

STRUCTURAL TRANSFORMATION OF GUYANA'S ECONOMY: AN ANALYSIS OF GROSS DOMESTIC PRODUCT BY ECONOMIC ACTIVITY

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Abstract:

This study explores how the petroleum sector affects Guyana's structural transformation of the economy from 2006 to 2025, extending to projections for 2035. The research is based on the literature of the resource curse and structural transformation that explores whether natural resource wealth leads to diversified development or a dependency on extractive industries. Guyana has been on a trajectory of economic growth since 2019, when offshore oil discoveries were made and commercial production began which raised concerns about the changes in the underlying economic structure.

Data by economic activity for GDP is sourced from the Guyana Bureau of Statistics and data analysis methods used are descriptive analysis, sectoral growth comparisons, the Herfindahl–Hirschman Index (HHI), and ARIMA forecasting methods. To reflect the structural change over time, the analysis is divided into two periods: the pre-oil period (from 2006 to 2019) and the oil production period (from 2020 to 2025).

The results suggest there is a significant change in the economic composition after the beginning of oil production. The growth rate of total GDP was high during the post-oil era and the petroleum industry emerged as the leading contributor of growth. The absolute growth of traditional sectors (agriculture, manufacturing, services) was still significant, but their shares fell significantly. The HHI also indicates a shift from moderately diversified (0.278) to highly concentrated (0.630) economies, with greater reliance on the extractive sector.

Predictions indicate growth in GDP up to 2035 but could be susceptible to external pressures given the high volatility of petroleum output. In general, the research findings suggest that the production of petroleum has been the catalyst for growth as well as for economic concentration, which has led to concerns about petroleum diversification and resilience.

Keywords — Guyana, Petroleum Production, Structural Transformation, Economic Growth, Gross Domestic Product, Economic Diversification, Economic Concentration, Herfindahl–Hirschman Index, Structural Break Analysis, ARIMA Forecasting.

I. INTRODUCTION

The detection and operation of petroleum resources have changed the economic fate of many developing nations by creating new national economic income, foreign investment and a faster rate of economic growth. Natural resource wealth brings tremendous development opportunity, but also significant economic and policy challenges. The natural resource curse theory indicates that while resources provide the initial impetus for economic growth, they also introduce challenges such as diminished economic diversification, greater reliance on resource price fluctuations, and slower growth in other sectors of the economy [1] [2] [3]. It has therefore become an important topic of economic research to study the impact of natural resource discoveries on the economy as a whole.

Structural transformation is a central feature of economic development and means the shifting relative importance of different sectors during economic development. In countries as they develop, it is generally resources that are shifted between sectors as a result of technological advances, productivity gains, investment decisions, and production and consumption trends [4]. However, the fast-growing petroleum industry can change this transformation process in resource-rich economies, by diverting economic activity from services to extractive industries. While petroleum production can significantly raise gross domestic product (GDP), economic growth and development in the long run relies on the question of whether it comes with diversification or a reliance on a single sector [5] [6].

Guyana is one of the latest and most important examples of a petroleum economy changing the face of the economy. Prior to the discovery of offshore petroleum resources, agriculture, mining, forestry and fisheries were the key sectors of the economy in relation to national production and employment [7]. Large offshore oil finds started in 2015, and commercial oil production began in late 2019, which led to an exceptional economic growth in Guyana; one of the fastest-growing economies in the world [8] [9]. The country's economic landscape has been

transformed as petroleum production has now become a significant source of the country's output.

With the transition of Guyana from reliance on agriculture to oil production, it is critical to understand the impact of oil production on the overall economic framework of the country. The governance and management of the petroleum resources is a critical factor in either promoting sustainable economic development through the resource or creating dependency on the extractive sector [10]. Thus, the assessment of the changes in sectoral GDP, provides valuable indicators of the level of transformation of the economy caused by the development of petroleum production and whether there have been significant changes in the relative importance of traditional productive sectors in the transition to an oil-producing economy.

The study assesses structural change in the economy of Guyana from 2006 to 2025 based on the Gross Domestic Product (GDP) data by economic activity from the Bureau of Statistics Guyana [11]. The analysis examines the changes in sectoral performance pre- and post-commercial oil production using descriptive statistics, annual growth rates, compound annual growth rates, sectoral contribution analysis, comparisons between pre- and post-commercial oil production, measures of economic concentration (Herfindahl–Hirschman Index), structural break analysis and time-series analysis of the forecasts of total GDP and petroleum GDP. It examines trends in the past and future performance and the study offers empirical evidence on the impact of the oscillations in the petroleum sector on Guyana's structural transformation and is contributing to the larger literature on the subject of resource-led economic development.

The objectives of this study are to:

1. Analyze trends in GDP across major economic activities in Guyana from 2006 to 2025.
2. Compare the performance of economic sectors during the pre-oil period (2006–

- 2019) and the oil-production period (2020–2025).
3. Assess the contribution of the petroleum sector to Guyana's economic growth over the study period.
 4. Evaluate the extent of structural transformation through changes in sectoral GDP contributions and economic concentration.
 5. Forecast total GDP and petroleum GDP for the period 2026–2035 to examine the likely trajectory of Guyana's economy.

II. STATEMENT OF THE PROBLEM

Despite the significant opportunities associated with petroleum discoveries, resource-rich economies often face challenges in translating resource wealth into sustained and diversified economic development. The resource curse literature suggests that while natural resources can drive short-term economic growth, they may also contribute to structural imbalances, particularly when economic activity becomes increasingly concentrated in extractive industries at the expense of other productive sectors [1] [2] [3]. This raises concerns about whether petroleum-led growth supports long-term structural transformation or reinforces economic dependence on a single dominant sector.

In Guyana, the discovery of offshore petroleum reserves and the commencement of commercial oil production in 2019 have generated unprecedented economic expansion and positioned the country among the fastest-growing economies globally. However, this rapid growth has also raised critical questions regarding the sustainability and structure of this transformation. While petroleum production has significantly increased national output, it remains unclear how this development has influenced the relative performance of other key sectors such as agriculture, manufacturing, mining, and services.

Existing studies on Guyana's petroleum sector have primarily focused on aggregate economic growth, governance frameworks, and the broader

macroeconomic implications of oil production. Although these studies provide valuable insights into national-level performance, they offer limited empirical evidence on how petroleum production has altered the internal composition of the economy. In particular, there is insufficient analysis of sectoral GDP shifts over time to determine whether traditional productive sectors have maintained their relative importance or whether economic activity has become increasingly concentrated in the extractive sector.

Furthermore, there is a lack of comprehensive empirical studies that integrate sectoral decomposition, measures of economic concentration, and long-term trend analysis to assess the extent of structural transformation in the post-oil period. As a result, policymakers and researchers have limited evidence on whether Guyana's petroleum boom is fostering broad-based economic development or increasing structural dependence on oil.

This study therefore seeks to address this gap by examining the structural transformation of Guyana's economy over the period 2006–2025 using GDP by economic activity data from the Bureau of Statistics Guyana (2023). By analysing sectoral trends, comparative pre- and post-oil performance, and overall economic concentration, the study provides empirical evidence on how petroleum production has reshaped the structure of the economy and its implications for long-term development.

III. REVIEW OF LITERATURE

A. Natural Resources, Economic Growth, and the Resource Curse

The relationship between natural resource abundance and economic development has been widely debated. Although petroleum resources can generate substantial income, export earnings, and fiscal revenues, these gains do not automatically translate into sustained development. This tension underpins the resource curse hypothesis, which posits that resource-rich economies often experience weak diversification, institutional fragility, and

macroeconomic instability despite resource wealth [1].

The literature has increasingly shifted away from deterministic interpretations of the resource curse toward institutional explanations. Badeeb et al. (2017) argue that outcomes depend largely on governance quality and policy effectiveness rather than resource endowment alone [1]. In a comparative analysis, Alssadek and Benhin (2023) similarly show that petroleum wealth yields divergent outcomes depending on how revenues are managed, with stronger institutions enabling more inclusive development [2].

Zheng et al. (2023) extend this argument by emphasising that long-term sustainability in resource-rich economies requires resilience-building policies and structural diversification [3]. Collectively, the evidence suggests that petroleum wealth is not inherently beneficial or harmful; rather, its developmental impact is mediated by institutional and structural conditions.

B. Structural Transformation and Economic Diversification

Structural transformation is central to economic development and refers to the reallocation of economic activity from low- to high-productivity sectors [4]. Sustained growth depends not only on output expansion but also on changes in the sectoral composition of the economy that enhance productivity and resilience.

Resource booms can significantly shape this process. Ross (2017) finds that petroleum-dependent economies often struggle with diversification due to the dominance of extractive industries in fiscal revenue, investment, and trade. This can suppress the growth of manufacturing and agriculture, increasing exposure to external shocks [5].

Similarly, Venables (2016) argues that without deliberate policy intervention, resource windfalls tend to reinforce sectoral concentration rather than structural upgrading. He emphasises the importance of converting temporary resource rents into long-term productive investments to avoid persistent dependence on extractive sectors [6].

Overall, the literature converges on the view that sectoral analysis is essential for understanding whether resource-led growth contributes to structural transformation or entrenches economic concentration.

C. Petroleum-Led Transformation in Guyana

Guyana represents a recent and significant case of rapid petroleum-driven economic change. Historically, its economy relied on agriculture, forestry, mining, and fisheries as primary contributors to output and employment [7]. The discovery of offshore oil reserves after 2015 and the start of production in 2019 fundamentally altered its growth trajectory.

McDonald and Üngör (2021) situate Guyana within the resource curse framework, noting that while petroleum has created substantial growth potential, long-term outcomes depend on institutional and policy choices [8]. Chang (2025) provides empirical evidence that oil production significantly increased GDP relative to comparable economies, confirming strong macroeconomic effects [9].

However, this evidence is largely aggregate in nature. It does not capture how petroleum production has affected the internal composition of the economy across sectors. Azubike (2020) emphasises that governance and institutional oversight are critical for ensuring that petroleum revenues translate into sustainable development [10]. Worrell (2025) further highlights the continued structural importance of traditional sectors and their sensitivity to resource-driven shifts [7]. Taken together, the literature confirms strong macroeconomic impacts of oil production but provides limited insight into sectoral restructuring.

D. Synthesis and Research Gap

The literature demonstrates that the developmental impact of natural resources is highly conditional, depending on institutional quality and the ability to manage resource rents effectively [1] [2] [3]. Structural transformation theory further emphasises

that long-term development requires shifts toward higher-productivity sectors rather than concentration in extractive industries [4] [5] [6].

In the context of Guyana, existing studies primarily focus on macroeconomic growth, governance considerations, and the overall economic implications of petroleum production [10] [9] [8] [7]. While these contributions are valuable, they provide limited insight into how petroleum production has reshaped the structure of economic activity across sectors.

In particular, there is a lack of empirical work that systematically examines changes in sectoral GDP contributions over time in the post-oil period. As a result, it remains unclear whether petroleum production has facilitated broad-based structural transformation or reinforced dependence on the extractive sector.

IV. METHODOLOGY

A. Research Design and Data Source

This study adopts a quantitative research design to examine the structural transformation of Guyana's economy between 2006 and 2025. A quantitative approach is appropriate because the study uses numerical economic data and statistical techniques to identify trends, measure changes, compare sectoral performance, and evaluate relationships within the economic structure over time [12]. This approach allows for an objective assessment of changes in sectoral contributions and the impact of petroleum production on Guyana's economic composition.

The dataset used in this study was obtained from the Guyana Bureau of Statistics, which provides official national economic statistics, including Gross Domestic Product (GDP) by economic activity. Annual GDP data measured at constant 2012 prices and expressed in Guyanese dollars (G\$ million) were collected for the period 2006–2025.

For analytical purposes, individual economic activities reported by the Bureau of Statistics were

grouped into four broad sectors to facilitate comparison of changes in economic structure over time. Agriculture, Forestry and Fishing comprised Growing of Sugar Cane, Growing of Rice, Growing of Other Crops, Raising of Livestock, Forestry, and Fishing. The Mining and Petroleum (Extractive Sector) included Mining and Quarrying, Petroleum and Gas and Support Services, Gold, Bauxite, and Other Mining and Quarrying. The Manufacturing and Industry sector consisted of Manufacturing, Sugar Manufacturing, Rice Manufacturing, Other Manufacturing, Electricity Supply, Water Supply and Sewerage, and Construction. The Services Sector included Wholesale and Retail Trade and Repairs, Transport and Storage, Accommodation and Food Services, Information and Communication, Financial and Insurance Activities, Financial Intermediation and Other Services, Insurance Services and Agents, Real Estate Activities, Professional, Scientific and Technical Services, Administrative and Support Services, Public Administration, Education, Human Health and Social Work, Arts, Entertainment and Recreation, and Other Service Activities. This classification enabled a comprehensive assessment of changes in sectoral contributions before and after the emergence of petroleum production while preserving the underlying economic structure reported in the national accounts.

The study period was selected to capture Guyana's economic development before and after the emergence of commercial petroleum production. The analysis separates the data into two periods: the pre-oil period (2006–2019) and the oil-production period (2020–2025). This classification enables comparison of sectoral performance and assessment of changes associated with the transition into an oil-producing economy.

B. Descriptive and Growth Analysis

The study begins with descriptive statistical analysis to examine differences in output levels and variability across economic sectors. Measures including the mean, median, standard deviation, minimum, and maximum values are calculated to summarize sectoral GDP performance and identify

differences in economic activity over the study period.

Trend analysis is conducted to evaluate changes in GDP patterns across major sectors from 2006 to 2025. Annual growth rates are analyzed to assess short-term sectoral performance, while the Compound Annual Growth Rate (CAGR) is calculated to evaluate long-term growth trends and compare the expansion or decline of different economic activities.

To examine changes associated with petroleum production, sectoral GDP performance is compared between the pre-oil and oil-production periods. Mean GDP values for each sector are calculated for both periods to identify changes in sectoral contribution and determine which activities experienced significant expansion, contraction, or relative stability following the introduction of petroleum production.

C. Economic Diversification Analysis

The study evaluates changes in economic concentration by examining changes in sectoral GDP composition over time. The analysis uses sectoral GDP contributions to assess whether Guyana's economy became more concentrated following the expansion of petroleum activities.

The Herfindahl–Hirschman Index (HHI) is applied as an indicator of economic concentration and is calculated as:

$$HHI = \sum_{i=1}^n s_i^2$$

where s_i represents the proportion of total GDP contributed by sector i . Changes in HHI values between the pre-oil period and the oil-production period are used to evaluate whether the economy shifted from a more diversified structure toward greater concentration in specific economic activities, particularly petroleum.

D. Forecasting Method

To assess future economic trends, the study applies the Autoregressive Integrated Moving

Average (ARIMA) model to forecast Total GDP and Petroleum GDP for the period 2026–2035. ARIMA models are widely used in time-series analysis because they allow forecasting based on historical patterns within economic data through autoregressive relationships, differencing, and moving-average components [13].

The ARIMA(1,2,0) model specification is used to generate forecasts for Total GDP and Petroleum GDP. The model incorporates historical GDP patterns and applies differencing to account for changes in the time-series structure. Forecast accuracy is evaluated using Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE), which measure the difference between observed and predicted values.

E. Analytical Framework Summary

The methodology combines descriptive analysis, sectoral growth measurement, pre- and post-oil comparison, diversification analysis, and forecasting. By grouping individual economic activities into four broad sectors, Agriculture, Forestry and Fishing; Mining and Petroleum (Extractive Sector); Manufacturing and Industry; and Services, the study provides a clearer assessment of structural transformation while retaining detailed sectoral information from the national accounts. This integrated analytical framework enables a comprehensive evaluation of both historical changes and future projections in Guyana's economy, providing evidence on how petroleum production has influenced economic growth, sectoral composition, and long-term development.

V. RESULT AND DISCUSSION

Table 1: DESCRIPTIVE STATISTICS OF GDP BY ECONOMIC ACTIVITY (G\$ MILLION)

Economic Sector	Mean	Median	Standard Deviation	Minimum	Maximum
Growing of Sugar Cane	9,749.40	11,393.00	4,920.08	2,895	16,054
Growing of Rice	47,344.30	48,920.00	10,699.55	29,436	65,777
Growing of Other Crops	129,574.85	117,485.50	37,086.52	84,059	212,693
Mining and Quarrying	877,586.80	127,941.00	1,541,903.52	70,190	5,304,772
Petroleum and Gas; Support Services	1,091,591.64	14,681.00	1,734,974.01	375	5,129,804
Manufacturing	56,415.05	51,421.00	14,297.44	44,668	101,580
Construction	88,974.55	68,799.00	50,930.63	56,793	251,753
Wholesale and Retail Trade	75,446.00	74,983.50	15,120.64	53,086	111,483
Transport and Storage	32,986.60	33,868.00	10,767.50	18,241	56,801
Financial and Insurance Activities	43,370.60	43,615.50	17,640.12	19,720	84,859
Real Estate Activities	75,006.25	74,799.50	8,629.01	60,615	92,412
Administrative and Support Services	59,788.70	56,222.50	19,559.33	30,452	104,820
Public Administration	35,722.00	34,606.00	5,492.54	29,818	46,630
Education	20,754.90	20,974.50	3,603.31	14,775	28,925
Human Health and Social Work	9,896.55	9,926.50	3,066.58	4,525	14,617

Table 1 presents the descriptive statistics for the major economic activities in Guyana from 2006 to 2025, highlighting significant differences in sectoral GDP contributions. Petroleum and Gas, including Support Services, recorded the highest mean GDP (G\$1,091.59 billion), followed by Mining and Quarrying (G\$877.59 billion), indicating the dominant role of extractive industries in driving economic growth. The substantial differences between the means and medians, together with the exceptionally high standard deviations of these sectors, suggest highly skewed distributions resulting from the rapid expansion of oil production in the latter years of the study. In contrast, the agricultural sectors contributed considerably less to GDP, with Growing of Other Crops recording the highest mean among agricultural activities (G\$129.57 billion), while Growing of Sugar Cane had the lowest mean (G\$9.75 billion), reflecting its declining economic importance. Among the non-extractive sectors, Construction, Wholesale and Retail Trade, Real Estate Activities, and

Manufacturing recorded relatively strong and stable contributions, whereas the public service sectors, including Public Administration, Education, and Human Health and Social Work, exhibited lower but more consistent GDP contributions. Overall, the descriptive statistics provide preliminary evidence of a structural transformation in Guyana's economy, characterized by the increasing dominance of the petroleum sector alongside continued contributions from traditional industries.

A. Trend Analysis (2006–2025)

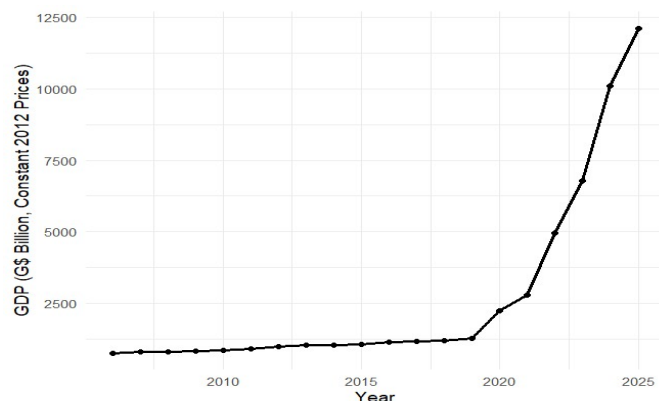


Fig.1 Total Gross Domestic Product of Guyana (2006–2025)

The trend in total Gross Domestic Product (GDP) from 2006 to 2025 indicates that Guyana experienced two distinct phases of economic growth. During the period 2006–2019, GDP increased gradually, reflecting steady economic expansion driven by traditional sectors such as agriculture, mining, manufacturing, construction, trade, and services. In contrast, GDP increased dramatically from 2020 onwards, with the steepest growth occurring between 2021 and 2025. This sharp acceleration coincides with the commencement of commercial petroleum production, suggesting that the oil sector has become the primary driver of economic growth. The rapid increase in GDP after 2020 indicates a significant structural transformation of the Guyanese economy, marking a transition from reliance on traditional economic activities to an economy increasingly dominated by petroleum production. These findings provide strong evidence that the discovery and exploitation of oil substantially altered Guyana's economic growth trajectory during the study period.

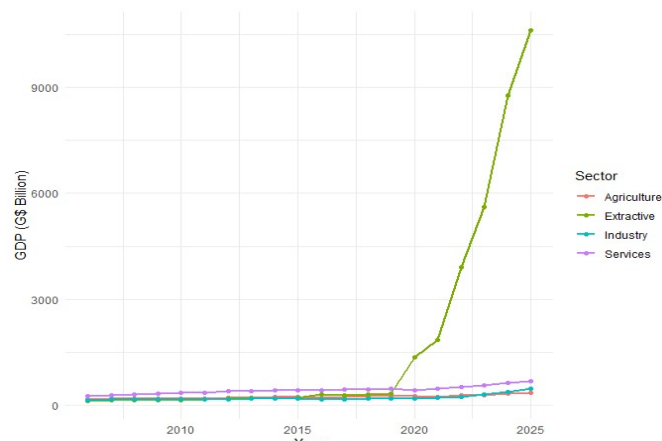


Fig. 2 Sectoral GDP Trends

There are clear structural changes in GDP composition over time, with a major shift in recent years driven primarily by the extractive sector, which rises sharply after 2020 from a relatively stable and low contribution to become the dominant source of economic growth. This rapid expansion strongly suggests a resource-led boom, most likely associated with increased petroleum and gas production, which has significantly reshaped the overall economic structure and concentrated growth in one sector. In contrast, the services sector shows steady and consistent growth throughout the period, remaining an important stabilizing component of the economy through activities such as trade, transport, finance, education, and public administration, although its growth is far more gradual and does not match the pace of extractives. The industrial sector excluding extractives records only modest gains, indicating limited expansion in manufacturing, construction, and utilities, while agriculture, forestry, and fishing remain relatively small and largely stagnant in their GDP contribution, reflecting a declining relative importance despite their continued role in employment and rural livelihoods. The economy exhibits a clear shift toward extractive-led growth, resulting in increased dependence on a single dominant sector, which has boosted total GDP but also raises concerns about concentration risk and limited diversification across other productive sectors.

B. Sectoral GDP Comparison Between Pre-Oil and Oil Era (G\$ million)

Table 2 Sectoral GDP Comparison Between Pre-Oil and Oil Era (G\$ million)

Period	Agriculture	Extractive	Industry	Services	Total GDP
Pre-Oil Period (2006–2019)	215,712	211,526	173,109	379,549	979,898
Oil Period (2020–2025)	295,618	5,351,471	294,353	553,770	6,495,212

There is a clear structural shift in GDP composition between the pre-oil and oil periods, with total GDP rising sharply from about G\$979.898 billion to G\$6,495.212 billion. In the pre-oil period, the economy was more balanced, with services as the largest contributor, followed by agriculture, industry, and a relatively small extractive sector. However, in the oil period (2020–2025), the extractive sector expands dramatically to dominate the economy, increasing its contribution far beyond all other sectors and becoming the primary driver of GDP growth. At the same time, services, while still significant in absolute terms, decline sharply in relative share, and agriculture and industry show only modest increases in value but reduced importance in percentage terms. This pattern indicates a strong shift toward extractive-led growth, with economic structure becoming more concentrated and less diversified compared to the pre-oil period.

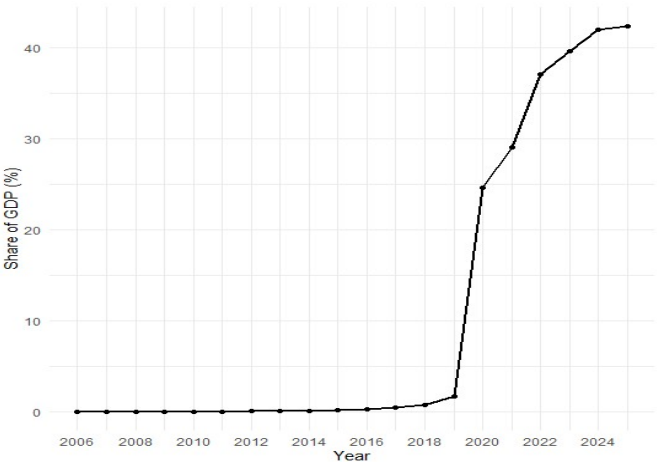


Fig. 3 Petroleum and Gas Share of Total

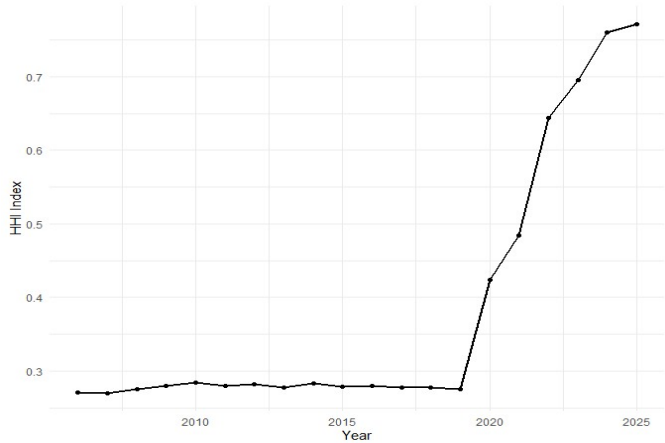


Fig. 4 Economic Diversification (HHI over time)

TABLE 3 MEAN HERFINDAHL–HIRSCHMAN INDEX (HHI) BEFORE AND AFTER OIL PRODUCTION

Period	Mean HHI	Interpretation
Pre-Oil Era (2006–2019)	0.278	Moderately diversified
Oil Era (2020–2025)	0.63	Highly concentrated

The results presented in Figure 3, Figure 4, and Table 3 demonstrate a significant structural transformation in Guyana's economy following the commencement of commercial oil production in 2020. During the pre-oil era (2006–2019), the Herfindahl–Hirschman Index (HHI) remained relatively stable, averaging 0.278, indicating a moderately diversified economy in which GDP was distributed across agriculture, industry, services, and the extractive sector without any single sector dominating national output. This stability is evident in Figure 4, where the HHI fluctuates only

marginally around 0.28 throughout the pre-oil period. However, with the start of petroleum production, the HHI increased sharply to an average of 0.630 during the oil era (2020–2025), indicating a highly concentrated economic structure. This increase coincides with the rapid rise in the petroleum and gas sector's share of GDP shown in Figure 3, where its contribution expanded from virtually 0% before 2020 to approximately 25% in 2020, increasing steadily to over 42% by 2025. The simultaneous rise in both the petroleum share of GDP and the HHI demonstrates that the rapid expansion of the petroleum sector has become the principal driver of economic growth while substantially increasing sectoral concentration. Although other sectors continued to grow in absolute terms, their relative contributions declined as petroleum assumed a dominant role in the economy. These findings indicate that Guyana has transitioned from a relatively diversified economic structure to one that is increasingly dependent on the extractive sector, highlighting both the substantial economic gains generated by oil production and the growing need to strengthen non-oil sectors to improve long-term economic resilience and reduce vulnerability to external shocks, including fluctuations in global oil prices.

C. Economic Forecasting Results (2026–2030)

TABLE 4 FORECASTING MODEL RESULTS

Variable	Model	RMSE	MAPE (%)	Interpretation
Total GDP	ARIMA (1,2,0)	495,718	6.45	High forecasting accuracy
Petroleum GDP	ARIMA (1,2,0)	236,465	35.43	Higher uncertainty/volatility

Table 5 Forecasted Total GDP and Petroleum GDP (2026–2035) (G\$ billion)

Year	Total GDP	Petroleum GDP
2026	14,939.64	6,466.75
2027	17,269.80	7,502.16
2028	19,897.26	8,741.14
2029	22,341.74	9,842.68
2030	24,898.84	11,037.02
2031	27,386.63	12,168.71
2032	29,917.07	13,342.69
2033	32,421.27	14,488.12
2034	34,941.61	15,652.83
2035	37,452.02	16,804.52

The forecasting results presented in Table 4 and Table 5 indicate that Guyana's economy is projected to experience sustained and substantial growth between 2026 and 2035, with the petroleum sector remaining the principal driver of economic expansion. The ARIMA(1,2,0) model selected for both Total GDP and Petroleum GDP demonstrates strong predictive performance for Total GDP, with an RMSE of G\$495.718 billion and a MAPE of 6.45%, indicating high forecasting accuracy. In contrast, the Petroleum GDP model records an RMSE of G\$236.465 billion and a higher MAPE of 35.43%, reflecting greater uncertainty and volatility associated with petroleum production and international oil market conditions. As shown in Table 5, Total GDP is forecast to increase from G\$14.94 trillion in 2026 to G\$37.45 trillion by 2035, while Petroleum GDP is projected to rise from G\$6.47 trillion to G\$16.80 trillion over the same period. These projections indicate that petroleum will continue to account for a substantial proportion of Guyana's economic output, reinforcing its role as the dominant contributor to future GDP growth. However, the comparatively higher forecasting error for Petroleum GDP suggests that future economic performance remains sensitive to fluctuations in oil prices, production capacity, and global energy demand. Consequently, although the forecasts point to continued rapid economic expansion, they also emphasize the importance of strengthening non-oil sectors to improve economic diversification,

enhance resilience to external shocks, and support sustainable long-term growth.

VI. CONCLUSION

This study examined the impact of petroleum production on Guyana's economic structure by analyzing GDP trends, sectoral performance, structural transformation, and future economic growth between 2006 and 2035. The findings demonstrate that Guyana has experienced a profound economic transformation since the commencement of commercial oil production in 2020. Before oil production, economic growth was gradual and relatively balanced across agriculture, manufacturing, construction, mining, trade, and services. Following the start of petroleum production, however, total GDP expanded at an unprecedented rate, confirming that the petroleum industry has fundamentally altered the country's economic growth trajectory.

The analysis of GDP trends showed that economic growth accelerated sharply after 2020, with petroleum and gas becoming the largest contributor to national output. While traditional sectors continued to record positive growth in absolute terms, their expansion was modest compared with the rapid growth of the petroleum sector. The comparison between the pre-oil and oil periods further revealed that total GDP increased from approximately G\$979.90 billion to G\$6.50 trillion, with the extractive sector overtaking services to become the dominant contributor to economic activity. These findings illustrate that Guyana's recent economic expansion has been driven primarily by petroleum production rather than broad-based growth across all sectors.

The study also established that the petroleum sector has become increasingly important in shaping the country's economic performance. The petroleum and gas share of GDP increased from virtually zero before 2020 to more than 42% by 2025, demonstrating the sector's central role in generating national income and driving overall economic growth. At the same time, the results indicate that the rapid expansion of petroleum has substantially

altered the composition of GDP, reducing the relative contribution of agriculture, manufacturing, and services despite continued growth in these sectors.

Evidence of structural transformation was further confirmed by the Herfindahl–Hirschman Index, which showed that Guyana's economy shifted from being moderately diversified before oil production ($HHI = 0.278$) to highly concentrated after oil production began ($HHI = 0.630$). The simultaneous increase in the petroleum share of GDP and the HHI demonstrates that economic activity has become increasingly concentrated within the extractive sector. Although this transformation has generated exceptional economic growth, it also increases the country's exposure to external risks associated with fluctuations in global oil prices, production levels, and international energy markets.

The forecasting analysis indicates that Guyana's strong economic performance is expected to continue over the next decade. Total GDP is projected to increase from approximately G\$14.94 trillion in 2026 to G\$37.45 trillion by 2035, while Petroleum GDP is forecast to rise from G\$6.47 trillion to G\$16.80 trillion. Although the forecasting model demonstrated high accuracy for Total GDP, the greater uncertainty associated with Petroleum GDP suggests that future economic performance will remain highly dependent on developments within the global petroleum industry.

The findings demonstrate that petroleum production has transformed Guyana into one of the world's fastest-growing economies, fundamentally reshaping its production structure and accelerating national income growth. However, the increasing concentration of economic activity within the extractive sector highlights the importance of policies that promote economic diversification, strengthen traditional productive sectors, and encourage investment in manufacturing, agriculture, services, and other value-added industries. Such measures will be essential to reducing economic vulnerability, improving resilience to external shocks, and ensuring that the benefits of petroleum

wealth contribute to sustainable and inclusive long-term economic development.

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