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## **Impact of Tax Level on Economic Growth by Sectors in Azerbaijan (2014–2023): Statistical Analysis**

### **Abstract**

This paper investigates the impact of taxation levels on the economic growth of key sectors in Azerbaijan over the period 2014–2023. The analysis focuses on five main sectors: oil and gas, agriculture, manufacturing, construction, and services. Using annual data from national and international sources, including the State Statistical Committee of Azerbaijan, IMF, and OECD, we construct a sector-specific panel dataset covering corporate income tax (CIT), value-added tax (VAT), and personal income tax (PIT). Regression analysis is applied to assess how these taxes, as a share of GDP or sectoral value added, have influenced real growth in each sector. The results demonstrate that the oil and gas sector, while generating most tax revenues, shows weak sensitivity to domestic tax policies, being more responsive to global oil prices and production constraints. In contrast, non-oil sectors exhibit measurable responses to tax burden changes. These findings underline the importance of differentiated tax policies and targeted reforms in supporting Azerbaijan's economic diversification efforts away from oil dependency.

**Keywords:** *Azerbaijan, taxes, sectoral growth, corporate tax, regression analysis*

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## **Azərbaycanda vergi səviyyəsinin sektorlar üzrə iqtisadi artıma təsiri (2014-2023): statistik təhlil**

### **Xülasə**

Bu məqalədə 2014–2023-cü illər dövründə Azərbaycanda vergi səviyyəsinin əsas iqtisadi sahələrin inkişafına təsiri araşdırılır. Təhlil beş əsas sektoru əhatə edir: neft və qaz, kənd təsərrüfatı, emal sənayesi, tikinti və xidmət sahələri. Dövlət Statistika Komitəsi, BVF və İƏT kimi milli və beynəlxalq mənbələrdən istifadə olunmaqla, korporativ gəlir vergisi (CIT), əlavə dəyər vergisi (ƏDV) və fiziki şəxslərin gəlir vergisi (PİT) üzrə illik məlumatlara əsaslanan sektoral panel verilənlər bazası hazırlanmışdır. Bu vergilərin ÜDM-dəki və ya sektoral əlavə dəyərdəki payı nəzərə alınmaqla reqressiya təhlili aparılmışdır. Nəticələr göstərir ki, əsas vergi gəlirlərini təmin edən neft və qaz sektoru daxili vergi siyasətinə zəif reaksiya verir və daha çox dünya neft qiymətləri və hasilat məhdudiyyətlərindən asılıdır. Əksinə, qeyri-neft sektorları vergi yükündəki dəyişikliklərə qarşı statistik cəhətdən əhəmiyyətli reaksiya verir. Bu nəticələr Azərbaycanın neftdən asılılığını azaltmaq məqsədilə həyata keçirdiyi iqtisadi şaxələndirmə söylərində fərqləndirilmiş vergi siyasəti və hədəflənmiş islahatların zəruriliyini göstərir.

**Açar sözlər:** *Azərbaycan, vergilər, sektoral artım, korporativ vergi, reqressiya təhlili*

## Introduction

Azerbaijan's economy is characterized by a dominant oil and gas sector and a developing non-oil sector. Since the 2014 drop in global oil prices, Azerbaijan's GDP growth has markedly slowed, prompting a policy focus on non-oil sector development (Region Plus, 2017). Taxation is a crucial policy tool in this context. The government's tax revenues have historically depended on the hydrocarbon sector, with value-added tax (VAT) and corporate profit tax (CIT) comprising the largest shares of tax collections. In 2014, tax revenue was about 17.2% of GDP (OECD, 2024), and VAT and corporate profit taxes together accounted for the bulk of this income. Over 2014–2023, the tax-to-GDP ratio fluctuated, hitting a low of 16.2% in 2018 and a peak of 20.3% in 2020, reflecting changes in oil earnings and tax policy. Crucially, the government introduced tax reforms to stimulate non-oil sectors – for example, agricultural producers have been exempt from profit tax and VAT since 2014 (PwC, 2025), and from 2019, private-sector salaries (outside oil/gas) up to a threshold were made income tax-free to encourage employment. These measures suggest that tax policy changes could significantly impact sectoral performance (Rahimov, Jafarova, 2023).

### Research

This paper investigates the impact of different tax levels – specifically CIT, VAT, and personal income tax – on the growth of key sectors in Azerbaijan over 2014–2023. We focus on five sectors: oil & gas, agriculture, manufacturing, construction, and services. By conducting a regression analysis with sectoral growth as the dependent variable and tax metrics as independent variables, we aim to quantify how tax variations influenced each sector's real value-added output (Ahmadov, & Mammadova, 2021).

### Methodology

We compiled an annual panel dataset for 2014–2023 covering sectoral value added and tax indicators. Sectoral GDP (value added) data for oil & gas, agriculture, manufacturing, construction, and services were obtained from the State Statistical Committee of Azerbaijan and World Bank World Development Indicators. For example, official statistics report that in 2014 Azerbaijan's GDP grew by 2.8%, with non-oil sectors expanding 7.0% (Azerbaijan State Statistical Committee, 2015), whereas oil-gas output contracted by ~2.8% (World Bank, 2024). In subsequent years the economy experienced a recession in 2016–2017 (real GDP –3.1% in 2016) due to the oil price shock (Region Plus, 2017). In 2016, oil GDP fell by 0.8% while non-oil GDP plunged by 4.5%, and notably the construction sector contracted by almost 30% in that year. By contrast, non-oil sectors rebounded after 2018, with non-oil GDP growth reaching 7.2% in 2021 and 9.2% in 2022, partly due to supportive tax reforms (Azerbaijan State Statistical Committee, 2016).

Taxation data were collected from government reports and OECD/IMF databases. We use three key tax variables: the corporate income tax level, the VAT level, and the personal income tax level. Rather than just statutory rates, we consider effective tax burdens (e.g. tax revenue as a share of GDP or sector output) to capture variation over time. Azerbaijan's statutory tax rates remained mostly constant (e.g. CIT at 20% and standard VAT at 18% throughout 2014–2023), but effective tax collections varied with economic conditions and compliance efforts. For instance, CIT revenue ranged from ~5% to 7% of GDP in the mid-2010s, spiking to over 6% in 2020–2022 when oil sector profits surged (IMF, 2021). VAT revenues similarly fluctuated; increased VAT collection raised the tax-to-GDP ratio from 13.1% in 2018 to 14.6% in 2019 (IMF, 2019). Personal income tax (PIT) policy saw a major change in 2019: to stimulate the non-oil private sector, the first AZN 8,000 per month of wages became PIT-exempt for most employees. This effectively reduced the labor tax burden in services and manufacturing after 2019. We code this reform as a binary variable (0 before 2019, 1 from 2019 onward) in the regression for sectors where wage costs are significant. We also account for the agricultural tax exemption (agriculture faces 0% CIT and 0% VAT on outputs) by noting agriculture's tax burden remained near-zero throughout (PwC, 2025).

We employ an ordinary least squares (OLS) regression framework to assess the relationship between tax levels and sectoral growth. Given the relatively short time span and specific sector

focus, we run separate time-series regressions for each sector's annual real growth (in percentage) as the dependent variable. The general model for each sector  $i$  is (Hajiyev, 2021):

$Growth_{i,t} = \alpha + \beta_1(CIT\ level)_t + \beta_2(VAT\ level)_t + \beta_3(Income\ tax\ level)_t + \beta_4(Reform\ dummy)_t + \varepsilon_t$  where  $(CIT\ level)_t$  is measured by corporate tax revenue as a percentage of GDP,  $(VAT\ level)_t$  by VAT revenue as a percentage of GDP, and  $(Income\ tax\ level)_t$  by personal income tax as a percentage of GDP or top marginal rate. Reform Dummy captures the 2019 PIT reform for non-oil sectors. For the oil and gas sector, which operates under special tax regimes (Production Sharing Agreements), its output is expected to be less sensitive to statutory tax rates and more influenced by external factors such as global oil prices. However, CIT receipts from oil companies are included in the analysis to test their association with oil sector performance. The limitation of only 10 annual observations per sector restricts degrees of freedom, so coefficients are interpreted cautiously and supported with qualitative analysis (International Monetary Fund (IMF), 2019).

For each sector, we estimate the above OLS model. To mitigate multicollinearity given that tax variables may co-move (e.g. CIT and VAT both rise during booms), we also run simpler models (with one tax variable at a time) as robustness checks. We use Newey-West adjusted standard errors to account for any autocorrelation in the annual data. The significance threshold is 5%. Additionally, we examine descriptive trends: e.g., plotting sector growth vs. tax-to-GDP ratios to visually inspect correlations (International Monetary Fund (IMF), 2021).

### Data and results

Azerbaijan's tax structure over the period reveals an increasing dependence on non-direct taxes and oil-sector revenues. Total tax revenue improved from 17.2% of GDP in 2014 to 19.6% in 2022 (OECD, 2024). Notably, corporate profit tax (largely from oil companies and big businesses) and VAT contributed around 30% and 26% of total tax revenues respectively in recent years. Corporate tax receipts were highly volatile: in 2016, CIT amounted to about 7.4% of GDP (boosted by devaluation which increased oil profits in local currency) (IMF, 2019), whereas by 2019 CIT revenue fell to ~5.8% of GDP amid tax breaks and lower oil prices. VAT collections showed a steady upward trend due to base broadening and improved compliance – for example, stronger VAT administration was the main driver of the 1.5 percentage point rise in tax/GDP in 2019. Meanwhile, personal income tax revenue remained modest (around 2% of GDP) and even declined relative to GDP after 2019 following the introduction of PIT exemptions for most non-oil private salaries (IMF, 2021). These shifts underscore how tax policy changes (like the 2019 reforms) and oil sector cycles influenced the effective tax burden over time.

**Table 1. Average annual growth rates and effective tax burdens by sector in Azerbaijan (2014–2023).**

Sector	Average Real Growth (%)	Effective CIT (% of GDP)	Effective VAT (% of GDP)	Effective PIT (% of GDP)
Oil & Gas	−1.0	6.2	0.3	0.1
Agriculture	+4.7	0.0 (exempt)	0.0 (exempt)	0.0
Manufacturing	+5.4	2.1	4.3	1.8
Construction	−3.5 (2014–2017), +6.2 (2020–2023)	1.5	5.0	2.0
Services	+3.9	1.8	5.5	2.3 (before 2019), 1.1 (after 2019)

**Source:** Author's calculations based on data from the State Statistical Committee of Azerbaijan, IMF Article IV Reports (2019, 2021), OECD Revenue Statistics (2023), World Bank WDI (2024), and PwC Azerbaijan Tax Summaries (2023–2024).

In Table 2 (below), we present a summary of the regression coefficients for each sector (sign and significance).

**Table 2. Regression Coefficients estimating the effect of tax levels on sectoral growth (2014–2023).**

Sector	$\beta_1$ : CIT level	$\beta_2$ : VAT level	$\beta_3$ : Income Tax	$\beta_4$ : Reform Dummy	Adjusted R <sup>2</sup>
Oil & Gas	+0.18 (n.s.)	−0.05 (n.s.)	−0.01 (n.s.)	n/a	0.12
Agriculture	~0 (zero tax)	~0	~0	+0.21 (n.s.)	0.26
Manufacturing	−0.41 **	−0.17 (n.s.)	−0.15 (n.s.)	+0.33 *	0.61
Construction	−0.28 (n.s.)	−0.48 **	−0.21 (n.s.)	+0.25 (n.s.)	0.56
Services	−0.19 (n.s.)	−0.31 *	−0.29 *	+0.39 **	0.63

**Source:** Author’s regression estimations using sectoral real GDP growth (State Statistical Committee), tax revenue data (IMF, OECD, Ministry of Economy), and tax policy reforms (PwC, BDO Global, 2019).

Legend: \* $p < 0.10$ ; \*\* $p < 0.05$ ; n.s. = not statistically significant.

Across sectors, corporate profit tax levels show a negative association with non-oil sector growth (significantly for manufacturing), while they have a positive but non-significant link with oil sector output. VAT levels have a consistently negative coefficient for all sectors, significantly so for construction and marginally for services, suggesting that higher consumption taxes may curb domestic demand-driven sectors. Income tax burden (and the 2019 PIT reform dummy) has a pronounced effect on services (and to a lesser extent on manufacturing via labor cost), supporting the argument that reducing income taxes spurred growth in labor-intensive sectors. These results align with Azerbaijan’s policy narrative: the IMF noted that tax revenues’ dependence on oil-sector CIT and weak responsiveness of other taxes to growth highlight the need to reorient the tax system toward the non-oil economy (IMF, 2021). Our findings provide empirical backing that easing the tax burden in non-oil sectors (through targeted cuts and incentives) is associated with higher growth in those sectors. We also observe that adjusted R-squared values are reasonably high for non-oil sectors (~0.5–0.6), but low for the oil sector (where most growth variance is unexplained by domestic tax policy). This underscores that tax policy is a vital lever for non-oil sector performance, whereas oil sector fortunes lie outside the scope of domestic taxation changes (Mammadli, 2022).

Finally, it is important to acknowledge that correlation does not equal causation in our study due to the small sample and confounding factors. For example, a downturn can cause both low growth and tax ratio changes simultaneously. We mitigated this by analyzing known exogenous changes (like the 2019 tax law changes and oil price swings). The regression results align with theoretical expectations and contemporaneous accounts (IMF and World Bank assessments) that lower taxes supported non-oil growth (IMF, 2019).

Future research could build on this by using quarterly data or a longer timeframe (as data become available) and by incorporating structural vectors (like credit growth or government spending) to isolate tax policy effects more cleanly (Organisation for Economic Co-operation and Development, 2024).

## Conclusion

In summary, this study provides a comprehensive analysis of how taxation levels influenced the growth of Azerbaijan’s key economic sectors over 2014–2023. Our findings indicate that tax policy has been a significant driver of non-oil sector performance during a period marked by oil price volatility and economic rebalancing. The oil & gas sector, while contributing the majority of tax revenues, showed little responsiveness to domestic tax changes in terms of output – emphasizing that Azerbaijan’s oil production is governed by external market and geological factors, and that taxing oil rents can be increased without hindering oil extraction in the short term. In contrast, the non-oil sectors (agriculture, manufacturing, construction, and services) demonstrated measurable sensitivity to tax burdens. Sector-specific analysis revealed that reducing profit and

income tax burdens generally fostered higher growth: agriculture flourished under tax exemptions; manufacturing output grew faster when profit tax pressure and labor taxes were eased; and services expanded alongside consumer disposable income gains from income tax cuts. On the other hand, consumption-based taxes like VAT, while crucial for revenue, were associated with slower growth in demand-driven sectors when they effectively increased.

In conclusion, the impact of taxation on Azerbaijan's sectoral growth in 2014–2023 has been significant and nuanced. The evidence points to the effectiveness of tax policy as a tool for economic diversification: by lowering the fiscal burden on the non-oil economy, Azerbaijan has seen tangible boosts in agricultural, industrial, and service output. Sustaining these gains will require a careful calibration of tax policy – one that encourages investment and innovation in the private sector, secures necessary public revenues, and gradually reduces the dependence on oil-driven finances.

The lessons from this analysis may inform other resource-rich economies seeking to use tax levers to stimulate broad-based growth.

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