



GHANA STATISTICAL SERVICE

PRODUCTIVITY, EMPLOYMENT AND GROWTH

NATIONAL REPORT 2024

with support from



International
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Productivity Ecosystems
for Decent Work



Schweizerische Eidgenossenschaft
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Federal Department of Economic Affairs,
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Norway

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ADMINISTRATIVE MAP OF GHANA



FOREWORD

Productivity is widely recognized as a fundamental driver of economic growth and sustainable development. As economies evolve, productivity growth driven by innovation, technological advancements, workforce development, and efficient use of resources becomes critical not only for improving living standards but also for ensuring the long-term economic prosperity of a country. In the case of Ghana, monitoring productivity trends is essential to understanding the current state and future trajectory of the economy.

As Ghana continues to grow and diversify its economy, it is necessary to understand how efficiently labour, capital, and other resources are being utilised. Tracking productivity trends allows for the identification of areas where the country excels and areas that may require targeted improvements. Assessing productivity indicators also offers insights into the structural shifts in the economy, the effectiveness of policy interventions, and the resilience of different sectors in the face of both local and global challenges.

The publication of this report marks the first time of presenting comprehensive productivity data that covers all sectors of the economy. This report provides a detailed and representative analysis of productivity trends across various industries. By providing both labour and multifactor productivity statistics, this report contributes to a deeper understanding of the factors that are influencing economic performance in the country.

This report provides a comprehensive view of productivity trends in all major sectors of the Ghanaian economy: agriculture, industry, and services, while also recognising the significant contributions of both the formal and informal sectors. The publication of this productivity report aims to foster greater economic transparency, dialogue, and evidence-based policymaking in Ghana. Further, the statistics presented align with international standards and best practices, offering valuable comparability to global productivity benchmarks. This allows policymakers, researchers, and development partners to position Ghana's productivity performance in a broader global context, while also informing local policy interventions that are contextually relevant to the country's unique needs.

Prof. Samuel Kobina Annim
Government Statistician

ACKNOWLEDGMENTS

This report represents the culmination of a dedicated and collaborative effort from a core technical team at the Ghana Statistical Service (GSS), which brought together expertise from various specialized units within the organization, in particular the Research and Data Science unit. Their contributions were instrumental in ensuring the robustness and reliability of the data, as well as the thoroughness of the analysis. Each member played a critical role in collecting, analysing, and interpreting the national economic and employment data to provide a comprehensive view of productivity trends across Ghana's economy.

The report also benefited from the invaluable technical support provided by the Employment Department of the International Labour Organization (ILO), particularly through their Productivity Ecosystems for Decent Work project, which operates in both Abuja and Geneva. This collaboration with the ILO brought global expertise and best practices into the process, ensuring that Ghana's productivity data aligns with international standards and methodologies. The support of the ILO team was essential in providing technical guidance on the conceptual framework and analytical tools used to assess productivity trends and their implications for labour markets and economic development. GSS is also grateful to Switzerland and Norway for providing financial support through the Productivity Ecosystems for Decent Work project.

The Ghana Statistical Service also acknowledges the important contributions of the High-Level Technical Productivity Working Group, whose members provided strategic direction, advice, and oversight throughout the development of the report. Their input was vital in ensuring that the report addressed key areas of concern for policymakers, as well as for stakeholders in the public and private sectors, including labour unions, employers, and development partners. Also, GSS is grateful for the technical support from academia, in particular, Professor William Baah-Boateng of the University of Ghana Department of Economics, for his invaluable contributions to the production of this report.

The Ghana Statistical Service expresses its deepest gratitude to all those involved, particularly the technical core team members, the High-Level Technical Productivity Working Group, and the leadership of the Government Statistician, Professor Samuel Kobina Annim. Their expertise, commitment, and collaboration have been critical in producing this important document, which will serve as a vital tool in monitoring productivity trends and supporting sustainable economic development in Ghana.

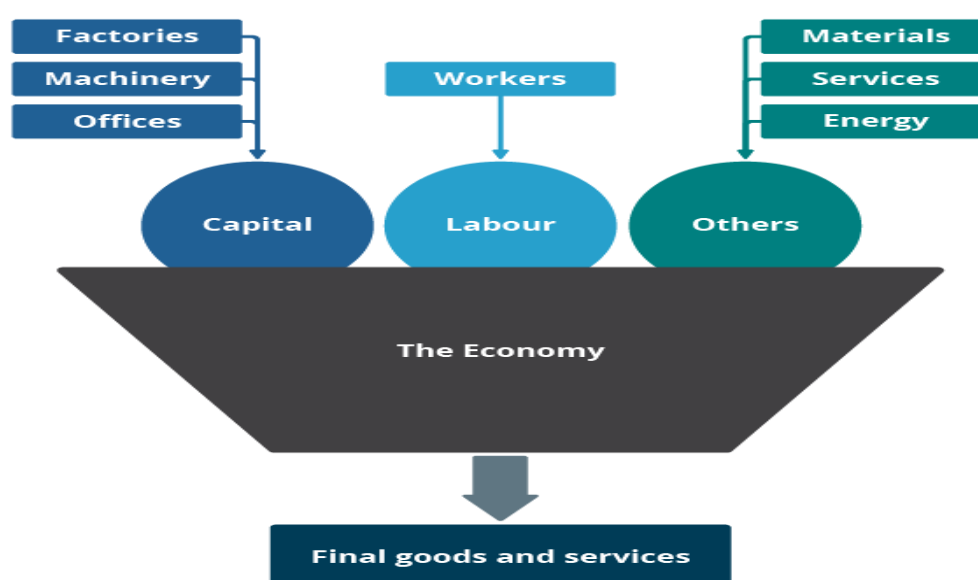
EXECUTIVE SUMMARY

What is labour and multi-factor productivity?

Labour productivity (LP) is simply a ratio of the country's economic output (the GDP) to the number of people employed (or the number of hours they worked). It is the most commonly used productivity measure worldwide to estimate the economic performance of a nation. It should not be considered as a direct measure of the “productivity of workers” in a country, as many factors influence economic production (the numerator in the ratio), including how much capital is invested, the availability and prices of natural resources, and many others.

Multifactor (or total-factor) productivity (MFP or TFP) is the second most commonly used productivity metric. It is calculated through an econometric equation based on the “growth accounting” approach in macroeconomics. MFP measurements seek to determine the contributions of labour and capital (the main *production inputs*) into the final economic output of a nation, and the contribution of a third element (obtained as a residual in the MFP equation). This residual element is considered as indicative of *efficiency gains* in the economy: how efficiently the economy uses its labour and capital to generate economic growth. It is linked in the medium and longer term to technological change. According to the ILO, MFP is a broad measure of productivity that goes beyond just labour productivity, which only considers the output per unit of labour. MFP includes multiple factors and can help assess how well an economy or sector is using its overall resources to generate economic growth.

FIGURE I: ECONOMIC INPUTS AND OUTPUTS (MFP)



Productivity is central to sustainable economic growth and social progress as it measures the contribution of different inputs to an output. Increased productivity and more equitable distribution of productivity gains between businesses and workers is critical to a country's long-term prospects. Productivity trends have implications for industrial or macroeconomic policies, negotiations on wages and working time.

Why measure labour and multi-factor productivity statistics in Ghana?

In this report, the Ghana Statistical Service for the first time provides key productivity statistics for Ghana, covering three decades, and with further detail for 2013 to 2022. In line with international standards and good practices, and with technical support from ILO, the report provides both labour productivity (that relates aggregate output to labour) and multifactor productivity (aggregate output relative to all inputs) trends. These statistics provide valuable insights into the efficiency of labour and other inputs in the economy. For policymakers, this data is critical in formulating sound economic policies aimed at promoting sustainable growth, improving competitiveness, and fostering innovation. By tracking productivity trends, policymakers can identify sectors that are underperforming or facing constraints that need attention. Further, labour and multifactor productivity are often linked to wages and employment opportunities. By improving productivity, government can create more wealth, potentially leading to better living standards and poverty reduction. It is an essential element for evaluating how effectively the economy is translating growth into benefits for the population. Last, the report provides insights into the dynamics of economic growth, capital and labour that have shaped Ghana's economic and social performance to this date.

- ❖ **Ghana has achieved a moderate level of labour productivity growth** since 1991, exceeding the performance of the average lower-middle income country but coming short of labour productivity growth levels in the average higher-middle income country.
- ❖ **The growth of productivity has increased since the beginning of the extraction of oil** in the early 2010s, with accelerations between 2010 to 2013 and 2013 to 2016.
- ❖ **This growth has not, however, generated sustained multifactor productivity growth and structural transformation.** These growth spurts are largely confined to the mining industry. Other economic activities that can generate productivity, decent employment growth and technological modernisation are not growing at pace. This underscores the fact that Ghana's labour market continues to be predominated by informality, unemployment and underemployment. As expected with the modernisation of the economy, household agriculture, crafts and trades have been losing employment as

they have gained in productivity. But employment flows out of these activities have been mostly towards lower-productivity activities in construction and other urban services.

- ❖ **Commercial agriculture, transportation, utilities and manufacturing have generated both net job creation and productivity growth.** In manufacturing, productivity has increased by 14 percent over the period 2013-2022, while employment has grown by 2.5 percent over the same period. Given its relatively large size and position in the economy, a rise in terms of growth in the manufacturing sub-sector in the coming years will be particularly important for Ghana's economy and social progress. Expectedly, the mining sector scored the highest levels of productivity growth but with no net job gains. The finance and insurance industry has been particularly dynamic in generating job opportunities for higher-skilled workers.
- ❖ **Average earnings in Ghana have been lagging productivity growth, and the divergence is increasing.** There are variations between sectors and sub-sectors as to how much productivity growth translates into earnings growth. Sub-sectors with highest earnings growth relative to productivity are utilities, construction, tourism, finance, insurance and professional services. In contrast, household agriculture, trade and repair services, education and other services, among others, are the sub-sectors where earnings growth is slower relative to productivity. These are also the more informal sectors, with lower organisation of labour and higher shares of self-employment.

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ABBREVIATIONS AND ACRONYMS

AHIES	Annual Household Income and Expenditure Survey
COVID-19	Coronavirus Disease 2019
ECOWAS	Economic Community of West African States
GLSS	Ghana Living Standards Survey
GSS	Ghana Statistical Service
GDP	Gross Domestic Product
GVA	Gross Value Added
ILO	International Labour Organization
ILOSTAT	International Labour Organization Statistics
LP(y)	Labour Productivity
MFP (A)	Multifactor Productivity
PIM	Perpetual Inventory Method
SAP	Structural Adjustment Programme
SSA	Sub-Saharan Africa
WDI	World Development Indicators

INTRODUCTION

What is productivity?

Productivity is defined as the efficient use of resources such as capital, labour and materials to produce goods and services. Productivity has come to be understood as central to sustainable economic growth and social progress. Rising productivity and the equitable distribution of productivity gains between businesses and workers is critical to a country's long-term prospects.

Measurement of productivity

Productivity measures can be classified as *single-factor* productivity measures – when they relate economic output to a single measure of input, or *multifactor* productivity measures – when they relate economic output to a combination of inputs, primarily, labour and capital. The most commonly used measures of productivity internationally are labour productivity (LP) and multifactor or total factor productivity (MFP or TFP). Labour productivity is the ratio of the total output (measured in terms of real GDP or real gross value added) on utilised labour inputs (measured in terms of the number of employed persons or hours worked), during a given time period. Multifactor productivity is obtained from a modularization that relates the growth of the total economic output to the growth of capital and labour inputs, and to the growth of a third element obtained residually. Both LP and MFP are critical metrics to appreciate economic trends and inform economic and social policy and dialogue.

Productivity trends allow to inform wages and salary negotiations and working time, as well as industrial or macroeconomic policies. Annual negotiations on the national minimum wage or sectoral collective bargaining on wages, working time and other working conditions should integrate changes in productivity in addition to the changes in the consumer price index (inflation).

This report thus fills an important gap in Ghana for economic and social policy making, and for constructive dialogue between Ghana's social partners. The Ghana Statistical Service (GSS) has produced for the first time a comprehensive report on Ghana's productivity trends. The report aligns with international standards for quality assurance and allows for comparability with other economies in Africa and the rest of the world. It makes use of the datasets produced by GSS over the years covering employment and earnings, capital accumulation and GDP for the period stretching from 1991 to 2022. Harmonising data series and their consolidation has involved the collaboration of GSS services responsible for labour, capital and national accounts. The data sources and computation methods, the assumptions and imputations that have been made are described. A disaggregation across the three broad sectors of

agriculture, industry and services has been possible for the period 1991 to 2019. Data with a finer disaggregation into 17 sectors has been used for the period 2013 to 2022.

This report is to be considered the first edition of GSS Productivity reports to be published in the future, to provide regular updates with the latest data available and to further detail sectoral and socio-economic evolutions in Ghana's economy and labour market, including on educational attainment and skills/occupations, formalization, and gender.

The next two sections of the report delve into Ghana's economy and labour market in section one and productivity trends in section two. Section one begins with the analysis of the patterns of economic growth followed by employment and decent work patterns in Ghana. The second section provides insight into aggregate labour and multi-factor productivity trends followed by sectoral productivity trends and ends with linkage between productivity and earnings.

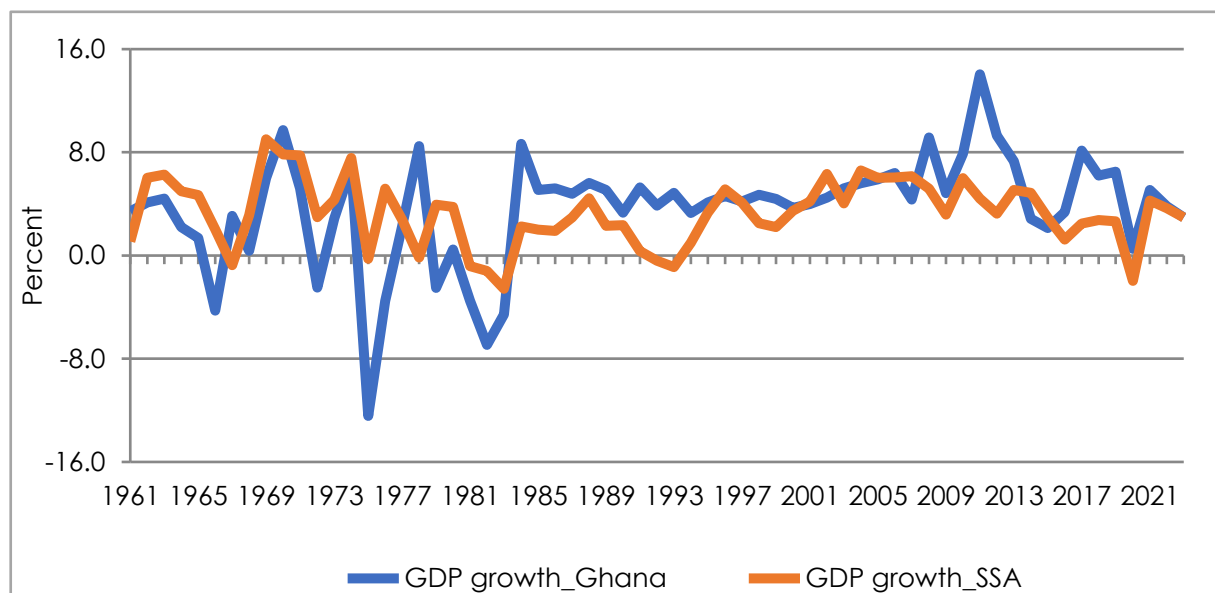
SECTION 1: GHANA'S ECONOMY AND LABOUR MARKET

Ghana is the second largest economy in West Africa behind Nigeria with a total GDP of US\$76.4** billion (National Accounts, GSS, 2023). The country has witnessed economic growth averaging 4.5 percent annually over the last three decades. Ghana attained middle-income status in 2006, and its per capita income stands at US\$2,436** as at 2023. Ghana has seen a consistent decline in poverty incidence since the 1990s, but inequality has risen, and its labour market continues to be dominated by a high degree of informality, unemployment and underemployment. Ghana's ability to achieve further and faster progress depends largely on its capacity to boost productivity and promote decent work.

1.1 The Patterns of Economic Growth

The Ghanaian economy was characterised by erratic growth in the 1960s and 1970s (Figure 1.1). Ghana has been able to maintain a relatively high level of growth (5.2 percent annual average) since 1984, generally trending above that of sub-Saharan Africa. Ghana's growth reached a high of 14 percent in 2011 because of the commencement of oil extraction, and a low of 0.5 percent due to the COVID-19 pandemic.

FIGURE 1.1: ECONOMIC GROWTH TRENDS OF GHANA AND SUB-SAHARAN AFRICA 1961-2023



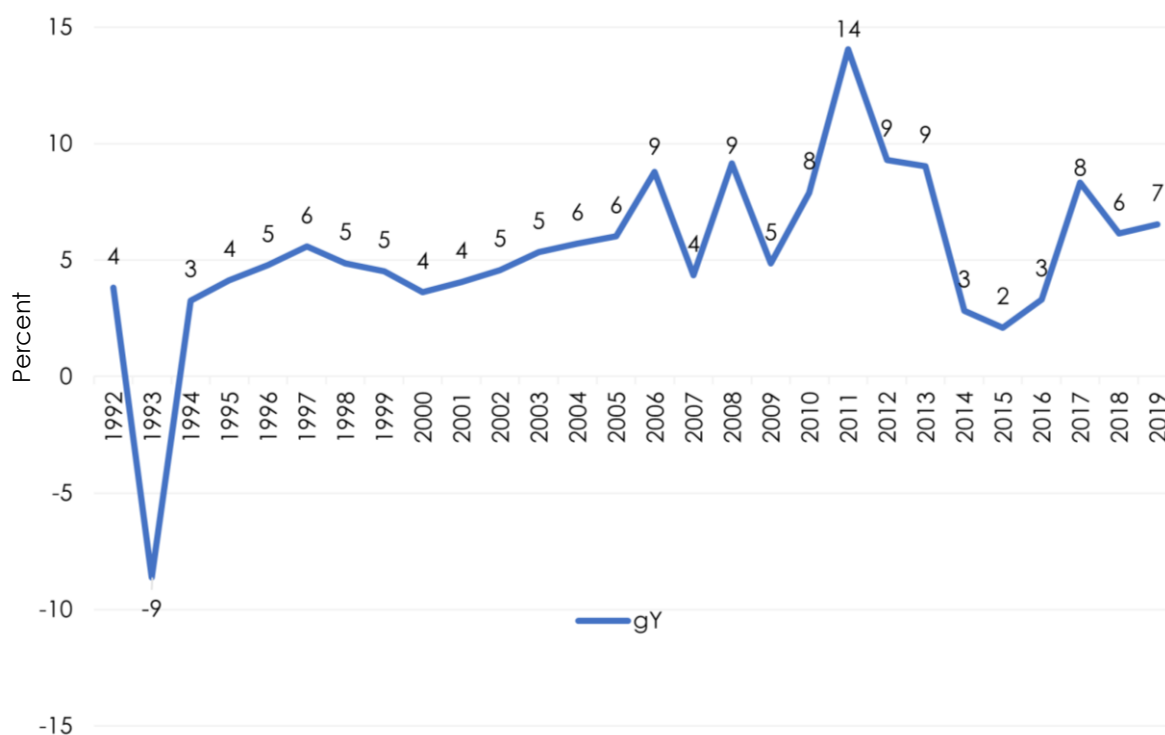
Source: Constructed from the Ghana Statistical Service and the WDI, World Bank ¹

The contribution of multi-factor productivity to GDP since 1992 has been quite erratic, ranging between a low of -9.0 percent in 1993 to a high of 14 percent in 2011 when the country commenced full operation of oil extraction in commercial quantities

** Provisional figures

(Figure 1.2). The contribution of productivity to national output averaged 5.3 percent annually between 1992 and 2019 with the second half of the period (2006-2019) recording average annual productivity of 6.9 percent compared with 3.8 percent over 1992-2005. Thus, contribution of multi-factor productivity has been better since 2006 that witnessed relatively a more erratic pattern.

FIGURE 1.2: CONTRIBUTIONS OF CAPITAL, LABOUR AND RESIDUAL MULTIFACTOR PRODUCTIVITY IN GDP GROWTH (GY) IN %

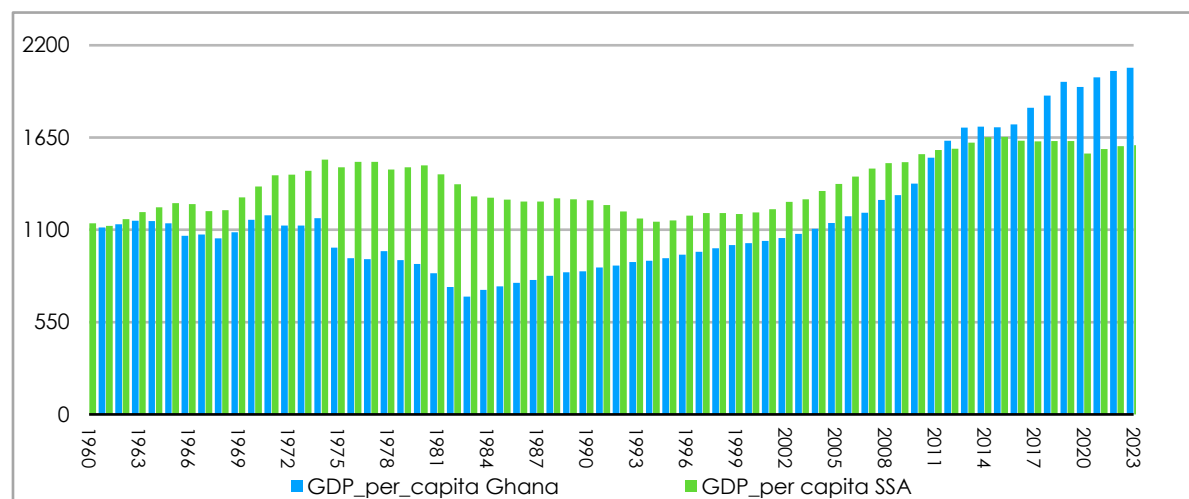


Source: Constructed from national accounts: Ghana Statistical Service

Ghana's poor growth performance between the 1960s and 1970s has eroded its GDP per capita compared to the average in Sub-Saharan Africa (SSA, Figure 1.3). The gap with SSA had only been bridged by the early 2010s. Ghana's per capita GDP

has remained higher than the SSA average since then, with the gap widening since 2017.

FIGURE 1.3: GDP PER CAPITA OF GHANA AND SSA 1960-2023 (2015 CONSTANT US\$)

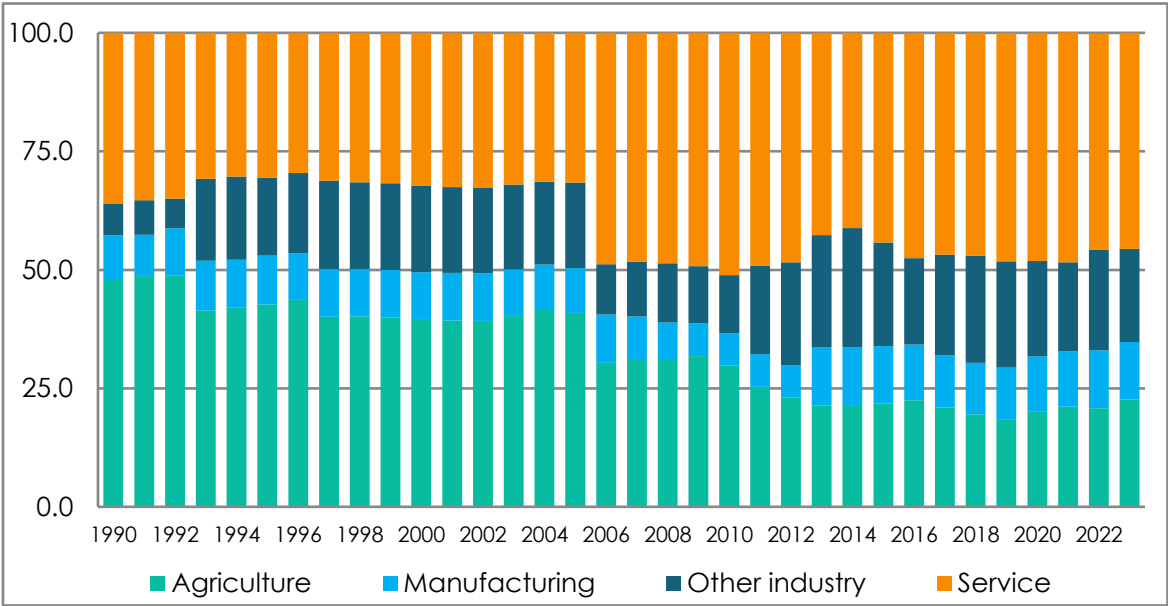


Source: Constructed from the Ghana Statistical Service and the World Development Indicators, World Bank

The Ghanaian economy has witnessed considerable structural change since the mid-2000s, with agriculture giving way to services in terms of broad sectoral contribution to GDP. Services now represent 45.6 percent of economic activities. The

services sector overtook agriculture as the leading contributor to GDP in 2006 when the national accounts was rebased. Agriculture's share dropped from 41percent in 2005 to 30 percent in 2006 and has consistently declined since then to 22.7 percent in 2023. At the same time, the share of the services sector appreciated substantially from 32 percent in 2005 to 49 percent in 2006 and has remained within 41-49 percent range since then. The rebase of the national accounts also saw a drop in the industrial sector's contribution to GDP by 7 percentage points from 28 percent. The crude oil production in commercial quantities which began in the last quarter of 2010 increased significantly the industrial sector's share in GDP from about one-fifth to about a third of national output. However, within the broad industrial sector, the share of manufacturing has dropped from 10 percent of GDP in 2006 to 6.9 percent in 2012, before rising and remaining stable at 11-12 percent of GDP over the last decade (Figure 1.4).

FIGURE 1.4: SECTORAL STRUCTURE OF THE GHANAIAN ECONOMY 1990-2022 (%)

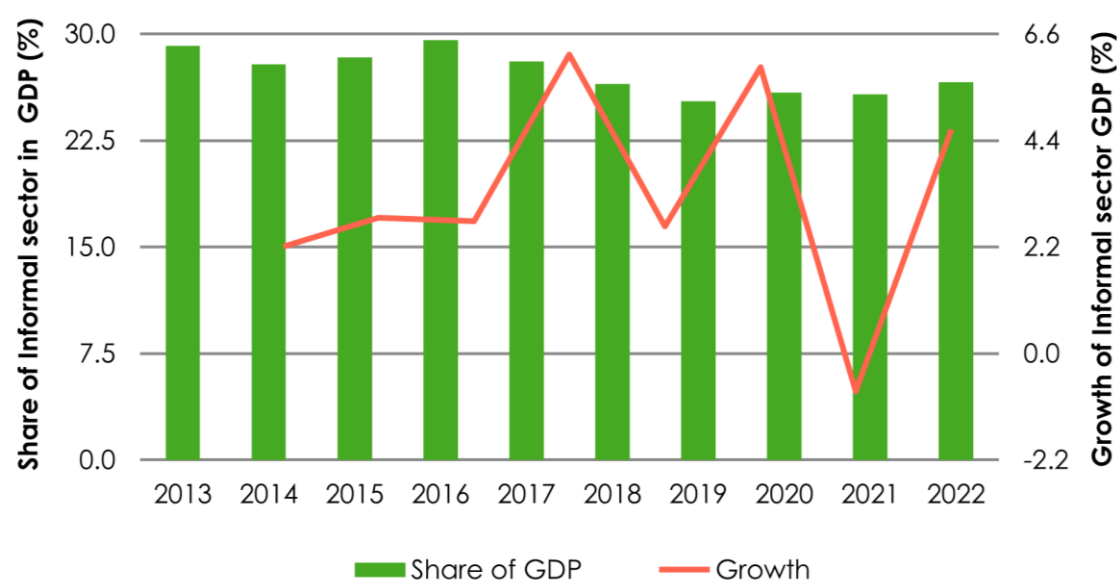


Source: Constructed from national accounts: Ghana Statistical Service

The Informal Economy

The informal economy constitutes a considerable segment of the Ghanaian economy. It is estimated to account for about 27 percent of GDP, with an average growth of 3.4 percent annually (Figure 1.5). In employment terms, the informal sector is even more important: at least eight out of every ten employed person is engaged in the informal sector (see Table 1.5). Essentially, most activities in the informal economy are characterized by low-productivity and low pay jobs. Thus 80 percent of workers contribute only about a quarter of the national output, which is an obvious constraint to the transformational agenda of the country.

FIGURE 1.5: GROWTH AND SHARE OF INFORMAL SECTOR IN GDP (%) 2013-2022



Source: Constructed from the national accounts: Ghana Statistical Service

1.2 Employment and Decent Work Patterns

Employment Opportunities

The health of an economy is largely measured by how economic growth and other macroeconomic aggregates translate into the generation of decent employment. According to the ILO, decent work is productive work for women and men in conditions of freedom, equity, security and human dignity. The concept of decent work is anchored on four key pillars, namely, productive employment, social dialogue, rights at work and social protection.

One key element of decent work is the availability of employment opportunities for a growing working age population. In 2000, a total of 7.43 million people were employed and this increased to 10.2 million in 2010 (Figure 1.6), representing 3.3 percent annual employment growth over the period. In 2021, about 9.99 million people were employed². This represents a reduction of employment of 0.7 percent annual average from 2010. Consequently, the employment rate (or the employment to-population ratio) which measures the economy's labour absorption capacity, has declined from 73.9 percent to 55.7 percent between 2000 and 2021 (Figure 1.6). This suggests that even though the Ghanaian economy is creating employment opportunities, this is not sufficient to absorb the growing working age population.

² ILO definition of employment changed following the 19th ICLS Resolution concerning statistics of work, employment and labour underutilization (2013) which exclude those working and producing for own-use considered to be working but not employed.

FIGURE 1.6: TOTAL EMPLOYMENT AND EMPLOYMENT RATE 1992 - 2023



Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service.

Note: 1. The concepts of employment and unemployment changed following the 19th ICLS Resolution concerning statistics of work, employment and labour underutilization (2013) which exclude those working and producing for own-use considered to be working but not employed and thus comparing indicators across years must be done with caution

2. Years with asterisk (*) represent data compiled from GLSS

Another indication of Ghana's labour utilization challenges is the high rate of unemployment. The overall unemployment rates after COVID-19 pandemic have remained within the range of 11.3 percent in 2022 and 14.7 percent in 2023 (Table 1.1). The rates are higher among young people aged 15-24 years, as over a quarter of them were estimated to be unemployed in 2023. Similarly, between 18.7 percent and 20.3 percent of young people are found to be out of employment, education or training (NEET). This represents a large underutilization of the youth labour force.

The rates of unemployment are higher in the urban areas than among rural dwellers. Indeed, many people in rural areas cannot afford to be unemployed and thus work to subsist, accounting for low unemployment rate in rural areas. On the other hand, the migration of young people into urban centres in search for limited job opportunities also explains higher unemployment rate among urban dwellers.

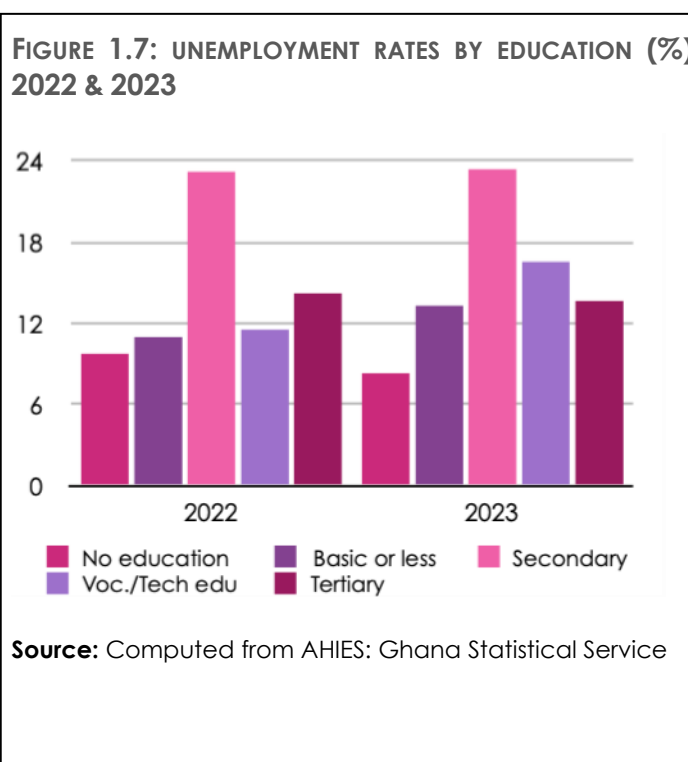
TABLE 1.1: UNEMPLOYMENT AND NEET RATES IN GHANA, 2000 – 2023

Unemployment rates	Population Census			GLSS		AHIES	
	2000	2010	2021	2013	2017	2022Q4	2023Q3
Over all 15+ years	10.4	5.8	13.4	5.2	8.4	11.3	14.7
Sex							
Male	10.1	5.4	11.6	4.8	7.5	10.1	10.9
Female	10.7	6.3	15.5	5.5	9.2	12.3	17.7
Location							
Urban	12.8	6.1	14.2	8	11.4	14.1	18.3
Rural	8.6	3.5	12.3	3.9	5.2	7.6	9.8
Youth group							
15-24 years	16.7	12.9	32.8	10.9	18.3	20.9	29.6
15-35 years	-	-	19.7		-	16.5	22.4
NEET							
15-24 years	-	-	-	-	-	18.7	19.7
15-35 years	-	-	-	-	-	20.3	18.7

Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service

Note: The concepts of employment and unemployment changed following the 19th ICLS Resolution concerning statistics of work, employment and labour underutilization (2013) which exclude those working and producing for own-use considered to be working but not employed and thus comparing indicators across years must be done with caution.

The educational dimension of unemployment points to higher unemployment rates among the educated than the less educated. The rate is lowest among those with no formal education, followed by those with basic education or less. The highest unemployment rate is recorded among those with secondary education in both years with tertiary and vocational and technical graduates ranging in the middle (Figure 1.7). The lower unemployment rate among those with no or lower education is largely linked to the high level of informality that serves as refuge for such people



because of their limited access to formal sector employment, which requires at least secondary education. On the other hand, limited job opportunities in the formal sector relative to the jobseekers with at least secondary education who do not find the informal sector attractive largely explains the higher unemployment rate among the educated (see Baah-Boateng, 2017).

Employment by economic sector

The structure of employment mirrors the changing structure of economic output, with agriculture losing its dominance to services. As can be seen in Table 1.2, the share of agriculture in total employment dropped from 53.1 percent in 2000 to 41.6 percent in 2010, against a surge in the services' share of employment from 31.5 percent to 43.0 percent over the same period. Employment in the industry sector and its major sub-sector, manufacturing, remained virtually unchanged.

TABLE 1.2: SECTORAL DISTRIBUTION OF EMPLOYMENT (%) 1992-2022

Economic Sector	Population Census			GLSS V, VI, VII			AHIES	
	2000	2010	2021	2006	2013	2017	2022	2023
Agriculture	53.1	41.6	33	54.9	44.7	38.3	40.3	39.3
Industry	15.5	15.4	13.7	14.2	14.6	18.2	15.7	16.5
o/w Manufacturing	10.7	10.7	6.7	11.4	9.1	11.9	9.7	10.3
Service	31.5	43	53.3	30.9	40.9	43.5	44	44.2

Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service

Note: The concept of employment changed after 2013 and, therefore, comparing indicators across years must be done with caution.

Informal employment

Informal employment has remained highly pervasive in Ghana, with no substantial reduction over the past decades. Eight out of 10 employed persons are engaged in informal activities (Table 1.3). Informal sector activities are dominated by own account work where earnings are typically low and irregular. Paid employment (most of which are in the formal sector), with clearly defined employer-employee relationships subject to national labour standards, constitutes between 20.2 percent and 27.4 percent in the Ghanaian labour market. Consequently, incidence of productive employment³ remains low, between 25.3 percent and 34.1 percent of total employment. For workers and business owners, the consequences of informality can be significant. They impede the full exercise of rights and limit access to social security systems, notably social insurance. When workers operate under precarious circumstances, it affects their full contribution to productivity and enterprise growth. The relationship between productivity and decent work goes both ways: productivity allows wages and working conditions to improve, but better wages and working conditions also contribute to productivity growth.

³ Productive employment comprises paid employment and self-employment with employees; employment that guarantees regular source of livelihood.

TABLE 1.3: STATUS AND QUALITY OF EMPLOYMENT IN GHANA (%) 2000 – 2023

Indicator	Population Census			GLSS		AHIES	
	2000	2010	2021	2013	2017	2022Q4	2023Q3
Status of Employment							
Paid Employment (%)	15.8	18.2	27.4	20.2	22.9	21.3	21.1
Self-employment (%)	73.4	60.8	60.0	52.4	53.4	55.7	57.8
Quality of Education							
Productive employment (%)	21.2	23.1	34.1	26.3	27.0	26.1	25.3
Vulnerable employment (%)	74.9	67.5	62.9	68.7	66.8	63.6	68.5
Informal sector employment	83.9	86.2	79.3	88.0	73.6	83.6	87.0

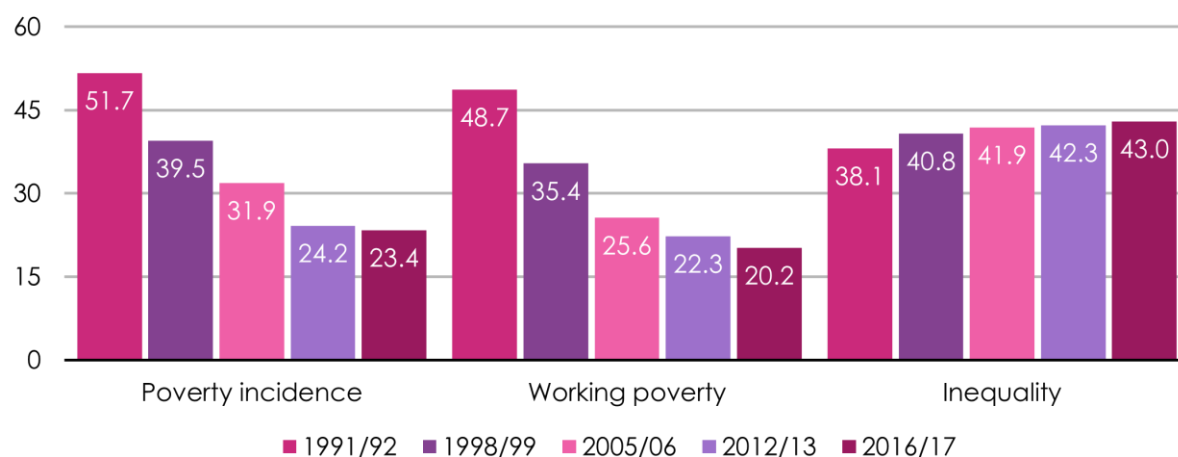
Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service

Note: The concept of employment changed following the 19th ICLS Resolution concerning statistics of work, employment and labour underutilization (2013) which exclude those working and producing for own-use considered to be working but not employed and therefore comparing indicators across years must be done with caution.

Working poverty

The working poor are employed people who live in households that fall below an accepted poverty line. Working poverty has been steadily declining in Ghana, together with the declining incidence of poverty. Over the last two-and-half decades the poverty rate receded from 51.7% to 23.4%. Working poverty rate has also seen consistent decline over the same period (Figure 1.8). This could largely be linked to the generally improving productive employment and declining rate of vulnerable employment. The downside, however, has been the consistent rise in inequality measured by Gini coefficient from 38.1 in 1992 to 43.0 in 2017. The foregoing suggests that the benefits of reduced poverty incidence and working poverty had not been evenly distributed among Ghanaians.

FIGURE 1.8: INCIDENCE OF POVERTY, WORKING POVERTY AND INEQUALITY 1992 - 2017



Source: GLSS III, IV, V, VI, VII, Ghana Statistical Service

Working Time

Adequate working time is a crucial part of decent work. It represents a key element of working conditions and has a great impact on workers' income, well-being, and living conditions. Mean weekly hours actually worked per employed person by sex, age and working time arrangement.

Excessive hours of work wear out workers with adverse effects on their productivity but also on their health, safety and work-life balance. Internationally, a common threshold defined for excessive working hours is 48 hours per week. As shown in Figure 10, about 7 percent of employed people are estimated to be working more than 48 hours a week, declining consistently to about 4 percent in the third quarter of 2023. The gender dimension shows male workers working excessively higher than their female counterparts. A higher proportion of urban workers also work excessively compared to those in rural areas. These observations suggest decent work concerns are higher among males than females and among urban than rural workers in respect of decent work time.

TABLE 1.4: EXCESSIVE WORKING HOURS BY SEX AND LOCATION (%)

Proportion of the employed working more than 48 hours a week

Period	All	Male	Female	Urban	Rural
2022Q1	6.9	9.3	4.8	9.8	3.4
2022Q2	6.1	8.9	3.5	8.8	2.7
2022Q3	6.1	9.1	3.5	8.4	3.2
2022Q4	5.9	8.9	3.3	8.5	2.6
2023Q1	4.9	7.5	2.7	6.8	2.5
2023Q2	4.7	7.4	2.4	6.4	2.7
2023Q3	4.2	6.6	2.1	6.0	1.9

Source: Computed from AHIES: Ghana Statistical Service

Equal Opportunity and Treatment in Employment

An assessment of equal opportunity and treatment in employment is carried out from a gender perspective. Two indicators are used in this assessment due to data availability. The first indicator is occupational segregation by sex using the Duncan index of dissimilarity to provide information on the extent to which women and men benefit from different opportunities and treatment in their work life. The occupational dissimilarity in Ghana of between 0.32 and 0.27 indicates a moderate to low dissimilarity of treatment. There is more gender dissimilarity (occupational segregation) in urban than in rural areas.

Another measure of equal opportunity and treatment in employment between men and women is female share of employment in senior and middle level management. The indicator provides insights into women's power in decision-making and in the economy. Women in Ghana accounted for 41% and 45% of employment in senior and middle level management in 2021-2023 with no significant difference between urban and rural areas.

TABLE 1.5: OCCUPATIONAL SEGREGATION AND FEMALES IN SENIOR AND MIDDLE LEVEL MANAGEMENT

Period	Occupational Segregation by sex			Female share in senior & middle mgt.		
	All	Urban	Rural	All	Urban	Rural
2021	0.3	0.4	0.2	41.2	41.8	38.5
2022: Q1	0.3	0.4	0.2	42.0	42.5	39.9
2022: Q2	0.3	0.4	0.2	42.1	43.0	38.8
2022: Q3	0.3	0.4	0.2	41.6	42.4	37.7
2022: Q4	0.3	0.3	0.2	44.7	45.0	43.0
2023: Q1	0.3	0.4	0.2	43.6	44.2	41.2
2023: Q2	0.3	0.4	0.2	41.9	42.7	39.1
2023: Q3	0.3	0.4	0.2	43.8	44.2	41.7

Source: Computed from 2021 Population Census and AHIES: Ghana Statistical Service

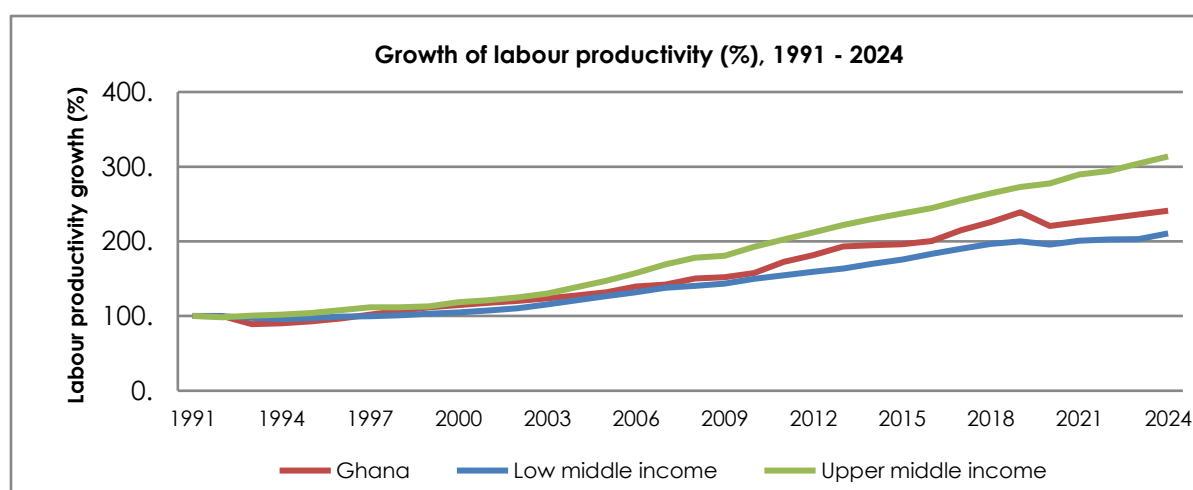
SECTION 2. PRODUCTIVITY TRENDS

2.1 Aggregate labour and multifactor productivity trends

The aggregate productivity of labour⁴ in Ghana recorded an annual compounded growth rate of 3.2 percent over the period 1991 to 2019, for a total growth over the period of 240 percent (Fig. 2.1). This is consistent with the annual GDP growth rate of 4.5 percent and the parallel increase in the employed population, as described in Section 1. A period of fairly steady growth of labour productivity from 1994 to 2010 can be observed. Since 2011 and the commencement of oil extraction a period of faster but also more uneven growth has followed.

To compare with the performance of other countries, lower-middle income countries grew slightly less over the same period (211%), while upper-middle income countries grew more (314%).

FIGURE 2.1: LABOUR PRODUCTIVITY GROWTH (BASE 100 IN 1991)



Note: Lower- and middle-income numbers are based on ILO estimates.

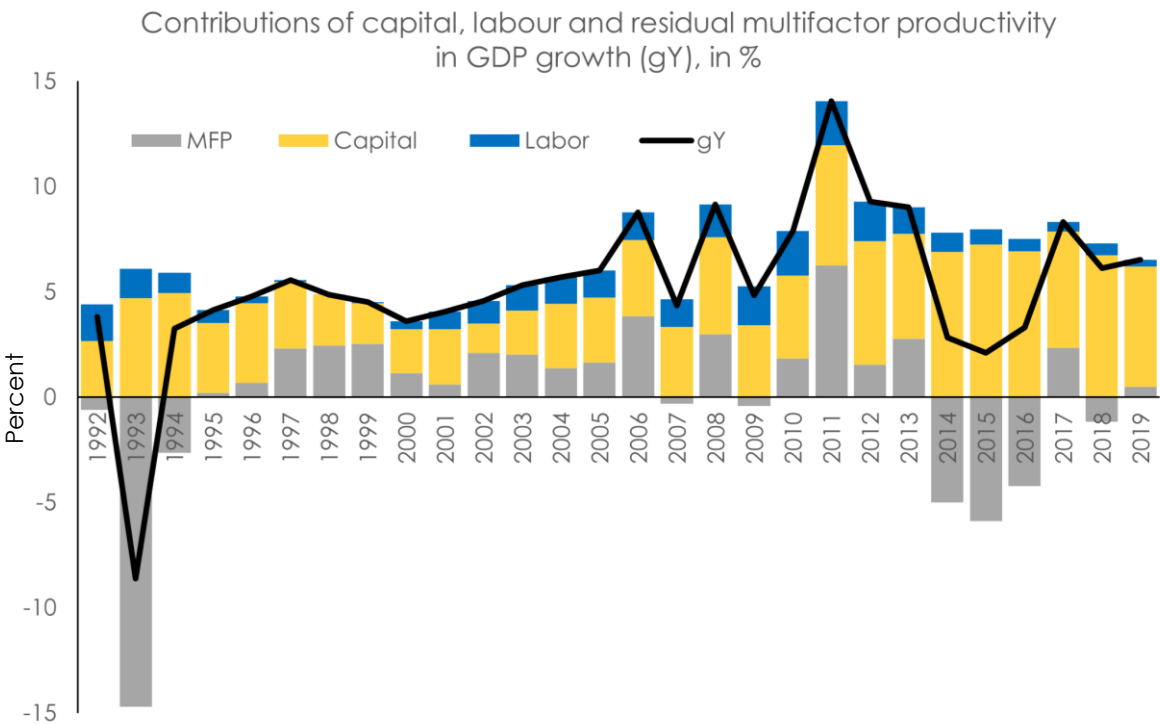
Source: Prepared from National Accounts: Ghana Statistical Service and the ILO

The contributions of capital, labour and multifactor productivity (MFP, also commonly known as total-factor productivity - TFP) to economic growth in Ghana are shown in Fig. 2.2. Multi-factor productivity has averaged over the last 30 years about 0.5 percentage points of annual growth, a relatively low contribution. A period of decline in the first part of the 1990s has been followed by positive growth from 1996

⁴ Labour is measured as number of employed persons (GLSS, population census and imputations). The measure for output is GDP.

to 2010. Since the beginning of oil extraction in 2011, MFP growth has become more uneven. Overall, the data suggests the economy is not consistently gaining in economic efficiency. Another main finding is the relative importance that capital has taken in the economic growth mix. Since 2011, capital accumulation is by far the major contributor to growth.

FIGURE 2.2: CONTRIBUTIONS OF CAPITAL, LABOUR AND RESIDUAL MULTIFACTOR PRODUCTIVITY IN GDP GROWTH (gY) IN %

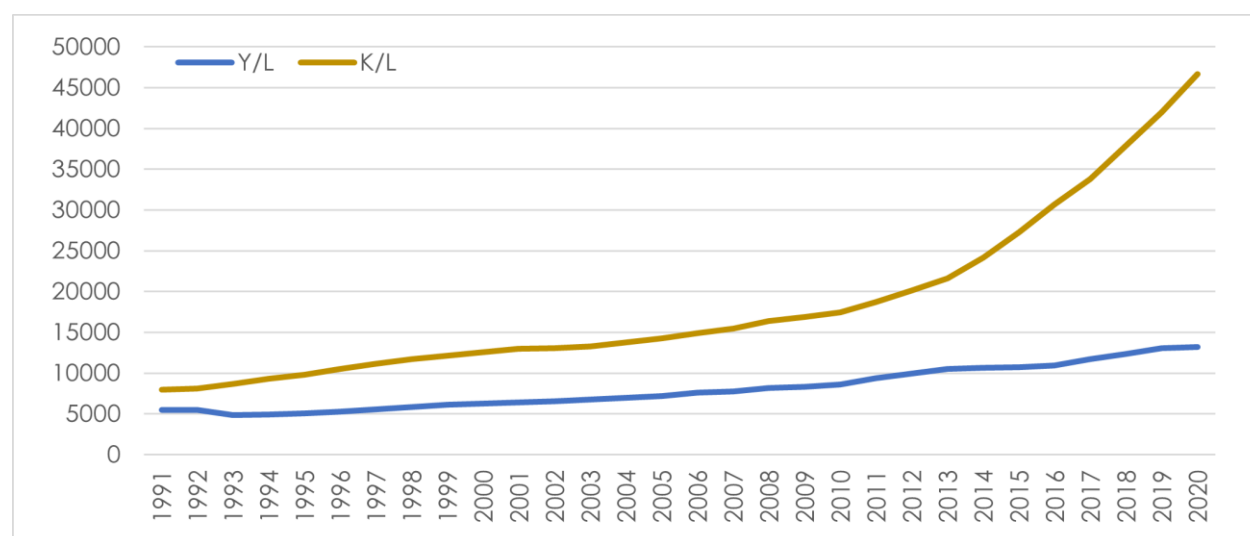


Source: National accounts, Ghana Statistical Service. A labour income share of 50 percent is used.

This finding is consistent with a low utilization of labour in the economy that translates in the high levels of underemployment and informal employment seen in Ghana, as described in Section 1.^{5,6}

The following charts further illustrate the aggregate labour and capital dynamics in Ghana's economy. The share of capital to labour in the economy has increased significantly since the early 2010s (Fig 2.3), but this has not markedly accelerated overall labour productivity growth.

FIGURE 2.3: LABOUR PRODUCTIVITY (Y/L) AND CAPITAL DEEPENING (K/L) IN GHC (CONSTANT 2013)



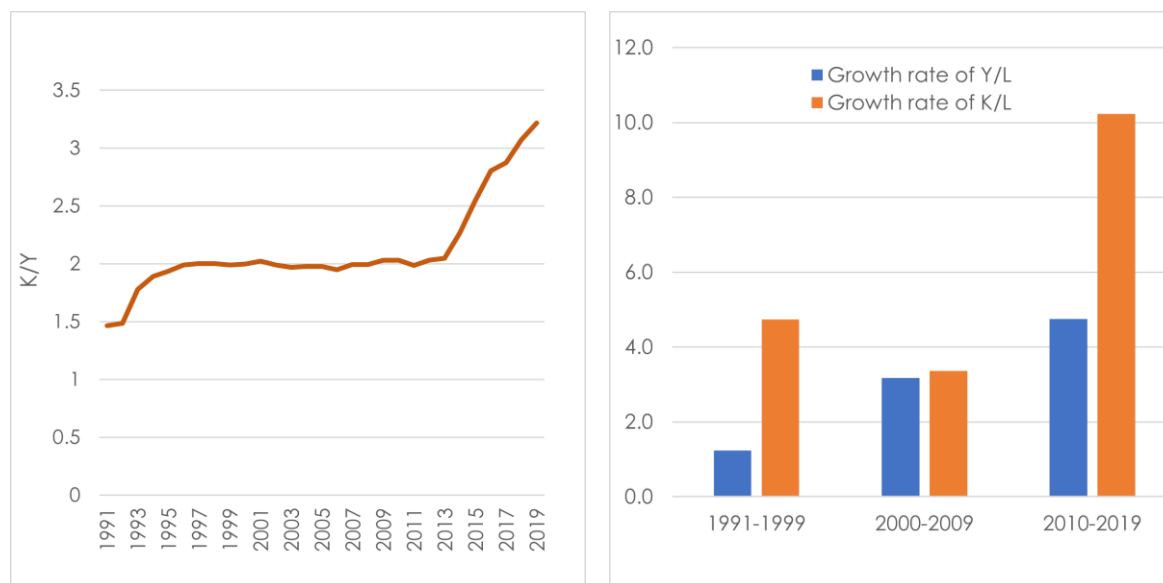
Source: Prepared from National Accounts: Ghana Statistical Service

⁵ As further described in the methodological annex, multifactor productivity models the respective contributions of production factors and of the efficiency of the use of these production factors. MFP is measured as a residual, and the evolution of the residual is indicative of "all sorts of things" (Solow, 1956) such as the quality of capital assets, the growing skills of workers, the macroeconomic environment, the functioning of markets or measurement errors, in addition to technological change, that the measure is commonly considered to represent. For the purpose of this report, the labour and capital inputs could not be adjusted considering changes in the quality/composition of labour or in the vintages of capital. Subsequent reports will seek to address the underlying data challenges.

⁶ The capital stock was estimated using the perpetual inventory method (PIM) and the Harberger approach for the estimation of the initial capital stock. A depreciation rate of 4 percent and a growth rate in the long run of 5 percent are used.

The capital-output ratio increased from 1.46 in 1991 to about 3.2 in 2019 (Fig. 2.4). Since 2010, the growth of capital deepening has been twice as fast as the growth of labour productivity (Fig. 2.5).

FIGURE 2.4: THE CAPITAL-OUTPUT RATIO (K/Y), 1991-2019 **FIGURE 2.5: AVERAGE ANNUAL GROWTH RATE OF Y/L AND OF K/L**



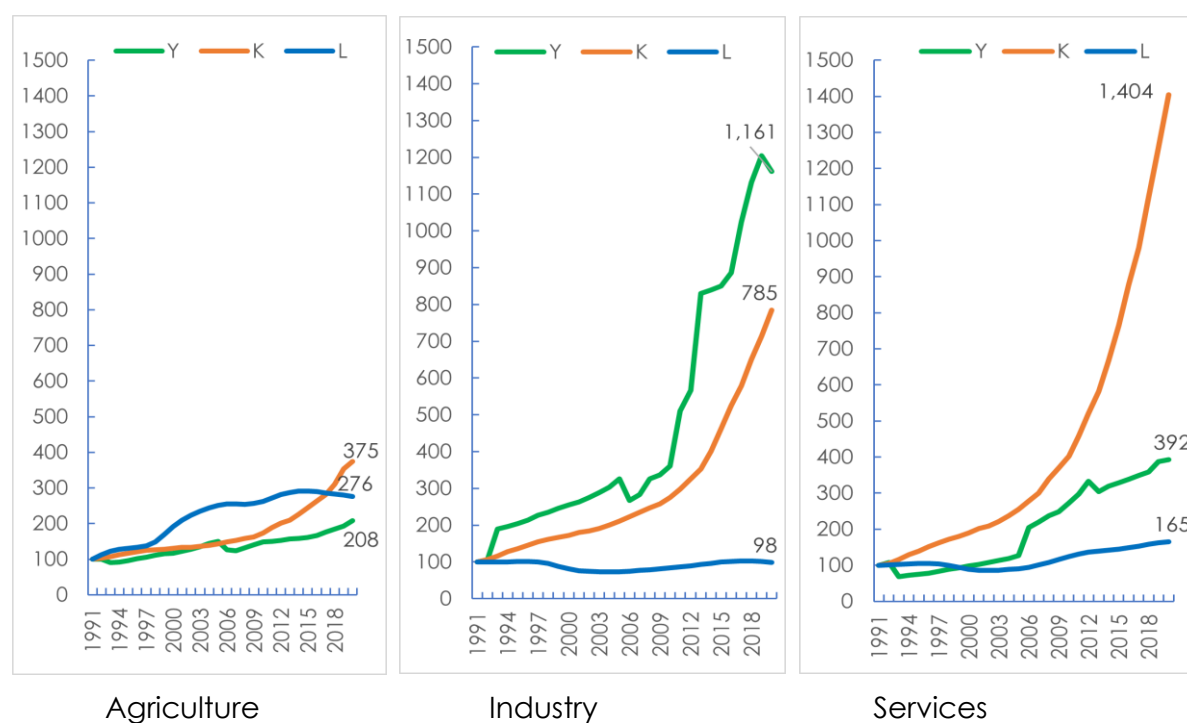
Source: Prepared from National Accounts: Ghana Statistical Service

2.2 Sectoral Productivity Trends

Labour productivity trends disaggregated in the three broad sectors of agriculture, industry, and services are provided below. Economic output, employment and productivity can evolve quite differently between different sectors, with important implications for economic and social policies.

In agriculture, the absolute number of people employed started to decrease only in the early 2010s. In industry, employment receded to some extent before returning to the levels of the early 1990s, while capital increased significantly. The highest accumulation of physical capital has happened in the services sector. Economic production was multiplied by 2 in agriculture, by 11 in industry and by 4 in services (Fig. 2.6).

FIGURE 2.6: TRENDS OF Y, K, AND L BY BROAD SECTOR (100 IN 1991)



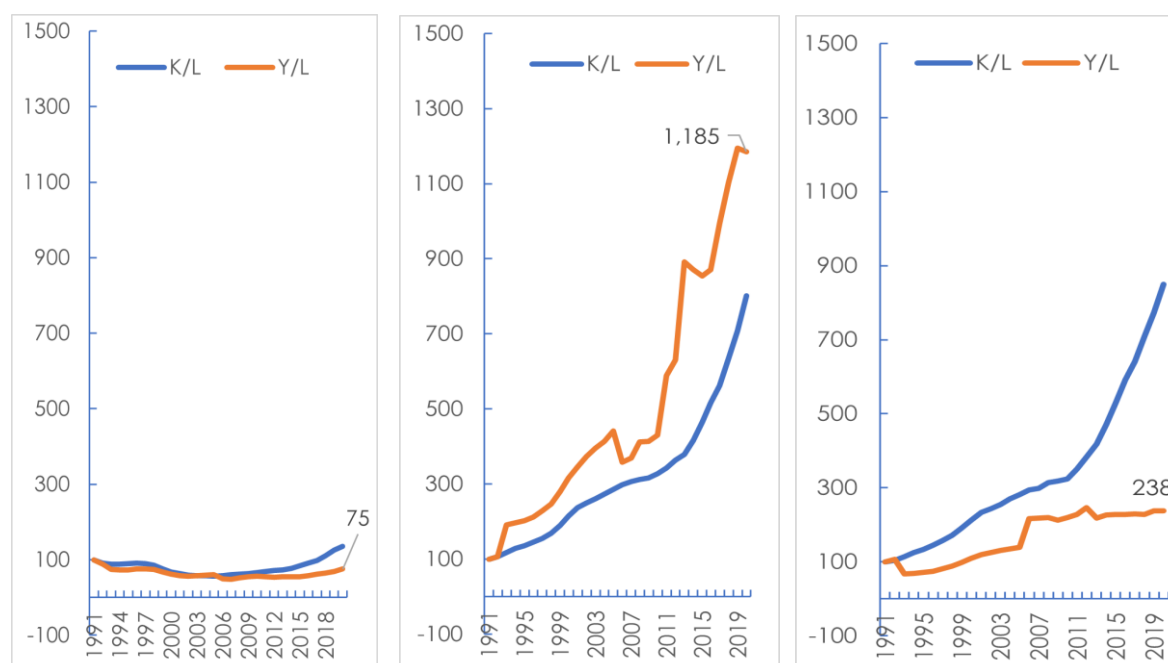
Constant 2013 prices

Source: Prepared from National Accounts: Ghana Statistical Service

The labour productivity and capital deepening ratios for the three sectors are presented in Fig. 2.7. In agriculture, labour productivity (Y/L) has decreased by 25 percentage points from its 1991 level. This is suggestive overall of a sector that continues to be characterized by low-productivity, employment intensive and low-pay activities, including for lack of better employment opportunities in other sectors. Productivity in services has increased but only slowly, with a growth of 237 percent

over the whole period. Labour productivity in industry has displayed the most dynamic productivity growth, increasing by 1185 percent over the period. Unfortunately, this has not been accompanied by a growth in the share of industrial activity and employment in the economy, as indicated in Section 1.

FIGURE 2.7: LABOUR PRODUCTIVITY (Y/L) AND THE CAPITAL/LABOUR RATIO (K/L) BY SECTOR. 1991=100

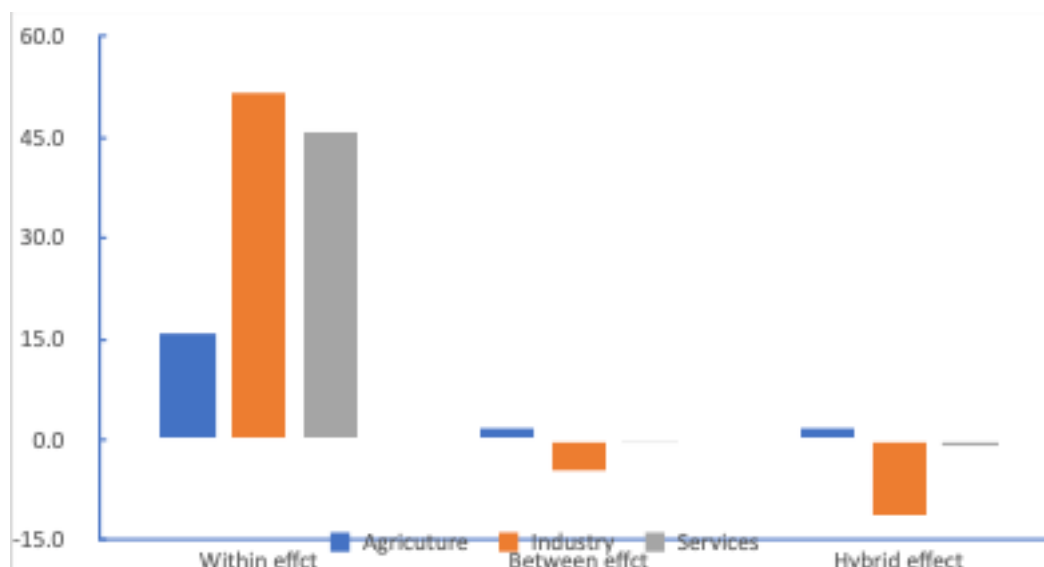


Source: Prepared from National Accounts: Ghana Statistical Service

A decomposition of aggregate labour productivity growth between the contribution of *within-sector* productivity growth and *between-sectors* productivity growth is further provided below, using the data of 2016 and 2022 (Fig. 2.8)⁷. The findings confirm an overall slow pace of structural transformation in Ghana: labour and capital are not flowing sufficiently from lower-productivity into higher productivity activities. A sustained pace of structural transformation is critical to sustained growth in incomes per capita and improvement of living standards. This phenomenon is further explained below by looking at a finer sectoral disaggregation.

⁷ Rf. To the methodological appendix for more details.

FIGURE 2.8: CONTRIBUTION OF WITHIN-SECTOR, BETWEEN-SECTOR/STATIC, AND BETWEEN-SECTOR/DYNAMIC EFFECTS TO PRODUCTIVITY GROWTH (2016-2022)



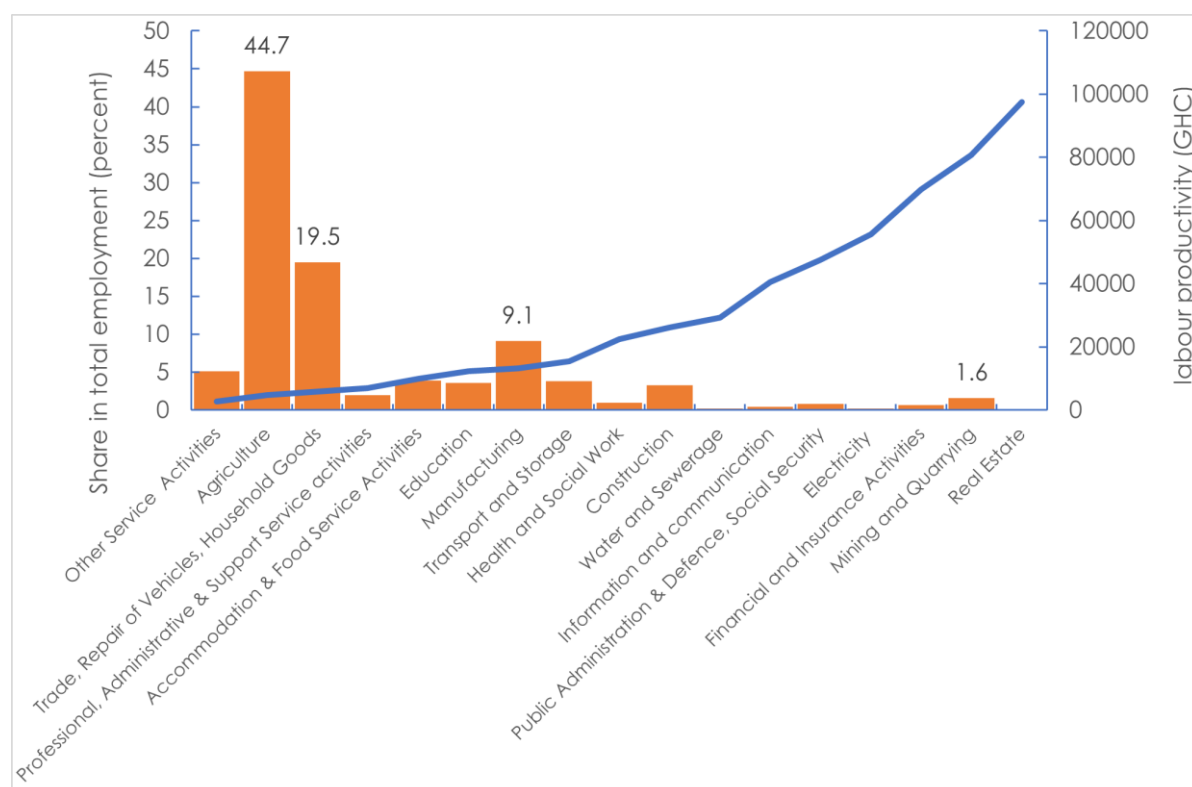
Source: Prepared from National Accounts: Ghana Statistical Service

Sub-sectors

While a consistent disaggregation of the economy into more than three sectors for the whole period since 1991 has not been possible for the iteration of this report, the most recent data (from 2013 to 2022) has been used to gain a more detailed insight on productivity trends. Seventeen sub-sectors are disaggregated.

As in many other developing countries, Ghana is characterized by large gaps in productivity levels between sub-sectors, and sectors with the highest levels of productivity tend to employ fewer people (Fig. 2.9).

FIGURE 2.9: LABOUR PRODUCTIVITY LEVEL AND SHARE IN TOTAL EMPLOYMENT FOR 17 SUB-SECTORS (2013)



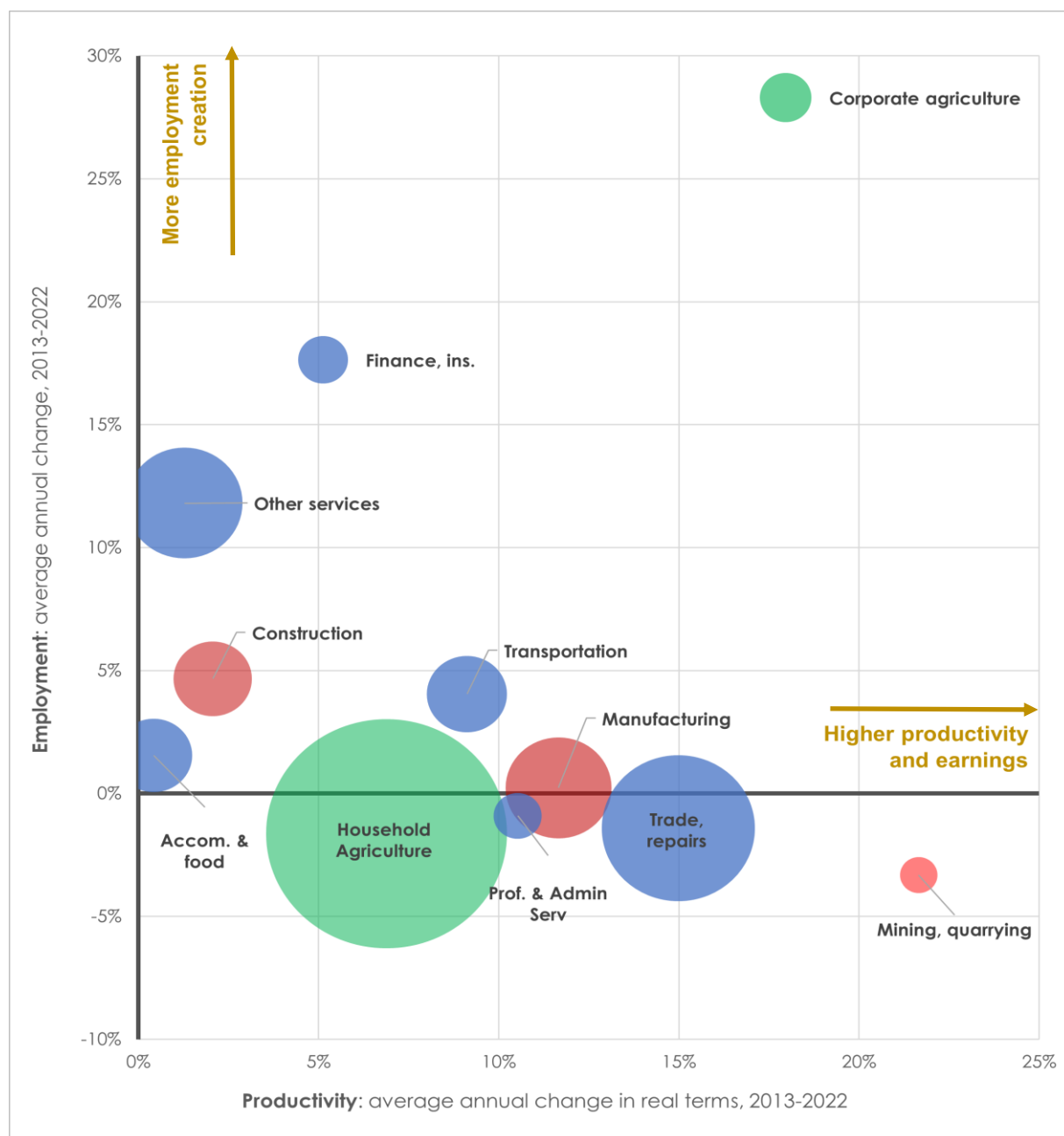
Source: Prepared from National Accounts: Ghana Statistical Service

Figure 2.10 plots the sub-sectors of the economy in Ghana on the basis of employment growth (vertical axis) and productivity growth (horizontal axis), with the size of the circles proportional to the size of the sector in total employment. The data is provided in the table that follows. The higher the sector is placed (vertical axis) the more employment it has created; the farther the sector (horizontal axis) the more productivity growth it has generated; and the wider the circle the bigger the sector in employment terms.

Corporate agriculture, manufacturing, transportation and utilities are the key sectors that have generated additional net jobs as well as productivity growth. The mining sector expectedly scores the highest levels of productivity but has not generated additional net jobs. The finance and insurance industry has been particularly dynamic in generating job opportunities for higher skilled workers. Household agriculture and tradesmanship activities have been losing employment as they gained in productivity, as expected with the modernization of the economy. But employment flows out of the more traditional activities have largely been directed towards the lower-productivity urban services ('other services') and construction sub-sectors, the less productive segments of the services and industry broad sectors. Employment flows towards less productive rather than more productive (and better-

paying) activities are a drag on the overall productivity and living standards of the nation.

FIGURE 2.10: EMPLOYMENT AND LABOUR PRODUCTIVITY GROWTH BY SUB-SECTOR, 2013-2022



Source: Prepared from National Accounts: Ghana Statistical Service

TABLE 2.1: EVOLUTION OF EMPLOYMENT AND LABOUR PRODUCTIVITY BY SUB-SECTOR, 2013-2022

	Share in total employment (2022)	Employment: average annual growth, 2013-2022	Real labour productivity: average annual growth, 2013-2022
Household Agriculture	39.2%	-1.6%	6.9%
Institutional / Corporate Agriculture	1.8%	28.3%	18.0%
Mining and Quarrying	1.0%	-3.3%	21.7%
Manufacturing	7.6%	0.2%	11.7%
Electricity	0.5%	27.3%	58.5%
Water and Sewerage	0.2%	1.1%	11.5%
Construction	4.2%	4.7%	2.1%
Trade, Repair of Vehicles, Household Goods	15.9%	-1.4%	15.0%
Accommodation & Food Service Activities	4.0%	1.5%	0.4%
Transport and Storage	4.3%	4.0%	9.1%
Information and communication	0.4%	0.7%	16.1%
Financial and Insurance Activities	1.7%	17.6%	5.1%
Real Estate	0.1%	2.0%	22.6%
Professional, Administrative & Support Service activities	1.6%	-0.9%	10.5%
Other Service Activities	9.1%	11.8%	1.3%
Total	100.0%	-0.2%	6.3%

Source: GSS National accounts dataset

2.3 Productivity and earnings

It has been possible to compute data for labour earnings⁸ and productivity over the period 2013-2022 (Figure 2.11). Overall, average earnings in Ghana are lagging behind the growth of labour productivity, and the divergence is increasing. As can be seen across the world, the Covid 19 pandemic has had a major impact on both real productivity and earnings.

FIGURE 2.11: TRENDS IN LABOUR PRODUCTIVITY AND AVERAGE EARNINGS IN GHANA (2013-2022), GH¢.



Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service.

⁸ Earnings data is from the GSS National Accounts. They include wage earnings from survey data as well as self-employed earnings computed as equal to two thirds of mixed income.

Trends for earnings and labour productivity by sector are shown in Fig. 2.12. In all three sectors wages are rising more slowly than labour productivity. The divergence between labour productivity and the average wage has increased over the period for the three sectors and is more accentuated in services.

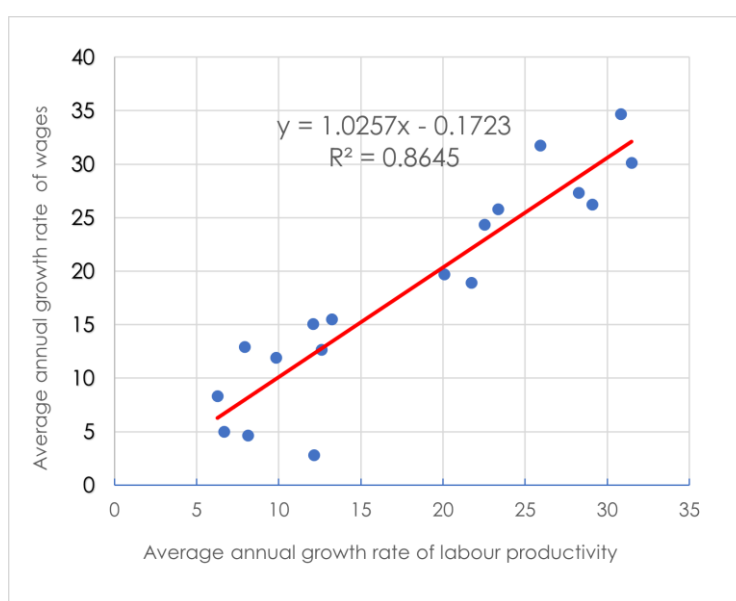
FIGURE 2.12: REAL LABOUR PRODUCTIVITY AND EARNINGS BY BROAD SECTOR, GH¢



Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service.

Wage growth remains highly correlated to productivity growth in Ghana (Figure 2.13). Still, there are important variations between sub-sectors as to how much productivity growth translates into earnings growth. Sub-sectors with highest earnings growth relative to productivity, using the National accounts data used for this report, include utilities, construction, tourism and finance, insurance and professional services. Sub-sectors where earnings growth are weakest relative to productivity include household agriculture, trade and repair services, education and other services.

FIGURE 2.13: LABOUR PRODUCTIVITY GROWTH AND AVERAGE EARNINGS GROWTH FOR 17 SUB-SECTORS, 2013-2022



Source: Constructed from GLSS, population census and AHIES, Ghana Statistical Service.

CONCLUSIONS

This report makes use of the available statistical data GSS has collected over the years to compute key productivity statistics for Ghana at a high level of detail, in line with international standards and good practice. The report sheds light into the complex dynamics that have shaped the economy to inform policy dialogue and foster additional research and analysis.

Over the past three decades Ghana's economy has achieved sustained progress, incomes per capita have increased and poverty has receded. However, growth has tended to concentrate in the mining sector with the extraction of oil; in the wider economy only a slow progress in structural transformation and economic efficiency may be observed.

Economic and industrial policy, as well as industry-specific strategies and collaborative action may take stock of important findings in this report. Key sectors deserving particular attention, as they have driven both economic growth and employment creation, include commercial agriculture, transportation and utilities, and manufacturing. Investment in Ghana remains at relatively low levels; more capital (and labour) needs to flow towards key productive sectors. Given its relatively large size and potential for both employment and productivity growth, the fate of manufacturing will be particularly significant for Ghana's economy in the coming years.

From a social dialogue and earnings perspective, data in this report suggest that labour earnings are falling behind the curve of labour productivity growth. This is closely related to the prevalence of informal, unorganized work in specific sectors, including household agriculture, tradesmanship, and sales and other urban services.

This work is to be considered as the first edition of GSS reports on Ghana's productivity, employment and growth. The analysis is based on available data from GSS and provides a basis for the Service to produce disaggregated data on GDP, employment etc. at the sectoral, sub sectoral and industry level to enable detailed analysis of Ghana's productivity. Thus, GSS hopes to be able to update our published series with the latest data available and to improve on the scope and depth of subsequent reports on productivity, employment and growth.

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APPENDICES

Annex A. Data sources, harmonization and computation

The data used for this report for output, capital and labour, in the aggregate and sectoral computations, are drawn from the National Accounts database, labour surveys and economic censuses. The labour input series on employment and earnings has been constructed using data from several survey instruments. In the computation of MFP, we use the series after removing the cyclic component because we estimated that only the trends are informative about the growth rate of labour input.

Multifactor productivity

Productive output Y in the economy (i.e., GDP or Gross Value Added) is expressed as:

$$Y_t = A_t F(K_t, L_t)$$

A is a shift parameter that captures the level of multifactor productivity. This function is assumed to exhibit constant returns to scale. We assume also that both products and factor markets are competitive and, hence, productive factors are used up to the point that their marginal productivities are equal to their remunerations (prices). Let the differential of Y be:

$$dY = F(K, L)dA + A * F_L * dL + A * F_K * dK$$

Dividing by Y and rearranging we obtain:

$$\frac{dY}{Y} = \frac{dA}{A} + \frac{AF_L L}{Y} \frac{dL}{L} + \frac{AF_K K}{Y} \frac{dK}{K}$$

If capital and labour are used up to the point that their marginal revenues are equal to their remunerations then $AF_L L/Y$ and $AF_K K/Y$ are equal to the capital income share and the labour income share respectively. Let us denote these two shares by α_K and α_L . It is obvious that: $\alpha_K = 1 - \alpha_L$. the quantities dY/Y , dA/A , dK/K , and dL/L are the growth rates of Y , A , K , and L respectively. We denote them respectively by g , g_A , g_K , and g_L for the sake of brevity. The growth rates g_Y , g_K , and g_L and the labour income shares can be estimated using national accounts data and labour statistics and we, consequently, infer the A 'unobservable' growth rate by considering it as a residual as follows:

$$g_A = g - \alpha_K g_K - \alpha_L g_L$$

Multifactor productivity growth rate is a summary statistic that measures the growth rate that is not due either to capital growth or labour growth. Otherwise, it is the growth of output that is not due to accumulation of the primary factors but to the increase of the efficiency in their use.

The main standard assumptions in the measurement of MFP are adopted as part of this report. These include behavioral hypotheses (profit maximizing behaviour), institutional hypotheses (competitive markets) and technical hypotheses (constant returns to scale and to the production possibilities set).

Shift-share decomposition of labour productivity and the economy's aggregate productivity (EAP)

Building on McMillan and Rodrik's (2011) approach, De Vries et al. (2015) develop a decomposition of the economy's aggregate productivity (EAP) by distinguishing three effects.

Let y_t be the aggregate productivity of an economy such as that:

$$y_t \equiv \sum \frac{Y_i}{E} = \sum_{i=1}^m \frac{Y_i E_i}{E_i E} = \sum_{i=1}^m y_i s_i \quad (1)$$

Thus, the economy's aggregate apparent labour productivity is the sum of the productivities of all industries, weighted by their shares s_i in total employment, where $s_i = E_i/E$. We are interested in the variation between $t-1$ and t of this productivity which we denote Δy_t . Otherwise, we have:

$$\Delta y_t \equiv y_t - y_{t-1}. \quad (2)$$

Let's see what this relationship (1) will look like if we develop it a bit. We will outline the decomposition of McMillan and Rodrik (2011) and after present the decomposition proposed by De Veries et al. (2015).

1. McMillan and Rodrik (2011) decomposition

We begin by this relationship:

$$\Delta y_t = \sum_{i=1}^m y_{it} s_{it} - \sum_{i=1}^m y_{it-1} s_{it-1} \quad (3)$$

We posit:

$$s_{it} = s_{it-1} + \Delta s_{it} \text{ and } y_{it} = y_{it-1} + \Delta y_{it} \quad (4)$$

we replace in equation (3) the variables s_{it} and y_{it} with the expressions in (4) to get:

$$\Delta y_t = \sum_{i=1}^m y_{it} (s_{it-1} + \Delta s_{it}) - \sum_{i=1}^m (y_{it} - \Delta y_{it}) s_{it-1} \quad (5)$$

We develop this expression to get

$$\Delta y_t = \sum_{i=1}^m y_{it} s_{it-1} + \sum_{i=1}^m y_{it} \Delta s_{it} - \sum_{i=1}^m y_{it} s_{it-1} + \sum_{i=1}^m \Delta y_{it} s_{it-1} \quad (6)$$

The first and the third terms are the same, after simplification we get:

$$\Delta y_t = \sum_{i=1}^m \Delta y_{it} s_{it-1} + \sum_{i=1}^m y_{it} \Delta s_{it} \quad (7)$$

This decomposition is exactly the one used by McMillan et al. (2014) and also in McMillan and Rodrik (2011). According to McMillan et al. (2014), "the first term in the decomposition is the weighted sum of productivity growth within individual sectors, where the weights are each sector's share of employment at the start of the period. We'll call this the "within" component of productivity growth. The second term captures the effect on productivity of labour reallocations between different sectors. Essentially, it is the inner product of productivity levels (at the end of the period) with the change in employment shares between sectors. We'll call this second term "structural change". When changes in employment shares are positively correlated with productivity levels, this term will be positive, and structural change will increase economy-wide productivity growth" (McMillan et al., 2014, p. 19).

Decomposition of De Vries et al. (2015)

Our starting point is relation (4), which defines the variation in the economy's aggregate productivity.

$$\Delta y_t = \sum_{i=1}^m y_{it} s_{ti} - \sum_{i=1}^m y_{it-1} s_{it-1} \quad (3)$$

$$\Delta y_t = \sum_{i=1}^m (y_{it-1} + \Delta y_{it})(s_{it-1} + \Delta s_{it}) - \sum_{i=1}^m y_{it-1} s_{it-1} \quad (8)$$

$$\Delta y_t = \sum_{i=1}^m y_{it-1} s_{it-1} + \sum_{i=1}^m y_{it-1} \Delta s_{it} + \sum_{i=1}^m \Delta y_{it} s_{it-1} + \sum_{i=1}^m \Delta y_{it} \Delta s_{it} - \sum_{i=1}^m y_{it-1} s_{it-1} \quad (9)$$

The first and the last terms are the same and after simplification we will have the decomposition of De Vries et al. (2015) which is as follows:

$$\Delta y_t = \sum_{i=1}^m y_{it-1} \Delta s_{it} + \sum_{i=1}^m \Delta y_{it} s_{it-1} + \sum_{i=1}^m \Delta y_{it} \Delta s_{it} \quad (10)$$

According to this decomposition, the variation in the economy's aggregate apparent productivity results from three effects.

The first reflects the change in the structure of the economy captured by the variation in the distribution of employment between sectors. This effect reflects the scale of employment reallocations between sectors. This is the employment reallocation effect. This effect is called also between-static-effect. If it is positive this means that workers are moving to above-average productivity sectors.

The second is the result of variations in an industry productivity, assuming that the structure of the economy remains unchanged. This is the within-sector effect. A high contribution from this effect implies that the EAP increases due to the improvement in labour productivity in various sectors.

The third effect or component results from the interaction between changes in industries productivity and the distribution of employment in the economy. This is a hybrid, joint or transversal effect⁹. Note that this effect is a covariance. Its contribution is positive when variations in employment and productivity move in the same direction. This is the case, hence, when labour migrates to branches where productivity is increasing.

⁹ Also known as the between-dynamic-effect or the dynamic reallocation effect.

Annex B. Contributions of factor accumulation and MFP to growth

The respective contributions of capital, labour and MFP to growth are summarized below for three different sub-periods and the whole period 1991-2019.

TABLE 3.1: CONTRIBUTIONS OF ACCUMULATION AND OF MULTIFACTOR PRODUCTIVITY TO GROWTH

Period	Growth rate					Contributions to growth in percent ($\alpha_K=0,5$)		
	Y	K	L	Y/L	MFP	K	L	MFP
1991-1999	2,69	6,71	1,29	1,38	-1,30	124,5	23,9	-48,4
2000-2009	5,25	5,42	2,33	2,85	1,37	51,6	22,2	26,1
2010-2019	6,89	11,91	2,16	4,63	-0,14	86,4	15,7	-2,1
1991-2019	5,23	8,2	1,9	3,16	0,15	78,7	18,5	2,8

Source: Team's computations using GSS data

The growth accounting decomposition of capital, labour and multifactor productivity for the three broad sectors is provided in the tables below.

TABLE 3.2: GROWTH ACCOUNTING IN AGRICULTURE (1991-2019)

Period	Growth rate					Contributions in percent ($\alpha_K=0,5$)		
	Y	K	L	Y/L	MFP	K	L	MFP
1991-1999	1,75	3,18	6,78	-4,71	-3,23	91,02	194,16	-185,19
2000-2009	2,05	2,37	4,24	-2,10	-1,25	57,7	103,2	-60,9
2010-2019	3,23	8,07	0,92	2,29	-1,26	124,8	14,3	-39,1
1991-2019	2,38	4,61	3,75	-1,32	-1,79	96,6	78,7	-75,3

Source: Team's computations using GSS data

MFP growth contributed positively and significantly to the growth of industry, representing almost three fifths of industrial growth over the period (1991-2019).

TABLE 3.3: GROWTH ACCOUNTING IN INDUSTRY (1991-2019)

Periods	Growth rate					Contributions in percent ($\alpha_K=0,5$)		
	Y	K	L	Y/L	MFP	K	L	MFP
1991-1999	11,90	6,59	-1,59	13,71	9,41	27,67	-6,69	79,02
2000-2009	3,20	4,46	-0,77	4,00	1,36	69,71	-12,07	42,36
2010-2019	13,58	10,73	2,17	11,18	7,14	39,5	8,0	52,5
1991-2019	9,3	7,3	0,0	9,26	5,6	39,1	0,2	60,7

Source: Team's computations using GSS data

In services MFP growth is slightly negative or stagnant for the whole period.

TABLE 3.4: GROWTH ACCOUNTING IN THE SERVICES' SECTOR

Period	Growth rate					Contributions in percent ($\alpha_K=0,5$)		
	Y	K	L	Y/L	MFP	K	L	MFP
1991-1999	-0,92	7,64	-0,70	-0,22	-4,39	-414,35	38,23	476,12
2000-2009	10,31	7,46	2,11	8,03	5,52	36,19	10,22	53,59
2010-2019	3,40	-2,94	16,91	1,12	-3,59	-43,3	248,8	-105,5
1991-2019	4,9	9,5	1,8	3,14	-0,7	95,6	17,7	-13,3

Source: Team's computations using GSS data

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