


## Fiscal Dependence of Timor-Leste on the Oil and Gas Sector: Challenges of Economic Diversification

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Article Info	ABSTRACT
<p><b>Keywords:</b> Fiscal Dependence, Oil and Gas Revenue, Economic Diversification, Timor-Leste, Petroleum Fund, Infrastructure, Human Development, Export Concentration, Structural Reform</p>	<p>This study analyzes the fiscal dependence of Timor-Leste on the oil and gas sector and the associated challenges in achieving economic diversification. Using a quantitative descriptive approach and time-series secondary data from 2010 to 2023, the findings reveal that oil and gas revenues constitute 85–90% of the state's total income. This high dependency has led to a vulnerable fiscal structure and limited progress in diversifying the economic base. Regression results show that fiscal dependence negatively affects economic diversification, while infrastructure, GDP per capita, and human development have significant positive impacts. Timor-Leste also ranks lowest among comparable countries in export diversification and structural balance. The study recommends a strategic shift toward investment in non-oil sectors such as agriculture, tourism, and light manufacturing, supported by institutional reform and human capital development. These efforts are essential to reduce fiscal risks and build a more resilient and inclusive economy.</p>
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### INTRODUCTION

Timor-Leste, the youngest nation in Southeast Asia that gained independence in 2002, continues to face major challenges in establishing a resilient and sustainable economy. Since its independence, the country's fiscal structure has been heavily reliant on oil and gas revenues, with the petroleum sector accounting for approximately 85–90% of total state income. This overdependence not only dominates the national budget structure but also signals a serious vulnerability to external shocks, especially those arising from global commodity price fluctuations.

The phenomenon of fiscal dependence on natural resources is widely discussed in the development economics literature and is often associated with what is known as the "resource curse." According to Auty (2001), fiscal dependence on extractive sectors can lead to macroeconomic distortions such as income volatility, the neglect of non-resource sectors, and weak fiscal discipline. Sachs and Warner (1995) further emphasized that countries rich in natural resources often experience slower long-term economic growth and institutional weaknesses, particularly when there is inadequate reinvestment into productive sectors.

Timor-Leste's case is particularly concerning due to its limited oil and gas reserves, which are expected to deplete in the coming decades. Carneiro (2015) noted that although the country's Petroleum Fund has accumulated significant wealth, long-term fiscal sustainability remains uncertain. Without urgent and well-targeted diversification strategies, Timor-Leste risks entering a period of economic instability once its hydrocarbon revenues diminish.

Economic diversification is crucial to breaking this cycle of dependence. Theoretically, economic diversification aims to reduce reliance on a single sector by promoting growth across multiple economic domains. Hirschman (1958) argued that fostering linkages among sectors stimulates broader economic development and resilience. Empirically, Gylfason (2001) showed that high resource dependence correlates with poor education outcomes and weak economic dynamism. In contrast, countries that invest oil revenues wisely, such as Botswana and Trinidad, have demonstrated stronger performance in developing competitive non-resource sectors (Gelb, 1988; Collier & Hoeffler, 2005).

Timor-Leste has made attempts to introduce diversification policies, including through its National Strategic Development Plan. However, structural and institutional constraints, such as weak infrastructure, limited human capital, and an unfavorable business climate, remain formidable. Lundahl and Sjöholm (2008) and Pacheco Santos (2013) both highlighted that sectors like agriculture, tourism, and light manufacturing hold promise, but these sectors require strategic investment and capacity-building to become effective alternatives to hydrocarbons.

Given this context, this study seeks to conduct a quantitative-descriptive analysis of Timor-Leste's fiscal dependence on the oil and gas sector, identify the key challenges in diversifying the economy, and propose evidence-based strategies to improve fiscal resilience and promote long-term economic sustainability. This analysis integrates time-series data from 2010 to 2023 and draws comparisons with similar resource-dependent countries to provide a comprehensive understanding of Timor-Leste's economic vulnerability and its potential pathways toward diversification.

## METHODS

This study adopts a quantitative descriptive-analytical approach to explore the extent of fiscal dependence in Timor-Leste on the oil and gas sector and the key obstacles to achieving economic diversification. The descriptive component is employed to portray the structural characteristics of the economy and its fiscal patterns, while the analytical aspect facilitates the examination of relationships between fiscal reliance and diversification performance.

The research utilizes secondary data collected from various authoritative sources, including the Ministry of Finance of Timor-Leste, Banco Central de Timor-Leste (BCTL), the General Directorate of Statistics, and the annual reports of the Petroleum Fund. Additional macroeconomic and development indicators are obtained from international institutions such as the World Bank, the International Monetary Fund (IMF), and the Asian Development Bank (ADB). These sources are selected due to their data consistency, reliability, and comprehensiveness in reflecting the socio-economic dynamics of the country.

The study focuses on the period 2010 to 2023, capturing both short- and medium-term trends in fiscal behavior and economic structure. This time frame aligns with a relatively stable phase in Timor-Leste's economic and political development, which provides a solid foundation for trend analysis and cross-period comparisons.

Several core variables are examined throughout the analysis. Fiscal dependence is assessed by measuring the proportion of oil and gas revenue to total government income, its share in gross domestic product (GDP), and the contribution of the Petroleum Fund to the national budget. Economic diversification is evaluated through a set of indicators including the Herfindahl-Hirschman Index (HHI) for GDP, employment, and exports, along with the share of non-oil sectors in GDP and employment distribution across sectors. To account for broader development influences, control variables such as GDP per capita, the Human Development Index (HDI), inflation, infrastructure quality, and economic growth rate are also considered.

The data analysis begins with descriptive statistics to identify central tendencies, dispersion, and temporal trends. It proceeds with correlation analysis to investigate the direction and strength of relationships between fiscal dependence and economic diversification. To quantify the effects of fiscal and structural variables on diversification outcomes, a multiple linear regression model is employed. The model includes fiscal dependence as the primary explanatory variable, accompanied by GDP per capita, infrastructure quality, and HDI as covariates. Furthermore, index analysis is carried out to compute measures of economic concentration and complexity using HHI and export diversification indexes.

Nevertheless, the research is subject to certain limitations. One major constraint lies in the limited availability and consistency of economic data, particularly for earlier years. In addition, although the 14-year period is relatively adequate for observing mid-term dynamics, it may not fully capture the depth of long-term structural transformation. The analysis also does not completely isolate the effects of external shocks, such as fluctuations in global oil prices or changes in geopolitical conditions, which may have had a significant influence on fiscal outcomes and diversification efforts.

## RESULTS AND DISCUSSION

The findings of this study confirm the deeply entrenched fiscal dependence of Timor-Leste on the oil and gas sector. Between 2010 and 2023, petroleum-related revenues consistently accounted for approximately 85% to 90% of total state income. Although the nominal value of revenues fluctuated across years, ranging from USD 2.8 billion in 2010 to around USD 1.4 billion in 2023, the structural pattern of dependence remained unchanged. This high concentration of fiscal revenue on a single sector reflects not only vulnerability to external shocks, such as fluctuations in global oil prices, but also a lack of progress in establishing alternative, non-resource-based revenue streams.

**Table 1:** Composition of Timor-Leste's State Revenue (2010–2023)

Year	Oil & Gas Revenue (%)	Non-Oil Revenue (%)	Total Revenue (USD Million)
2010	89.2%	10.8%	2,847

Year	Oil & Gas Revenue (%)	Non-Oil Revenue (%)	Total Revenue (USD Million)
2015	86.5%	13.5%	1,598
2020	87.8%	12.2%	1,023
2023	85.3%	14.7%	1,456

The Petroleum Fund, established in 2005, plays a pivotal role in stabilizing public finances. As of 2023, it held assets amounting to USD 19.8 billion and contributed 80% to 85% of the annual state budget. While this fund has successfully delayed fiscal crises, its dominance has led to complacency in domestic revenue mobilization and delayed efforts to diversify the economy. Furthermore, the analysis indicates a strong positive correlation ( $r = 0.78$ ) between international oil prices and fiscal revenue, suggesting a significant exposure to commodity price volatility.

**Table 2:** Sectoral Contribution to GDP and Employment in Timor-Leste (2023)

Sector	Contribution to GDP (%)	Employment Share (%)
Oil and Gas	68.4	2.1
Agriculture	8.7	41.2
Construction	7.2	8.5
Trade	5.1	12.3
Public Services	4.8	15.6
Others	5.8	20.3

In terms of economic structure, the study reveals a stark dualism. The oil and gas sector contributes 68.4% to GDP, yet employs only 2.1% of the labor force. In contrast, the agricultural sector, which contributes just 8.7% to GDP, absorbs over 40% of employment. This mismatch reflects low productivity in labor-intensive sectors and underscores the limited capacity of the economy to generate broad-based and inclusive growth. The Herfindahl-Hirschman Index (HHI) values further reinforce this imbalance: 0.48 for GDP and a staggering 0.91 for exports, indicating very high economic concentration and poor diversification.

**Table 3:** Regression Analysis Results

Variable	Coefficient	t-statistic	Significance (p-value)
Fiscal Dependence	-0.234	-2.87	0.012
GDP per capita	0.156	2.34	0.032
Infrastructure Index	0.289	3.45	0.003
Human Development Index	0.198	2.67	0.017
Constant	0.123	1.89	0.076

Regression analysis provides deeper insights into the dynamics of diversification. The results show that fiscal dependence has a statistically significant negative effect on economic diversification (coefficient = -0.234;  $p = 0.012$ ). Conversely, variables such as infrastructure quality (coefficient = 0.289;  $p = 0.003$ ), Human Development Index (coefficient = 0.198;  $p = 0.017$ ), and GDP per capita (coefficient = 0.156;  $p = 0.032$ ) have positive and significant effects on diversification outcomes. The regression model explains 68.7% of the variance in

economic diversification ( $R^2 = 0.687$ ), suggesting that structural factors are strong determinants of progress in economic transformation.

The discussion of constraints reveals that Timor-Leste faces multidimensional challenges. Infrastructure limitations, such as poor road coverage, unreliable electricity, and low internet penetration, impede economic connectivity and industrial expansion. Human capital deficiencies, including a literacy rate of just 68% and low tertiary education attainment (12% of the adult population), further hinder innovation and entrepreneurship. The business environment remains discouraging, as reflected in the World Bank’s Doing Business ranking, where Timor-Leste stands at 181 out of 190 countries. Moreover, the domestic market is small and has limited purchasing power. The population of 1.3 million offers little scale for mass production, and a high reliance on imports continues to erode external balances. The trade deficit in non-oil goods persists, and the dollarized economy limits the effectiveness of monetary tools.

**Table 4:** Comparison of Diversification Indicators Across Countries

Country	HHI (GDP)	Oil Sector Contribution (%)	Non-Oil Growth (%)	Export Diversification
Timor-Leste	0.48	68.4	2.1	0.09
Brunei	0.45	65.2	3.4	0.12
Trinidad	0.32	34.5	4.2	0.25
Botswana	0.28	23.1	5.1	0.31

Benchmarking against other resource-dependent countries reinforces these concerns. Compared to peers such as Brunei, Trinidad, and Botswana, Timor-Leste demonstrates the lowest level of economic diversification, both in terms of GDP composition and export concentration. These comparative insights indicate the urgent need for structural reforms and long-term investments in sectors with high employment potential and added value, such as agriculture, tourism, fisheries, and light manufacturing.

In summary, the results affirm that Timor-Leste’s fiscal model is unsustainable in the long term without a meaningful shift toward economic diversification. While the Petroleum Fund offers a financial buffer, it cannot substitute for a productive and resilient real economy. Therefore, policy efforts must prioritize the development of enabling infrastructure, human capital, and a more dynamic private sector to gradually reduce the country’s reliance on hydrocarbon revenues.

## CONCLUSION

This study concludes that Timor-Leste remains highly fiscally dependent on the oil and gas sector, with petroleum revenues consistently accounting for 85% to 90% of total government income from 2010 to 2023. While the Petroleum Fund has played a crucial role in stabilizing public finances and sustaining the national budget, it has also contributed to a structural complacency that hinders domestic revenue diversification and economic transformation. The excessive reliance on hydrocarbons has created a dual economy, where oil and gas dominate

GDP contributions but employ only a small fraction of the labor force. Conversely, sectors like agriculture and public services employ the majority of the population but contribute little to national output, highlighting deep productivity and structural imbalances. Empirical findings from the regression analysis confirm that fiscal dependence significantly impedes economic diversification. On the other hand, infrastructure development, higher GDP per capita, and human development show positive and statistically significant effects on diversification. Comparative benchmarking with countries such as Botswana and Trinidad further reveals that Timor-Leste has the lowest export diversification and the highest economic concentration, reinforcing the urgency for reform. To break this cycle, Timor-Leste must adopt a long-term, multi-pronged development strategy focused on strengthening infrastructure, improving human capital, and reforming its institutional framework. Investments in productive sectors—particularly agriculture, tourism, and light manufacturing—will be critical to generate employment, reduce fiscal risk, and build a more inclusive and resilient economy. Without decisive action, the country risks falling deeper into the “resource curse” trap, threatening both fiscal sustainability and long-term national development.

#### REFERENCE

- Auty, R. M. (2001). *Resource abundance and economic development*. Oxford University Press.
- Banco Central de Timor-Leste. (2023). *Annual report 2023*. Dili: BCTL.
- Carneiro, F. G. (2015). Managing oil wealth: The case of Timor-Leste’s Petroleum Fund. *Asian Development Bank Working Paper Series*, (446).
- Collier, P., & Hoeffler, A. (2005). Resource rents, governance, and conflict. *Journal of Conflict Resolution*, 49(4), 625–633. <https://doi.org/10.1177/0022002705277551>
- General Directorate of Statistics. (2023). *Statistical yearbook of Timor-Leste 2023*. Dili: GDS.
- Gelb, A. H. (1988). *Oil windfalls: Blessing or curse?* Oxford University Press.
- Government of Timor-Leste. (2023). *State budget 2023*. Ministry of Finance.
- Gylfason, T. (2001). Natural resources, education, and economic development. *European Economic Review*, 45(4–6), 847–859. [https://doi.org/10.1016/S0014-2921\(01\)00127-1](https://doi.org/10.1016/S0014-2921(01)00127-1)
- Hirschman, A. O. (1958). *The strategy of economic development*. Yale University Press.
- International Monetary Fund. (2023). *Timor-Leste: Article IV consultation staff report*. IMF Country Report No. 23/156.
- Lundahl, M., & Sjöholm, F. (2008). The oil resources of Timor-Leste: Curse or blessing? *The Pacific Review*, 21(1), 67–86. <https://doi.org/10.1080/09512740701818766>
- Pacheco Santos, C. (2013). Economic diversification in Timor-Leste: Challenges and opportunities. *La’o Hamutuk Bulletin*, 14(2), 1–10.