION

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Abstract

This study analyses the costs and benefits of key industrialization policy initiatives identified by the Ghana Priorities Reference Group as potentially important to the country's future development. Cost benefit analysis was carried out on 2 interventions namely the mining, processing, and transformation of bauxite into alumina and aluminium, and the establishment of Special Economic Zones (SEZs). Evaluating the costs and benefits of the bauxite-alumina-aluminium value chain, shows that the processing of 5-20 million tonnes of bauxite annually into alumina and aluminium could provide average net benefits worth $140 million or roughly 0.24% of GDP in expectation. The average Benefit cost-ratio (BCR) for this intervention is 1.05. However, these values are characterized by large fluctuations as the standard deviation of net benefits is about $221 million. The analysis argues that given the proposed volumes of alumina and aluminium production, a minimum production of aluminium curtails the problem of limited value addition, reducing the volume of exports of raw bauxite. Importantly this estimate does not include the measure of flow-on effects such as direct and indirect employment, and technological transfers. Additionally, it does not include social, economic and environmental costs associated with the destruction of the natural environment required to the mined bauxite. The second analysis surveyed the literature on SEZs globally and in Ghana and concludes that SEZs are unlikely to be an efficient investment. The study proposes that the government should devote limited resources to economy-wide reforms rather than geographically delimited areas within which governments facilitate industrial activity through fiscal and regulatory incentives. Broad-based infrastructure support is key to link individuals and firms to economic opportunities and scale-up economy-wide efficiency as the country prepares to profit from the African Continental Free Trade Area (AfCFTA).

Policy Abstract

Intervention 1: Set up an integrated Bauxite Authority to Facilitate the Processing of Ghana's Bauxite into Alumina and its Conversion into Aluminium ingots using the VALCO Smelter

Overview

Ghana's economic performance has been less than stellar since the introduction of oil. Growth increased to 14% in 2011 (largely jobless growth) and since then growth has been less than desirable partly blamed on the huge infrastructural deficit and the limited fiscal space. With limited fiscal space to inject growth through increase infrastructural spending, the country has stepped up its effort to utilize her natural resource deposit. The Ghana Integrated Aluminium Corporation (GIADEC) was established in 2017 by an act of parliament whose responsibility was to promote and develop the integrated aluminium industry. The following year government of Ghana concluded a USD 2 billion Master Project Support Agreement (MPSA) with Sinohydro Corporation Limited, a Chinese based company to support priority investment infrastructure projects in the country and the subsequent establishment of GIADEC. This development has to some extent divided the country with activists raising social and environmental concerns. This paper sought to shed some insight on the development using the costs-benefit approach to ease the concerns the various stakeholders may have with the financial and technical support of the Copenhagen Consensus Center

Implementation Considerations

Costs and Benefits

Costs

In the analysis of costs, the total costs of the Integrated Aluminium Industry (IAI), various controllable and uncontrollable factors such as production volumes and costs of raw materials were factored, resulting in 27 scenarios. These scenarios yielded annual total costs that ranged between $1.02 billion and $3.2 billion for the entire IAI. This is composed of costs for mining bauxite which ranges between $122 million to $523 million at various levels of production. The costs for alumina production ranges between $540 million and $1.6 billion. Similarly, costs for aluminium production ranges between $360 million and $1.07 billion at various levels of production. These costs are inclusive of investment costs which are annualized over a 50-year lifetime.

The median cost of all 27 scenarios for the entire value chain is 2.1 bn USD per year.

Benefits

Analysis of total benefits also yielded about 27 scenarios based on a similar controllable factor of production volume but with a different uncontrollable factor which is the market price of the commodity. Total benefits ranged between $934 million and $3.6 billion, with a median value of $2.3 billion. The average benefits for bauxite production range between $35.5 million and $284 million under different production levels. Benefits in alumina production range between $320 million which can increase to $1.8 billion and that of aluminium production lies between $583 million and $1.5 billion, given their production volumes. Given the various cost estimates, the net benefit for the entire IAI ranges between -$365 million to $560 million, with an average benefit of $140 million, representing an average benefit-cost ratio of 1.05 which is about 0.24 percent of Ghana's GDP.

The analysis argues that given the proposed volumes of alumina and aluminium production, a minimum production of aluminium curtails the problem of limited value addition, reducing the volume of exports of raw bauxite. Importantly, this estimate does not include difficult to measure flow-on effects such as direct and indirect employment, and technological transfers. Additionally, it does not include social, economic and environmental costs associated with the destruction of the natural environment and livelihood of the affected communities required to the mined bauxite.

Intervention 2: Use of Specialised Economic Zone in Ghana’s Industrialisation Drive

Free Zone concept or Specialised Economic Zones has long been recognised in the development literature as part of market-oriented, institutional, structural and economic reforms. Africa and Ghana for that matter embraced the concept a couple of decades given the failure of the import substitution pursued right after independence. Conceived then to attract export-oriented firms and facilitate trade, attract foreign direct investment, aid technology transfer and boost domestic private sector competitiveness with the end goal spurring economic growth and development. Against these theoretical and hypothetical benefits, empirical evidence has been mixed and heavily driven by data from developed and emerging markets. Available evidence on Africa generally and Ghana for that matter does not validate the hypothetical benefits. Costs show up in the form of host governments giving vastly generous trade incentives or subsidies or broadly tax expenditures to export-oriented firms (fiscal losses) and other hugely initial investments and several guarantees including vast lands. Benefits have included volume increase in export, foreign exchange earnings, income taxes, employment, the attraction of foreign direct investment, technology transfer and the generation of 2% of the global employment, etc. Enormous as this may be in nominal terms the question arises whether the share of the 2% of global employment from SEZs is justified in the face of the sacrifices the countries have to be made as well as the geographical distribution of the employment creation especially concerning developing countries such as Ghana. The theoretical benefit from SEZs hinges on the country meeting basic infrastructure requirements. To that extent, it would be prudent for the country to utilise her limited fiscal space to open up the entire country and reduce the huge infrastructural deficit which imposes further restrictions on the growth driers of the economy. Emerging evidence support the fact that countries are shifting policy from SEZs to creating the enabling business environment and improve economy-wide efficiency for the private sector to thrive. In the current form, the evidence points heavily towards concentrating limited resources to economy-wide reforms rather than geographically delimited areas within which governments facilitate industrial activity through fiscal and regulatory incentives and infrastructure support. It would be prudent for the government to utilise its limited fiscal space to open up the whole country, especially in terms of infrastructure, quality education and other incentives for all firms so that economic activity can freely take place in every corner of the country to realise balanced and more sustainable growth of the economy. Tax incentives on their own do not attract FDIs but other factors such as skills pool, availability of social and infrastructural facilities such as good schools, health facilities, road network, electricity, etc. may also count as significant considerations in investment decisions. Currently, the country loses hugely through tax expenditures which have been one primary means of attracting firms into the Free Zone enclaves and it does not represent efficient utilisation of the nation's revenue. Ghana's economy is predominantly SME based scattered all over the country and free zoning might only serve the interest of foreign firms rather than encouraging domestic private capital (domestic firms) to take such advantage though lately, the Ghana Free Zone Authority (GFZA) has been urging locals firms to relocate and take advantage of opportunities available within the enclaves. Several private-sector surveys including Ease of Doing Business, Enterprise Survey, Global Competitiveness Index and Country Private Sector

Diagnostic (CPSD) point to many constraints that the concept of SEZs cannot address given the huge investment and tax expenditures associated with such intervention and even now that it is planned for every region (16) to have SEZs. The World Economic Forum's Global Competitive Index (GCI) in its report ranked Ghana 106 out of 140 countries predominantly on the back of poor infrastructure. On the readiness of future of production report (2018), Ghana needs to improve on its performance both in terms of the structure of production and drivers of production that requires broad-based investment in both hard and soft infrastructure among other interventions

Summary BCR Table

Intervention	Benefits	Costs	BCR
Mining, processing, and transformation of bauxite into alumina and aluminium	2287m USD per year	2136m USD per year	1.07
Special economic zones	na	na	<1

Note: Bauxite intervention figures are the median benefits and costs (average figures are similar)

General Introduction

That resources are limited in supply is common knowledge. Given this reality, it is important to ask how can a country achieve the most with available resources at its disposal? This is particularly true for Ghana where for every cedi of revenue generated approximately 97 percent goes into just two line items namely; compensation of employees and interest payment. For a given extra cedi amount, it is then imperative that the country employs a scientific approach to deploying that money. This paper examines the costs and benefits of two key industrialization policy initiatives namely the setting up of an integrated bauxite authority to facilitate the processing of Ghana's bauxite into alumina and its conversion into aluminium using the VALCO Smelter and the use of Specialised Economic Zones in Ghana's industrialisation drive. These two interventions were chosen by a Reference Group convened for the Ghana Priorities project and are loosely tied under the umbrella of 'industrialization'. The two interventions are addressed in turn, and each essay can be read as a standalone piece or together as a single report.

1. INTERVENTION 1:

Set up an integrated Bauxite Authority to Facilitate the Processing of Ghana's Bauxite into Alumina and its Conversion into Aluminium ingots using the VALCO Smelter

1.1 Introduction

Ghana historically has relied on its natural resources for economic and social development. The country is endowed with abundant resources that have attracted investment from the traditional Paris Club Creditors and Non-Paris Club Creditor Members especially China. Global business attention has focused on Ghana in several sectors including oil and gas, timber, cocoa, gold, diamond, bauxite, aluminium, and manganese. Though the country has bauxite reserves, Ghana's export is dominated by gold, cocoa and lately oil.

Infrastructural deficits in both hard and soft infrastructure however continue to impose restrictions on the growth drivers of the economy, undermining the country's efforts at achieving structural transformation and sustainable socio-economic development. According to the National Development Commission (NDPC), Ghana needs an annual infrastructural investment of $1.5 billion for the next ten years. Ghana's growing public debt and its associated financing costs however currently absorb more than 45% of non-oil tax revenue resulting in the crowding out of priority spending when taken together with compensation of employees. Public debt was almost 130% towards the end of 2000, requiring debt relief through the Highly Indebted and Poor Country Imitative (HIPC), after a major change in government. The country completed the arrangement in 2004 and also benefited from the Multilateral Debt Relief Initiative (MDRI) which was completed by the end of 2006 thus conferring a borrowing space for the country. But that is history now and forgotten in the face of current development that put the public debt stock at GHS 208 billion including financial bailout arrangement (over 60% of GDP).

Given the limited fiscal space and huge infrastructural deficit, the country has intensified its effort to harness its natural resources for socio-economic development including the setting up of the Ghana Integrated Aluminium Corporation (GIADEC) in 2017 by an act of parliament whose responsibility is to promote and develop the integrated aluminium industry. In 2018, the government of Ghana concluded a $2 billion Master Project Support Agreement (MPSA) with Sinohydro Corporation Limited, a Chinese-based company to support priority investment infrastructure projects in the country and the subsequent establishment of GIADEC. However, several criticisms have emerged highlighting the perceived high costs or opportunity costs associated with the intervention relative to the potential benefits of going into the project. Questions have arisen regarding the net benefit to Ghana. Experts have questioned the basis of the decision to increase attention to the bauxite industry in the face of social and environmental costs that are not factored into the decision process. This analysis examines the costs and benefits of the intervention. It is noted that the revamp in the industry is predicated on the premises that it will contribute to fiscal revenue as well as other economic benefits such as employment generation and value activities that could benefit the economy. Government sources claim a resilient integrated aluminium industry is projected to contribute about $10 billion in economic output annually in addition to the expected attraction of foreign direct investments. To the government, a country with an estimated bauxite reserve of about 900 million metric tonnes, large natural gas reserves to power our industries, an existing smelter, and expanded ports as well as significant quantities of industrial salt, a resilient integrated aluminium industry that will create thousands of jobs is too good to overlook. Recently, the CEO of GIADEC stated that the Integrated Industry "expected that this will lead to the creation of 35,000 new jobs, 10,000 of which will be direct and 25,000 indirect. It is also expected that there will be an annual boost to the economy of about $10 billion, which is roughly 15 percent of the country's expected gross domestic product (GDP) at the end of 2019".

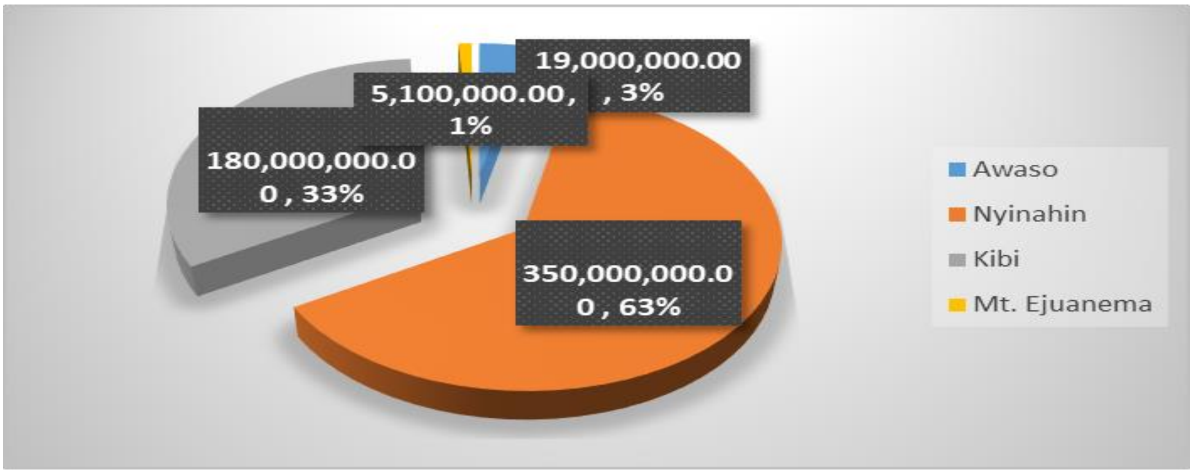
1.2. Cost-benefit analysis of the Integrated Aluminium Industry (IAI).

The aluminium value chain consists of three main levels. The first level involves the mining of bauxite, which is the primary mineral for aluminium production. The second stage involves the refinery of bauxite into alumina through the Bayer process. The last stage involves the smelting of alumina into aluminium, available for industrial consumption. Each of these processes of mining, refining, and smelting involve a series of cost with the costs rising at each level of the value chain. This section presents an analysis of the potential costs in each stage of the value chain.

Bauxite mining

Bauxite mining involves the clearing of the topsoil in bauxite rich areas for the mineral. There is scant information concerning the number of bauxite reserves in the country except for earlier estimates given by Kesse (1985). According to Kesse, based on a geological survey, the total amount of bauxite reserves in Ghana is about 540 million tonnes, with the bulk of the deposits from Nyinahin with 350 million tonnes representing 63 percent of total reserves. However, Agbolosoo (1991) contends that Ghana has 780 million tonnes of proved reserves of bauxite, averaging in grade between 45 and 60 percent. The Ghana Integrated Aluminium Development Corporation has recently stated that a firm has been commissioned to provide data on the country's total reserves. At a recent meeting with the authority, it was suggested the figure would be available by the end of March 2020. The Ghana Integrated Aluminium Development Corporation estimates an extraction capacity of between 10 to 20 million tonnes of bauxite per year. This means that mining can continue for 18 to 37 years assuming a 70 percent recovery rate.

Figure 1: Bauxite reserves in Ghana as of 1985.



Source: Kesse (1985).

Bauxite Cost Estimation

In estimating the value of bauxite mining, scenarios are given in the form of price and volume of bauxite mined (see Table 1). Although there are no official documents on the amount of bauxite to be mined per year, the Ghana Integrated Aluminium Development Corporation (GIADEC) has stated in various releases that between 10 and 20 million tonnes of bauxite annually will be mined. However, interactions with officials from GIADEC officials reveal that the company plans to extract bauxite from 4 mines with an annual capacity of between 2 to 5 million tonnes. This analysis is done on the assumption that the mines will not provide equal volumes of bauxite. Given this, the analysis, therefore, uses a low production scale of 5 million tonnes, a high production scale of 20 million tonnes and an average production scale of 10 million tonnes.

There is little current information available on bauxite production costs. However, the World Bank in their Bauxite and Aluminium Handbook (1981) estimates the cost of bauxite to be between 12 and 30 dollars per ton. However, given the current price of bauxite per ton, these estimates seem to be reasonable even currently. The Ghana Extractives Industry and Transparency Initiative (GHEITI) in 2016 reported that a total of $550,157 (35% of net revenue) was received in the form of corporate income tax. This gives a net revenue of $1,571,877 out of total revenue of $36,865,766 from the production of about 1.14 million tonnes of bauxite. This implies a production cost per tonne of bauxite of approximately $30. Further, between 2016 and 2018, Alcoa, a bauxite mining company, recorded average production costs of $16, $18 and $19 respectively. Also, in the estimation of bauxite costs, Rajendra (2011) estimates a cost of $16 per ton as of 2011. Assuming a 2 percent increase in costs per year (Otto et al., 2006) puts the cost at about $19 per tonne.

Table 1 presents the scenarios used for the analysis of the Ghana bauxite market concerning volume, price, and costs. Total cost estimation of bauxite production involves the costs of new bauxite mines which will be required given the estimated production volumes. Currently, the Awaso mines are the only active bauxite mine which can produce an average of approximately 2 million tonnes. Thus, each of the low, medium and high case scenarios will require investments in new bauxite mines. The production costs are annualised to present the figures given in the fourth panel of Table 1.

Table 1: Bauxite production scenarios

Metric	Low production	Medium production	High production	Units
Production volume[1]				
Tonnes refined per year	5.00	10.00	20.00	Million tonnes
Production cost estimates				
Low production cost per tonne	12.00	12.00	12.00	Million USD
Average production cost per tonne	21.00	21.00	21.00	Million USD
High production cost per tonne	30.00	30.00	30.00	Million USD
Investment costs				
The total[2]	312.5	625	1250	Million USD
Total investment cost	5000.00	7500.00	10000.00	Million USD
Lifespan of plant	50.00	50.00	50.00	Years
The annualized cost of investment per tonne				
Best case (5% discount rate)	3.42	3.42	3.42	USD
Average case (8% discount rate)	5.11	5.11	5.11	USD
Worst case (14% discount rate)	8.76	8.76	8.76	USD
Total costs[3]				
Best case scenario[4]	70.27	147.39	301.62	Million USD
Average case scenario[5]	120.33	250.87	511.96	Million USD
Worst-case scenarios[6]	176.29	370.10	757.73	Million USD

[1] Interactions with officials from GIADEC officials reveal that the company plans to extract bauxite from 4 mines each with an annual capacity of between 2 to 5 million tonnes.
[2] Investment cost is averaged at $62.5 per tonne. This was obtained based on a bauxite mine in Guinea which cost $750 million for 12 million tonnes of bauxite per year. Source: https://www.ega.ae/en/media-releases/2019/may/gac-financing.
[3] This is inclusive of production and investment costs.
[4] is characterized by low production costs per tonne and investment costs at 5% rate.
[5] Average case scenario is characterized by average production costs per tonne and investment costs at 8% rate.
[6] worst-case scenario is characterized by high production costs and investment costs at a 14% rate.

Total costs for bauxite production ranges between $70 million for low production of bauxite under low cost per tonne and low discount rate. Under the worst conditions, the annual production cost of 5 million tonnes of bauxite can rise to about $176 million. Total costs for other production levels are also presented in Table 1 above.

Bauxite Revenue Estimation.

An examination of traded metal prices on the market and the 2016 GHEITI report places the price of Bauxite between $29 and $40.5 per tonne, translating to an average amount of about $32.5 per tonne. This analysis considers three scenarios of bauxite price determination – a low price scenario of $29 per tonne, an average price scenario of $32.5 per tonne and a high price scenario of $40.5 per tonne.

Under good economic conditions, characterised by high bauxite prices, the revenue of $225 million is obtained at a production level of 5 million tonnes. Similarly, under bad conditions characterised by low bauxite prices, total revenue under a production level of 5 million tonnes is reduced by about $80 million (See Table 2). Estimating net benefit across all combinations provides multiple cases. However, this analysis dwells on three main scenarios for the estimation of the net benefits:

Scenario one (Worst case scenario): The worst-case scenario is obtained when bauxite is sold at the lowest price but produced under the maximum operating cost. This scenario incurs net losses in many cases. In the worst-case scenario, a loss of about $31 million is incurred at a production volume of 5 million tonnes. The losses increase with increased production levels.

Scenario two (Average case scenario): This scenario presents the situation where bauxite is sold at the average price, at an average production cost. Under this scenario, an average gain of about $42 million per year is realised with a maximum gain of $138 million under high production.

Scenario three (Best case scenario): The best-case scenario is obtained when bauxite is sold at a high price with the lowest cost of production. This scenario, under the various production levels, presents the highest net benefit. Under this scenario, which is the highest, an estimated average benefit of $154 million is realised with a maximum of $598 million under high production.

Analysis of net benefits indicates that losses will occur at the scenario where the price of bauxite is low with high production cost, irrespective of the volume of bauxite mined. Maximum net benefits are obtained with high prices and low production costs, coupled with high production volumes.

Benefit-cost ratios (BCR) measure the ratio of revenue to costs in each scenario. High values of BCR (BCR<1) indicate high revenues as compared to its costs, eventually yielding high profits. Benefit-cost ratios are independent of production volumes. For the bauxite scenario, lower BCR is recorded for the worst-case scenarios, where the price of bauxite is lower and its operating costs are high. Increased volume production requires new investment hence the higher cost associated with production but higher production from existing mines is associated with a lower cost because investment costs are observed.

Table 2: Revenues and net benefits for bauxite production

Metric	Low	Medium	High	Unit
Tonnes refined per year	5.00	10.00	20.00	Million tonnes
Alumina prices				
Low bauxite price	29.00	29.00	29.00	USD
Average bauxite price	32.50	32.50	32.50	USD
High bauxite price	40.50	40.50	40.50	USD
Total Benefits				
Total Benefits (low price)	145.00	290.00	580.00	Million USD
Total benefit (average price)	162.50	325.00	650.00	Million USD
Total benefit (high price)	225.00	450.00	900.00	Million USD
Net benefits				
Worst case scenario	-31.29	-80.10	-177.73	Million USD
Average case scenario	42.17	74.13	138.04	Million USD
Best case scenario	154.73	302.61	598.38	Million USD
BCR				
Worst case scenario	0.82	0.78	0.77	
Average case scenario	1.35	1.30	1.27	
Best case scenario	3.20	3.05	2.98	

Alumina production

The Ghanaian government plans to seek investment to create a refinery that refines up to 4 to 6 million tonnes of alumina. This will require about 8 to 12 million tonnes of bauxite.

Alumina production costs depend on factors such as energy, price of bauxite and the price of caustic soda, hence they vary across countries and companies. The average production cost stands at about $280 per tonne (Alcoa, 2019; Dash, 2019). However, Ghana requires significant investments in alumina refineries to produce alumina. Generally, the investment cost of alumina refineries is $1000 per tonne (Tuler & Scott-Taggart, 2001). The calculated annualised costs of investments in alumina refineries are also added to each of the scenarios underlying the cost of alumina production.

The determination of final costs of alumina production, including its annualised investment costs also present several scenarios across each production level out of which three main scenarios are used for this analysis:

1. Best case scenario – Lower production cost and 5% discount rate on investment cost

2. Average case scenario – Average production cost and 8% discount rate on investment cost
3. Worst case scenario – High production cost and 14% discount rate on investment costs.

Cost determination for alumina is presented in Table 3.

Table 3: Cost determination for alumina production

Metric	**Low production**	**Medium production**	**High production**	**Units**
Production volume[7]				
Tonnes refined per year	2.00	4.00	6.00	Million tonnes
Production cost estimates				
Low production cost per tonne	250.00	250.00	250.00	Million USD
Average production cost per tonne	280.00	280.00	280.00	Million USD
High production cost per tonne	320.00	320.00	320.00	Million USD
Investment costs				
Investment cost per tonne	1000.00	1000.00	1000.00	Million USD
Total investment cost	5000.00	7500.00	10000.00	Million USD
Lifespan of plant	50.00	50.00	50.00	Years
Annualized cost of investment				
5% discount rate	109.55	219.11	328.66	Million USD
8% discount rate	163.49	326.97	490.46	Million USD
14% discount rate	280.40	560.80	841.20	Million USD
Total production costs				
Best case scenario	609.55	1219.11	1828.66	Million USD
Average case scenario	723.49	1446.97	2170.46	Million USD
Worst-case scenarios	920.40	1840.80	2761.20	Million USD

Alumina benefits

The London Metal Exchange (LME) prices of alumina indicate a price range of $330 to $410 per tonne of alumina. The average value is calculated to be about $370 per tonne. Three scenarios are presented for the determination of the net benefits of alumina at the various production levels while considering the cost-based scenarios. The worst-case scenario is identified by low alumina prices and the highest cost of production (worst case scenario in cost case). The average case scenario is determined by average alumina prices and an average

[7] GIADEC plans to secure investment that is worth constructing about 3 alumina refineries with a combined capacity of between 4 to 6 million metric tonnes. Source: https://www.graphic.com.gh/news/general-news/ghana-news-ghana-integrated-aluminium-development-corporation-scouts-for-investors.html

cost of production (an average-case scenario in the cost case). Similarly, the best-case scenario is determined by high alumina prices and the lowest production cost (best case scenario in the cost case).

Table 4 provides the revenue and benefits determination for alumina production. It must be noted that there shall be unrefined bauxite, given the estimated alumina amounts which are assumed to be exported. The analysis of residual bauxite exports is presented in later sections of this text.

Analysis of alumina revenues indicates that, in the worst case, net benefits of alumina will be a loss of $260 million, increasing with the high production of alumina. Under the best case, net benefits of alumina production yield a profit of $210 million under a low production rate, with increases to $631 million under high production.

Table 4: Revenue and net benefit determination for alumina production

Metric	**Low**	**Medium**	**High**	**Unit**
Tonnes refined per year	2.00	4.00	6.00	Million tonnes
Alumina prices				
Low alumina price	330.00	330.00	330.00	USD
Average alumina price	370.00	370.00	370.00	
High alumina price	410.00	410.00	410.00	
Total Benefits				
Total Benefits (low price)	660.00	1320.00	1980.00	Million USD
Total benefit (average price)	740.00	1480.00	2220.00	Million USD
Total benefit (high price)	820.00	1640.00	2460.00	Million USD
Net benefits				
Worst case scenario	-260.40	-520.80	-781.20	Million USD
Average case scenario	16.51	33.03	49.54	Million USD
Best case scenario	210.45	420.89	631.34	Million USD
BCR				
Worst case scenario	0.72	0.72	0.72	
Average case scenario	1.02	1.02	1.02	
Best case scenario	1.35	1.35	1.35	

Aluminium production

The final phase of the aluminium value chain is the smelting of alumina into aluminium. Government plans to retrofit the existing VALCO smelter to produce about 300,000 tonnes of aluminium. VALCO has a smelting capacity of 200,000 tonnes per year and is currently operating at a level of 20,000 tonnes per year. The Integrated Aluminium Industry (IAI) plans to retrofit VALCO to increase production and add two new smelters which cumulatively produce about 800,000 metric tonnes of aluminium per year.

Power is a major component of the total cost for aluminium, forming about a third of total aluminium cost. The power cost and the energy efficiency of the smelter in a particular country can, however, change the cost profile significantly. Ghana currently uses a Soderberg smelter which consumes about 16MW to 17MW of power per tonne (Husband, McMahon & van der Veen, 2009). However, new Prebake technologies use about 15 percent less energy, translating to about 13MW of power per tonne. In 2012, the IEA Energy Technology Network estimated the capital cost of new prebake point feeder technologies to be about €4000 ($5120 per 2012 Euro-Dollar exchange rates).

A price of $0.05 per kWh of power will shoot the total operating cost of aluminium to over $2100 per tonne, which is above the global aluminium price. Two cost scenarios are studied under the aluminium smelter. First, power is obtained at a cost of $0.05 per kwh and second, power costs obtained at $0.035 per kwh. The efficiency of the smelter is averaged to be 13 MW per tonne of aluminium produced.

Table 5: Cost determination for aluminium production

Metric	Current production	Average production	Maximum production	
Production volume				
Tonnes of aluminium per year	0.30	0.60	0.80	Million tonnes
Average investment costs[8]	512.00	2048.00	3072.00	Millions USD
Lifespan	50.00	50.00	50.00	Years
Annualised investment costs				
5%	28.05	112.18	168.27	Millions USD
8%	41.85	167.41	251.11	Millions USD
14%	71.78	287.13	430.70	Millions USD
Cost per tonne				
Power costs at 5 cents/kwh	650.00	650.00	650.00	USD
Power costs at 3.5 cents/kwh	455.00	455.00	455.00	USD
Total cost per tonne				
High power cost scenario	195.00	390.00	520.00	USD
Low power cost scenario	401.47	802.94	1070.59	USD
Total costs of production				
Total costs (High power costs, 14% annualised cost)	645.31	1434.19	1960.11	Million USD
Total costs (low power costs, 5% annualised costs)	429.52	915.12	1238.86	Million USD
Total costs (average power costs)	537.41	1174.66	1599.48	Million USD

Net benefits for aluminium production are obtained by considering three scenarios:

1. Best case scenario: The best-case scenario is characterised by lower production costs (arising from low power costs) and high prices for aluminium.
2. Worst case scenario: This is characterised by high production costs arising mainly from high power costs and low aluminium prices.
3. Average case scenario: This is estimated by averaging the values of the low and high case scenarios.

Analysis of net benefits for aluminium production shows that in the worst-case scenario, net benefits from aluminium presents a loss of about $105 million under the current smelter capacity. This increases to $179 million in the best-case scenario.

[8] determination excluded an already existing smelter of 200,000 tonnes capacity.

Table 6: Revenue and net benefit determination for aluminium production

Metric	Current production	Average production	Maximum production	Unit
Production volume	0.30	0.60	0.80	Million tons
Benefits per tonne				
Benefits (low prices)	540.00	1080.00	1440.00	Million USD
Benefits (average prices)	583.50	1167.00	1556.00	Million USD
Benefits (high prices)	609.00	1218.00	1624.00	Million USD
Net benefits				
Worst case scenario	-105.31	-354.19	-520.11	Million USD
Average case scenario	46.09	-7.66	-43.48	Million USD
Best case scenario	179.48	302.88	385.14	Million USD
BCR				
Worst case scenario	0.84	0.75	0.73	
Average case scenario	1.09	0.99	0.97	
Average case scenario	1.42	1.33	1.31	

Estimating the costs and benefits of the entire aluminium value chain.

The analysis given above indicates the net benefits under each of the phases within the Integrated Aluminium Industry. This section, however, estimates the maximum value obtained from the entire aluminium value chain based on the costs and the benefits provided. The cumulative assessment takes note of the following assumptions:

1. Revenues from bauxite and alumina volumes needed for domestic aluminium production are sunk into the cost determination for alumina production.

2. Export values from bauxite and alumina are added to benefit estimation in the entire aluminium value chain.

Table 7: Marginal cost determination for bauxite, alumina, and aluminium

Metric	Low production	Average production	High production	Unit
Bauxite production volume	*5*	*10*	*20*	*million tonnes*
Total Bauxite costs				
Best case scenario	70.27	147.39	301.62	Millions USD
Average case scenario	120.33	250.87	511.96	Millions USD
Worst case scenario	176.29	370.10	757.73	Millions USD
Average bauxite costs	122.29	256.12	523.77	
Alumina Production volumes	2.00	4.00	6.00	*Million tonnes*
Alumina marginal costs				
Best case scenario	438.88	877.76	1316.64	Millions USD
Average case scenario	520.91	1041.82	1562.73	Millions USD
Worst case scenario	662.69	1325.38	1988.06	Millions USD
Average marginal costs	540.83	1081.65	1622.48	Millions USD
Aluminium production volumes	*0.3*	*0.6*	*0.8*	*Million tonnes*
Aluminium marginal costs				
Aluminium marginal costs (high)	432.36	960.91	1313.27	Millions USD
Aluminium marginal costs (Low)	287.78	613.13	830.04	Millions USD
Aluminium marginal costs (Average)	360.07	787.02	1071.65	Millions USD

Total costs in the IAI

Table 1 provided the total cost of bauxite production under the various production levels and price scenarios. This gives a minimum production cost of $70.27 million for low production levels at a lower production cost and a maximum of $757 million for high production levels at a higher cost of production. An average cost of bauxite production is obtained for each of the production levels.

Marginal costs for this analysis are defined as the cost of producing the commodity less the price of the raw material. For instance, the marginal cost of alumina is obtained by considering other cost factors other than bauxite. For alumina, bauxite forms between 25 to 30 percent of total production cost, which is averaged to be about 28 percent of the total alumina production cost. Similarly, alumina forms between 25 to 38 percent of aluminium prices which is averaged to be a third of aluminium prices. The marginal costs and their respective average marginal costs for bauxite, alumina, and aluminium are presented in Table 7.

Using the average marginal costs for each phase of the aluminium value chain, there are about 27 different total cost scenarios as presented in Table 8. The scenarios are given an *A-B-C* nomenclature where item A represents cost scenarios for bauxite, B represents the cost scenario for Alumina and C represents cost scenarios for Aluminium. For example, total cost under the name *L-M-H* represents lower production costs for bauxite, average production costs for alumina and High production costs for aluminium.

Table 8: Estimation of total costs under production-level scenarios.

Scenarios	Total cost (USD M)	Scenarios	Total cost (USD M)	Scenarios	Total cost (USD M)
LLL	1023	LLM	1450	LLH	1735
LML	1745	LMM	1991	LMH	2276
LHL	2286	LHM	2532	LHH	2816
MLL	1334	MLM	1581	MLH	1865
MML	1698	MMM	2125	MMH	2409
MHL	2239	MHM	2666	MHH	2950
HLL	1425	HLM	1852	HLH	2136
HML	1965	HMM	2392	HMH	2677
HHL	2506	HHM	2933	HHH	3218

Total benefits in IAI

For each production level, the benefit for the IAI is estimated. Total benefits are obtained for alumina and aluminium only since all bauxite produced is assumed to be absorbed in alumina production, rather than sold. Considering the production levels of aluminium, it is observed that a substantial volume of alumina shall be leftover and exported in its raw form with the remainder being utilized locally for aluminium production. This section includes exports of bauxite and alumina that were not refined locally into alumina and aluminium respectively. The total benefits for alumina and aluminium are therefore presented in Table 9.

Table 9: Estimating total benefits from alumina and aluminium

Metric	Low production	Average production	High production	Unit
Bauxite export volume	1.00	2.00	8.00	Million tonnes
Bauxite export benefits				
Export value (low prices)	29.00	58.00	232.00	millions of USD
Export value (average prices)	32.50	65.00	260.00	millions of USD
Export value (high prices)	45.00	90.00	360.00	millions of USD
Average exports	35.50	71.00	284.00	millions of USD
Average Alumina export volume	0.87	2.87	4.87	*Million tonnes*
Alumina export benefits				
Worst case scenario	286.00	946.00	1606.00	Millions of USD
Average case scenario	320.67	1060.67	1800.67	Millions of USD
Best case scenario	355.33	1175.33	1995.33	Millions of USD
Average benefit	320.67	1060.67	1800.67	
Average aluminium production volume	0.30	0.60	0.80	*Million tonnes*
Aluminium production benefits				
Worst case scenario	540.00	1080.00	1440.00	Millions of USD
Average case scenario	583.50	1167.00	1556.00	Millions of USD
Best case scenario	609.00	1218.00	1624.00	Millions of USD
Average benefit	577.50	1155.00	1540.00	Millions of USD

The total benefits are estimated in the same way as the total costs were estimated under the 27 scenarios as presented in Table 10. The figures for total revenue seem repetitive since the scenario for bauxite revenues across the production levels are assumed to be zero.

Table 10: Total benefit estimations for production levels in IAI.

Scenarios	Total benefit (USD M)	Scenarios	Total benefit (USD M)	Scenarios	Total benefit (USD M)
LLL	934	LLM	1511	LLH	1896
LML	1674	LMM	2251	LMH	2636
LHL	2414	LHM	2991	LHH	3376
MLL	969	MLM	1547	MLH	1932
MML	1709	MMM	2287	MMH	2672
MHL	2449	MHM	3027	MHH	3412
HLL	1182	HLM	1760	HLH	2145
HML	1922	HMM	2500	HMH	2885
HHL	2662	HHM	3240	HHH	3625

Net benefits in IAI

Tables 11, 12 and 13 present the net benefits, BCR and percentage of GDP for each of the 27 scenarios. The maximum net benefit is about $559 million per year which is characterised by a low bauxite production, high alumina production and high production of aluminium. This is about 1 percent of GDP. The maximum net loss is characterised by average bauxite production, low alumina production and low production of aluminium, costing the nation about 0.6 percent of GDP. Generally, an average net benefit of $140 million per year is obtained, which is about 0.24 percent of GDP. Benefit-cost ratios are range from a minimum of 0.73 to a maximum of 1.2 with an average BCR value of 1.05. These values, however are characterised by high fluctuations as the standard deviation is about $221 million.

Table 11: Net benefits estimation for production scenarios in IAI.

Scenarios	Total net benefit (USD M)	Scenarios	Total net benefit (USD M)	Scenarios	Total net benefit (USD M)
LLL	-90	LLM	61	LLH	161
LML	-71	LMM	260	LMH	361
LHL	128	LHM	459	LHH	560
MLL	-365	MLM	-34	MLH	66
MML	11	MMM	162	MMH	262
MHL	211	MHM	361	MHH	461
HLL	-242	HLM	-92	HLH	8
HML	-43	HMM	107	HMH	208
HHL	156	HHM	306	HHH	407

Table 12: BCR estimation for production scenarios in IAI

Scenarios	Total benefit (USD M)	Scenarios	Total cost (USD M)	Scenarios	Total cost (USD M)
LLL	0.91	LLM	1.04	LLH	1.09
LML	0.96	LMM	1.13	LMH	1.16
LHL	1.06	LHM	1.18	LHH	1.20
MLL	0.73	MLM	0.98	MLH	1.04
MML	1.01	MMM	1.08	MMH	1.11
MHL	1.09	MHM	1.14	MHH	1.16
HLL	0.83	HLM	0.95	HLH	1.00
HML	0.98	HMM	1.04	HMH	1.08
HHL	1.06	HHM	1.10	HHH	1.13

Table 13: Net benefits as a percentage of GDP

Scenarios	Total benefit (USD M)	Scenarios	Total cost (USD M)	Scenarios	Total cost (USD M)
LLL	-0.2%	LLM	0.1%	LLH	0.3%
LML	-0.1%	LMM	0.4%	LMH	0.6%
LHL	0.2%	LHM	0.8%	LHH	1.0%
MLL	-0.6%	MLM	-0.1%	MLH	0.1%
MML	0.0%	MMM	0.3%	MMH	0.5%
MHL	0.4%	MHM	0.6%	MHH	0.8%
HLL	-0.4%	HLM	-0.2%	HLH	0.0%
HML	-0.1%	HMM	0.2%	HMH	0.4%
HHL	0.3%	HHM	0.5%	HHH	0.7%

1.3. Conclusion and Policy Implications

This analysis was done to examine the costs and benefits of the Integrated Aluminium Industry instituted by the Government of Ghana. The analysis presented various scenarios of costs and benefits to each level of the aluminium value chain, beginning from bauxite production to aluminium smelting. The study shows that the IAI is profitable under some cost and production levels.

It is noteworthy to include other social benefits from direct and indirect employment as a result of this intervention, which is not part of this analysis. There are however several factors that will impact the total profitability of the IAI. One important factor is the cost of power. Power is essential to the success of the IAI. Obtaining power at a lower price significantly reduces the cost of production of alumina and aluminium. Further substantial reductions are possible when smelters with high efficiencies, i.e. smelters that utilise lesser power to produce a tonne of alumina and aluminium are used. However, this has bearing on investment costs and will require substantial investments to obtain such smelters. This notwithstanding, the benefits of reduced costs over the life of the smelter and refineries add to the profitability of the IAI.

Secondly, the profitability of the industry depends on the production volumes of bauxite, alumina, and aluminium. The analysis shows that producing bauxite at higher volumes will only lead to an increase in exports of raw bauxite and alumina which limits the benefits of value addition. Producing bauxite at volumes as low as 5 million tonnes a year is enough to meet the estimated needs for alumina and aluminium based on their estimated capacities. It is for this reason that the low production of bauxite, coupled with high volumes of alumina and aluminium production presents the best-case scenario for Ghana under the IAI. This reduces production costs and presents the country with increased benefits for value addition.

It must also be highlighted that other costs should be factored into the analysis such as environmental and social costs which to date have not been objectively concluded. According to the GIADEC, the country has not done any social and environmental impact analysis as they were waiting for investor commitment. Destruction to the local economy that hinged on the forest, loss of community livelihoods and other living creatures, water bodies, etc are yet to be fully examined. The conclusion of this study should, therefore, bear these in mind going forward. The government will have to decide whether it intends to finance the initial investment or invite private investors. Obviously, given the limited fiscal space available to the government, inviting private investors seems most feasible. This should be considered after an independent social and environmental impact analysis has been carried and the necessary safeguards have been adhered to.

2. Intervention 2: Use of Specialised Economic Zone in Ghana's Industrialisation Drive.

2.1. Introduction

The concept of Free zones or Specialised Economic Zones has long been recognised in the development literature as part of market-oriented, institutional, structural and economic reforms. Perhaps with the setting up of the first Shannon Free Zone in Ireland in the 50s, the development of export processing zones in emerging markets grew worldwide (Stein 2012), notably in China, India and Singapore and many other places including Africa. They were originally conceived to attract export-oriented firms and facilitate trade, attract foreign direct investment, aid technology transfers and boost domestic private sector competitiveness with the end goal of spurring economic growth and development. With the onset of globalisation, developing countries saw Free Zones or Export Processing Zones as a key policy intervention to participate in global value chains and boost export earnings.

The post-independence African economic policy prescription focused predominantly on import substitution with manufacturing being the anchor. The inefficient import-substitution policy pursued by most developing countries especially in Sub Saharan Africa (SSA) in the 1970s then led to the setting up of export promotion strategies to engineer economic growth based on SEZs. The aim was to attract FDI, thus prompting the paradigm shift to export promotion under the notion of the outward orientation of countries and consistent with the dictates of globalisation and neo-liberal economic policies with economic growth as the end goal (Kinunda-Rutashobya, 2003; Aggaewal, 2005; Quaicoe et al, 2017). According to Cook (2000), Export Processing Zones were also packaged as a means of overcoming the traditional economy-wide barriers to export or trade evidenced by weak exports from Sub-Saharan African. The share of world exports from this region declined from 3.74% in the early 80s to a paltry 1.49% in the year 2003 (Babatunde, 2009) with Africa's share of world export declining by more than 60% in the last three decades. Unfavourable terms of trade especially with traditional exports/primary commodities, the low savings rate in face of high need of investment and the drive to diversify export base as a part of broader economic diversification aided this paradigm shift.

The International Labour Organisation documents that in 2006 some 3500 Zones had been established in approximately 130 countries across the globe that offered around 66 million people employment equivalent to 2% of world employment (Boyenge, 2007). Enormous as this may be in nominal terms, the question arises whether the share of the 2% of global employment is justified in the face of the sacrifices that have to be made as well as the geographical distribution of the employment creation especially concerning developing countries such as Ghana. The theoretical benefits of Free Zones, underpinned by neoclassical theory, cost-benefit analysis, new growth theory, and the export-led growth hypothesis, have not always fully materialised, particularly in emerging and frontier markets. This according to Farole (2010) is partly the result of a lack of systematic data-driven analysis on the performance of Export Processing Zones or Specialised Economic Zones around the world and Africa in particular.

Providing an ex-ante analysis of benefits and costs can be problematic given the challenges of anticipating all costs, benefits, including non-quantifiable benefits and costs associated with the operationalisation of such Zones. Costs show up in the form of host governments giving vastly generous trade incentives or subsidies or broadly tax expenditures to export-oriented firms (fiscal losses) and other huge initial investments and several guarantees. Additional unanticipated costs such as overruns and land disputes also make precise cost estimation challenging. Benefits have included volume increase in export, foreign exchange earnings, income taxes, employment, the attraction of foreign direct investment, technology transfer, etc. However, empirical evidence on the economic impact has not been uniform.

A World Bank report in 1999 authored by Madani (1999) concluded with a focus on Senegal and Mauritius that EPZs did not generally fulfil the roles of engines of industrialisation and engines of growth as anticipated in the conceptualisation and few benefits including employment generation, the attraction of FDI accrued. Similarly, De Armass and Jallab (2002) concluded with the Mexican experience that overall, the EPZs (Maquiladoras) had not been successful as an engine in modernising and growing the Mexican industrial sector. Even in Mauritius where some success has been recorded, it's been argued that EPZs should be operated as an overall trade-oriented reform program aimed at opening up the whole economy rather than being treated as enclaves (Kinunda-Rutashobya, 2003). The experience of China is however much better in comparison though caution has been sounded in its wholesale adoption elsewhere in the world as opined by Graham (2004). That said, Jayanthakumaran (2003) found that EPZs in South Korea, China, Malaysia, Sri Lanka, and Indonesia have been economically efficient, generating returns well above estimated opportunity costs. The exception was the Philippines' EPZ which generated negative net present value (NPV) due to the huge infrastructure costs incurred in setting up the zones in that country. Engman et al. (2007) found that for three BRICS nations of Russia, India, and China, EPZs are a sub-optimal policy from an economic point of view because the policy benefits are few and distort the allocation of scarce resources, although they may serve as a useful stepping stone in the trade liberalisation agenda especially for poor countries. Further, the study noted that the policy should not be viewed as a substitute for an overall national economic reform. This presupposes that the effect of EPZ or SEZs is not universal and that country-specific context is very important in translating the theoretical benefits into actual. This provides the channel for Ghana to evaluate the policy options before embarking up the idea of regional specialized economic zones given that the country has now sixteen regions – up from the previous ten regions. The next section provides Ghana’s experience so far and the policy options for considerations.

2.2 The Free Zone in Ghana: The Story So far.

Ghana embraced the concept of Specialised Economic Zones or Export Processing Zones in the mid-90s as part of a broader economic strategy. In 1995 a law was passed to set up the Ghana Free Zones Board (GFZB) under an Act of Parliament that received presidential assent in August 1995. The sole aim of establishing and promoting Export Processing Zones was to facilitate the establishment of free zones in Ghana and also to provide for the regulation of activities in the free zones and its related purposes. In Ghana, Export Processing Zones are used interchangeably with Free Zones because companies operating in the Zones enjoy some incentives not available to other firms' outside the enclave (so called ‘freebies’).

There have been a total of four zones in Ghana located in Shama, Sekondi, Tema and the Ashanti Region, though in reality, only the Tema one is functioning with investors being sought for the other three. In reality, the GFZB operates both the enclave scheme and the single-factory location scheme which makes the whole country a free zone for which a firm can set up anywhere in the country and still enjoy the status of free zones. This is after meeting certain basic requirements, the most important of which is the firm’s ability to prove the existence of a ready foreign market for its products (Quaicoe et al, 2017).

Later in July 1998, the Trade Gateway and Investment Project was approved and became effective in 1999 and sought to attract a critical mass of export-oriented firms and facilitate trade in Ghana, the development of off-site infrastructure for a privately financed Export Processing Zone; and the improvement of the quality and standards of services delivered to investors and exporters by the Borrower's institutions and agencies responsible for trade and investment. Under the review of the Trade Gateway and Investment project, it was noted that the Free Zones Board was not being coordinated well and as such was not achieving its fundamental developmental objectives. The review proposed the need to change the nature of the Tema enclave from an Export Processing Zone (EPZ) to a Multi-Purpose Industrial Park (MPIP) - which may still retain certain free zone characteristics, and to include the provision of credit funds for the construction of “on-site” infrastructure. As far back as the late 90s, there have concerns about the deliverables from the operation of the zones giving the numerous incentives the government offers.

Quaicoe et al (2017) show that both free zones exports and free zones investments have a significant negative relationship with economic growth under the static benefit approach. Milberg, (2007) asserts that the implementation of the Free Zones Programme comes with two key types of benefits, namely static and dynamic benefits. The paper clarifies that the static benefits are the easily quantifiable outcomes that a country derives in the short-term from the use of EPZs such as investments, employment, and exports. The dynamic benefits, on the other hand, are the long-term not-so-easily quantifiable outcomes from the implementation of EPZs as a trade policy tool such as technology transfer, integration with the domestic economy and ultimately structural change.

Consequently, Quaicoe et al (2017) under the assumption of the static benefits approach employed the vector error correction model (VECM) in examining the relationship between exports, investments and overall economic growth in Ghana whilst representing overall economic growth by nominal dollar GDP (*GDP*) and Free Zone activities by free zones exports and free zones investments. The study concludes that the Free Zones Programme has not served its purpose of promoting economic growth in Ghana given its common knowledge that the concept of free zones is a second-best option and as such is not meant to be a lasting policy for promoting economic growth. The study recognising the negative effect of EPZs urged the government to scrap the concept and possibly look at opening up the whole country, especially in terms of infrastructure and other incentives for all firms, so that economic activity can freely take place in every corner of the country to realise balanced and more sustainable growth of the economy

There have been abuses at the Zones. It was recently reported that about 80 companies licensed to operate as free zone companies are inactive and unfit to carry out business as beneficiaries of the Free Zones Act according to the Ghana Free Zones Authority. An Action Aid funded report in 2014 highlighted weaknesses in Ghana's Free Zones operationalisation and pointed out that, the numerous tax exemptions granted under the practice dwarf the benefits of the enclave. It reports in its findings that, though FDI has inched up, trade taxes have declined. Ghana was subject to the lowest tax rates in West African sub-region thus undermining the harmonisation of trade and investment regimes across the sub-region through initiatives such as the ECOWAS Common External Tariffs (CET). Ghana's trade and investment strategy has invariably contributed to the "race to the bottom" phenomenon that has bedevilled the sub-region in the last three decades. The report concluded that Ghana's Free Zones, in particular, has shown significant improvement in financial performance since 2007, but the fact that the country's trade balance is still in the negative suggests that the Free Zones concept has so far failed to turn the trade balance in Ghana's favour.

Against this backdrop, the Ghana Free Zone Authority (GFZA) has announced plans to establish Special Economic Zones in every region of the country in line with the government's industrialisation drive. In line with this GFZA is engaging stakeholders to revise the Act whilst an appeal has been made to traditional leaders to make available lands for the development of industrial enclaves within their jurisdictions to create jobs for the youth and boost economic growth.

2.3. Policy Recommendations

The global, emerging and Ghana specific experience point to a broad policy shift from the concept of SEZs as captured in the following recommendations. In the current form, the evidence points heavily towards concentrating limited resources to embarking on economy-wide reforms rather than geographically delimited areas within which governments facilitate industrial activity through fiscal and regulatory incentives and infrastructure support. To this extent, any policy intervention in this direction will yield a sub-optimal impact probably translating to BCR of less than one particularly as the dynamic benefits of SEZs are long term and do not easily lend themselves to quantification.

In 2014, ActionAid proffered that tax incentives on their own do not attract FDIs but other factors such as skills pool, availability of social and infrastructural facilities such as good schools, health facilities, road network, electricity, etc. may also count as significant considerations in investment decisions. This is evident by the fact that despite tax exemptions (25%) to other regions excluding Accra and Tema, there is still over-concentration of investment inflows to these two major cities perhaps indicating that other factors rank ahead of tax exemptions. Tax exemptions have not promoted FDI but economic stability anchored on fiscal and monetary policy and quality infrastructure. Given the limited fiscal space in Ghana, it would be economically prudent for the government to utilise that space to open up the whole economy to guarantee a minimum competitive threshold for all firms in the country as argued by Quaicoe et al (2017). Ghana’s economy is predominantly SME based scattered all over the country and free zoning might only serve the interest of foreign firms rather than encouraging domestic private capital (domestic firms) to take such advantages. Lately, however, GFZA has been urging local firms to relocate and take advantage of the opportunities the zones offer. That said, the drive to stipulate minimum capital for entry into the enclaves as part of the proposed amendment to the Act might end up in a zero-sum game.

Currently, road and rail infrastructure deficit add significantly to the restrictions on the growth drivers of the economy. Out of the 67,000km road stock, only 12,800km are the main arteries with 3,800km paved. This is made worse by the low central government budget allocation as a result of the low domestic revenue mobilisation, rising emoluments of public sector workers and interest payments on the country's debt stock. Currently, compensation of employees and interest payments absorb approximately 97% of the country's non-tax revenue. Several private-sector surveys including Ease of Doing Business, Enterprise Survey, Global Competitiveness Index and Country Private Sector Diagnostic (CPSD) point to many constraints that the concept of SEZs cannot address given the huge investment and tax expenditures associated with such intervention. Especially now that it is planned for every region (16) to have SEZ. The World Economic Forum's Global Competitive Index (GCI) in its report ranked Ghana 106 out of 140 countries predominantly on the back of poor infrastructure. On the readiness of the future of production report (2018), Ghana needs to improve on its performance both in terms of the structure of production and drivers of production that requires broadly based investment in both hard and soft infrastructure among other interventions. This is particularly daunting given the dwarfed revenue envelope, expenditure and the fact that more than 30% of Ghana’s hard infrastructure (roads) will be impacted by climate change in the upcoming years.

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GHANA PRIORITIES

The Ghanaian economy has been growing swiftly, with remarkable GDP growth higher than five per cent for two years running. This robust growth means added pressure from special interest groups who demand more public spending on certain projects. But like every country, Ghana lacks the money to do everything that citizens would like. It has to prioritise between many worthy opportunities. What if economic science and data could cut through the noise from interest groups, and help the allocation of additional money, to improve the budgeting process and ensure that each cedi can do even more for Ghana? With limited resources and time, it is crucial that focus is informed by what will do the most good for each cedi spent. The Ghana Priorities project will work with stakeholders across the country to find, analyze, rank and disseminate the best solutions for the country.

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Copenhagen Consensus Center is a think tank that investigates and publishes the best policies and investment opportunities based on social good (measured in dollars, but also incorporating e.g. welfare, health and environmental protection) for every dollar spent. The Copenhagen Consensus was conceived to address a fundamental, but overlooked topic in international development: In a world with limited budgets and attention spans, we need to find effective ways to do the most good for the most people. The Copenhagen Consensus works with 300+ of the world's top economists including 7 Nobel Laureates to prioritize solutions to the world's biggest problems, on the basis of data and cost-benefit analysis.