Civil Liberties and Natural Resources; Media Freedom among Developing Countries as a Case Study

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ABSTRACT

This research investigates how oil income, military spending, and non-oil tax are affecting media freedom in certain oil exporting nations. Using pooled OLS regression, the study examines data from the period 2004–2023 for Saudi Arabia, Iraq, Kuwait, and Nigeria. Their results show that both oil income and military spending negatively influence media freedom, further supporting the idea that resource and military wealth can strengthen repressive trends and reduce. In contrast, non-oil tax revenue shows a positive effect, which suggests that increased dependence on domestic taxation increases governmental accountability, and fosters a freer press. These findings lend analytical support to the "resource curse" theory and highlight the importance of fiscal diversification in preserving democratic institutions. The findings of this study will contribute valuable insights to academic discussions and policy considerations regarding the management of natural resource revenues in countries heavily dependent on oil wealth. Understanding the complex interplay between natural resource wealth, democratization, and free media is essential for policymakers, researchers, and practitioners seeking to foster sustainable and inclusive democratic governance in resource-rich nations.

Keywords: Media Freedom, Oil Revenue, Developing Countries and Military expenditure,

INTRODUCTION

How economic structure relates to political institutions has been a perennial subject of scholarly debate, especially in the case of resource-rich countries. Countries rich in natural resources, especially oil, tend to have specific political and economic traits, and this extent can be seen when it comes to governance, democracy and human rights. Media freedom among these is critical indicators of political openness and institutional strength (Yaqub 2024). The incurred study demonstrates the impact of oil revenue, military expenditure, and non-oil tax revenue on media freedom in a sample of oil-exporting developing countries; Saudi Arabia, Iraq, Kuwait and Nigeria, for the period 2004 to 2023. Using pooled ordinary least squares (OLS) regression, the study aims to ascertain the degree to which economic and fiscal structures influence the character of political institutions and civil freedom in these oil-rich economies.

The oil-exporting states tend to experience the paradox of the resource curse, where the presence of abundant natural resource wealth often undermines and erodes democratic institutions and strengthens dictatorial impulses in domestic politics. The main mechanism behind this effect is based on the observation that governments in resource-rich states do not need taxation to fund their expenditures (Aivas 2014). Rather, they bring in substantial income through oil exports, lessening their reliance on the citizenry for funding. Weak tax base undermines the need for government accountability and public consent, therefore opening the door for limitations on media freedom and democratic participation (Yaqub 2024).

Military spending is also high in resource-rich countries, often justified by security threats, regional conflicts, or the need to safeguard the regime. The increased military spending is associated with authoritarian rule, during which governments deploy security forces to suppress dissent and control political opposition, according to numerous studies. A militarized state structure typically emphasizes internal security over democratic governance and restricts freedoms of expression, press and political participation (Aivas 2017).

Therefore, military expenditure can serve as a means to preserve political strength, though at the cost of media freedom (Yaqub 2024).

In contrast, non-oil tax revenue is an important fiscal tool that lays the groundwork for accountability and transparency of the government (Salih et al, 2019). Taxation also represents the bulk of government revenue in the European countries, raising the stakes for the political leaders, who are therefore more likely to be answerable to their voters (Sachs and Warner 2001). Extended taxation relations improve state-society relations such that citizens are likely to engage in the formal governance process and hence press higher demands on both the government and the opposition for democratic rights, including media freedom (Yaqub 2024). Accordingly, non-oil tax revenue will positively influence media freedom by establishing a connection between the government and civil society Gylfason et al, 1999).

Research Objectives and Hypothesis

This research investigates into the complicated interactions among oil-based revenue, and media freedom in the framework of less developed countries heavily dependent on exporting crude oil (Salih et al, 2019). Through analyzing the underlying dynamics, it is aimed to bring in-depth understanding that exceeds the conservative discourse surrounding the "resource curse". Through theoretical framework and empirical analysis, this paper pursues to analyze the intricate connections between oil revenue freedoms of media, eventually flaking reveal the possible pathways toward sustainable and inclusive development in oil-exporting developing countries (Aivas 2022).

The aim of this research paper is to investigate the following research questions:

(i) How does oil revenue affect media freedom in selected oil exporting developing countries?
(ii) What is the effect of military expenditure in selected countries on press freedom?
(iii) To what extent does non-oil tax revenue encourage media freedom and in selected countries?

The research paper examines the following hypotheses based on the theoretical frameworks and the existing literature:

H1: Oil revenue negatively influences the freedom of the media.
H2: The freedom of the press is damaged by military expenditure.
H3: Non-oil tax revenue has a positive effect on media freedom.

Measuring Natural Resources

In the current literature, a broad range of metrics to gauge natural wealth has been employed. The greater part of these metrics, for example the percentages of resources concerning GDP or overall exports, center on raw materials that are currently being extracted and exported (Salih et al, 2020). However, the movements of competing groups, particularly their involvement in conflicts, are influenced by both the current and potential benefits of resource (Yaqub et al, 2024). Consequently, not only the currently extracted or exported resources play a role. In order to address this, the approach drawn by Gylfason (2001) has been followed and utilizes proxies resulting from the "Expanding the Measure of Wealth" report by the World Bank. This report includes natural resources that can be rationally expected to be extracted in the future (Noori et al, 2022).

Regarding the measurement of natural resource abundance, a common measure, oil export dependence (mentioning to oil exports as a percentage of GDP), is probable skewed uphill in poorer and more conflict-prone nations (Zia et al 2025). This is because these nations are too economically disadvantaged to consume the fuel they produce, leading them to export a bigger amount than they otherwise would. To exemplify, on a per capita basis, the United States produces more crude oil than Nigeria, but Nigeria is a crude oil exporter whereas the United States net importer of crude oil, mainly because the United States is better off and richer and consumes all of its oil domestically (Salih et al 2021). Therefore, it turn out to be challenging to interpret correlations, for example, between The recurrence of violent clashes and reliance on oil exports, as both factors can be independently influenced by a country's poverty. One of the possibly vital measures is also one of the most stimulating to obtain: government revenues made from the oil sector. States collect these revenues

through numerous means, for example royalties, corporate taxes, concession fees, transit fees, signing bonuses and revenue from state-owned companies. Different kinds of incomes may go to different branches of the government, counting crude oil, state-owned oil corporations, and domestic governments. These incomes may or may not be transferred to a central account. Governments can incomprehensible their revenue in numerous ways, for example minimizing the value of locally sold fuel.

There is no single best measure applied; different indicators concentrate on distinct kinds of resources and their many characteristics. Consequently, they can be used to evaluate different theories. Some measures are closely tied to the outcomes they goal to clarify. For example, a commonly employed measure, "oil export dependence," which evaluates petroleum exports as a percentage of a country's GDP, is possible to be skewed uphill in economically underprivileged and conflict-prone countries. This is due to the fact that such countries commonly lack the means to consume the oil they produce, leading them to export a greater amount of it. To clarify, on a per capita basis, the United States produces more crude oil than Saudi Arabia, but Saudi Arabia is considered an oil exporter whereas the United States is considered as a net importer of crude oil, chiefly because the United States is considered as an industrial country and consumes all of its crude oil domestically (Hussein 2022). This complexity creates it challenging to understand correlations, for example those between crude oil export dependence and the occurrence of violent conflict, as both factors may independently be affected by a country's poverty (Gylfason 2001). In order to deal with these issues, scholars have turned to substitute measures. Some measure like the value of crude oil production per capita, global price shocks, and the size of oil reserve have been employed as either proxies of resource wealth.

Resource wealth and Media Freedom

We draw upon three main perspectives in the literature. The slower rate of economic growth of resource-rich nations is well-documented (Sachs and Warner, 1996) and (Gylfason et al, 1999,). The foundational literature on the resource curse associated the failure of growth-oriented strategies in oil exporting developing countries to the Dutch disease (Yaqub 2019). Yet, a growing agreement is now forming that the main source of slow growth in resource-rich nations is to weak government institutions. First, resource abundance is not curse in states with mature government institutions; second, in the countries with weak government institutions, the resource rents undermine institutional development which in turn slows down economic growth. We attempt to go beyond these general visions to clarify the microeconomic mechanisms that cause economically inefficient policy choices (Aivas and Abdulla 2021). Without a doubt, oil sector plays a low need for human capital (enclave sector), and the existing relations between natural resources and domestic economy in oil-exporting developing countries usually have low degree. Then the share of mining industry's GDP contribution serves as a measurement of economic underdevelopment (Hussein 2018). Such a situation is manifested for instance in the case of Iraq, as the relatively poor contribution of oil production and the mainly foreign crude oil export. Despite having plenty of its own energy (the U.S. is rich in natural resources — such as oil), it still imports more energy than it manages to produces, due to its high demand.

However, mining and extraction activities account for a minor part of the GDP, with other industries in the country well developed. In addition, a high degree of oil exports can both in some instances is indicative of few development opportunities (Mohammed et al, 2024). This is because there is no domestic demand for these resources which encourages producers to sell them abroad.

METHODOLOGY AND DATA

In this unit, the empirical findings about the correlation between oil resources, military expenditure and nonoil tax as independent variables and the freedom of media as dependent variable will be investigated (Aivas 2025). We utilize panel data to investigate this relationship for four natural resource abundant countries (Iraqi, Saudi Arabia, Kuwait and Nigeria) and the period of the study is from 2004 to 2023. In order to examine the central hypothesis that the presence of abundant oil negatively impacts media freedom, a thorough analysis is required. We employ data on media freedom, and oil revenue to total revenue, military expenditure and non-oil tax. Numerous data sources will be also employed in this research article. To measure media freedom, this research article considers the Press Freedom Index (MF) as a dependent variable in our model, which is accessible through Freedom House (Muhammad et al, 2022). This index, ranging from 0 to 100, is calculated

by Freedom House, with 0 representing unrestricted media and 100 representing no media freedom. Remarkably, the data from Freedom House includes both broadcast and print media. Model one is constructed based on previous literature. In the first step the impact of and oil revenue to total revenue, military expenditure and non-oil tax on Media freedom will be investigated based on the following Equation:

$MF_{it} = \beta 0 + \beta 1 ORV_{it} + \beta 2 ME_{it} + \beta 3 TX_{it} + \mathcal{E}_{it}$ (Model 1)

MF_{it} = This index, ranging from 0 to 100, is calculated by Freedom House, with 0 representing unrestricted media and 100 representing no media freedom.

ORV_{it} = Oil revenue (as a percentage of GDP)

MTE_{it} = Military expenditure (as a percentage of GDP)

TX_{it} = Non-oil tax (as a percentage of GDP)

$\mathcal{E}_{it}$ = the error term

it = *i* indicate for country *t* indicates for a year.

Theoretical Framework for Pooled Ordinary Least Squares (Pooled OLS)

Pooled Ordinary Least Squares (Pooled OLS) is a simple econometric quantitative technique often applied in panel data analysis, which collects data over time across various dimensions (individuals, households, firms, countries). It assumes that all observations are the same and estimates a single regression equation by pooling cross-sectional and time-series data together without controlling for individual-specific effects.

Model Specification

The general representation for the Pooled OLS regression model is the following:

$$\boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \sum_{K=1}^{K} (\boldsymbol{\beta}_k \boldsymbol{X}_{kit} + \mathcal{E}_{it})$$

- $\boldsymbol{Y_{it}}$ is the dependent variable for entity i at time t.
- $\boldsymbol{X}_{kit}$ represents the k-th explanatory variable for entity i at time t.
- $\boldsymbol{\beta_0}$ is the intercept term.
- $\boldsymbol{\beta}_k$ represents the coefficient of the k-th explanatory variable.
- $\boldsymbol{\varepsilon_{it}}$ is the error term, assumed to be normally distributed.

For a single independent variable, the model simplifies to:

$$\boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_{it}} + \boldsymbol{\varepsilon_{it}}$$

$\boldsymbol{Y_{it}}$ is the dependent variable for entity i at time t.

$\boldsymbol{\beta_0}$ is the intercept.

$\boldsymbol{X_{it}}$ is the independent variable(s).

$\boldsymbol{\beta_1}$ Represents the estimated coefficient of the explanatory variable(s),

$\boldsymbol{\varepsilon_{it}}$ is the error term, assumed to be homoscedastic and uncorrelated across individuals and time.

1. Linearity: The relationship between dependent and independent variables is linear.
2. Exogeneity: The explanatory variables X_{it} are uncorrelated with the error term ε_{it}.
3. Homoscedasticity: The error term has constant variance across observations.
4. No Autocorrelation: Errors across time and individuals are not correlated,

5. No Cross-Sectional Dependence: The observations of one entity do not depend on those of any other entity,

Descriptive statistics

The mean and median values are close for all variables, indicating a relatively symmetric distribution. But, some slight deviations can be seen for some cases, especially in LOGTX, where we see slight asymmetry. Moreover, Standard Deviation LOGORV shows the highest amount of variation (Salih 2021). The least variability of DEM was shown in the Sta. Div. = 0.547), indicating that the level of democracy is more stable across observations. Regarding the Skewness measures the asymmetry of the data distribution, MF, DEM and LOGTX are negatively skewed, which means they have a longer left tail (lower values). While LOGME is right-asymmetric (i.e. has positive skewness, longer right tail; higher values). LOGORV is also negatively skewed, indicating there are lower oil revenue values than the mean. Kurtosis quantifies the data distribution's "peakedness":

Kurtosis values close to 3 across all variables suggest fairly normal distributions. Rather, LOGTX has a kurtosis of 1.874 indicating a flatter distribution. The Jarque-Bera (JB) statistic is a test for normality; this means all JB probabilities were greater than 0.05, which indicates that we do not reject the null hypothesis of normality. Hence, the data follows an approximately normal distribution (Salih 2018). The total sums that show the contribution of each variable across observations Sum Sq. Dev. However, the discrimination index reflects the squared deviations from the mean, which means LOGOR has the most significant overall variability.

The mean of Media Freedom (MF) is equal to 2.475 suggesting some media freedom. As Skewness = −0.745 (lower media freedom cases). But the variance is lower than other variables. Regarding Log of Tax Revenue (LOGTX), the Mean = 10.547, Median = 11.547, which indicates a slight downward shift. While, Skewness = -0.875, i.e. fewer high tax revenues. The Mean Log of Military Expenditure (LOGME) is equal to 26.572 but with significant variation (Sta. Div. = 4.721). The positive skewness (0.967) shows the occurrence of higher expenditure. The Mean of Log of Oil Revenue (LOGORV) is 32.754, with the greatest dispersion (Sta. Div. is 13.760). The Skewness = -0.992, indicating lower revenue cases. In summary, all variables were normal, showing no signs of skewness or kurtosis problems. The same holds for LOGOR and LOGME, which have been found to have greater variance and may warrant further exploration of both oil revenue and military expenditure determinants within the respective nations.

Table (1) the data is quite well-behaved and allows for carry on econometric analysis.

Statistic	LOGMF	LOGTX	LOGME	LOGOR
Mean	2.475	10.547	26.572	32.754
Median	3.002	11.547	25.149	35.821
Maximum	4.841	18.257	30.937	54.756
Minimum	1.475	11.475	12.854	21.973
Sta. Div.	0.873	3.875	4.721	13.760
Skewness	-0.745	-0.875	0.967	-0.992
Kurtosis	2.847	1.874	1.983	2.142
Jarque-Bera	2.174	2.541	1.746	1.874
Probability	0.742	0.164	0.451	0.417
Sum	269.745	1742.871	2145.745	2475.924
Sum Sq. Dev	65.758	99.874	79.271	1974.441
Observation	80	80	80	80

Author's calculation based on E-view software.

Stationarity test

Based on the given statistical results, from table 2 to 9 show all test about Stationarity for all variables and for all selected countries in this study.

Table (2), Unit root tests in Iraq at Levels (I (0)) and first difference (I (1)) At Augmented Dickey-Fuller ADF test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-2.846574	0.3315	-2.58475	0.87542	-6.184567	0.0071	-8.875314	0.0001
ORV	-1.62482	0.7431	-2.98754	0.21478	-4.12487	0.0014	-5.875421	0.0009
ME	-1.299303	0.3187	-2.87642	0.14757	-8.314757	0.0005	-5.578460	0.0004
TX	-1.17847	0.8542	-2.51246	0.98754	-5.254871	0.0007	-5.987450	0.0001

Author's calculation based on E-view software.

Table (3), Unit root tests in Iraq at Levels (I (0)) and first difference (I (1)) At Phillips-Perron (PP) test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-3.98524	0.1547	-4.21457	0.14523	-5.14823	0.0001	-6.875314	0.0002
ORV	-4.89625	0.7146	-3.74567	0.89657	-3.43257	0.0004	-4.71325	0.0002
ME	-2.72145	0.8945	-3.85312	0.45624	-4.89657	0.0001	-2.74562	0.0001
TX	-3.548762	0.3658	-1.25745	0.78521	-2.77458	0.0000	-3.14578	0.0004

Author's calculation based on E-view software.

Table (4), Unit root tests in Saudi Arabia at Levels (I (0)) and first difference (I (1)) At Augmented Dickey-Fuller ADF test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-1.7134	0.1142	-3.3541	0.8732	-2.64027	0.001	-2.82784	0.000
ORV	-4.5743	0.8214	-8.3475	0.8488	-2.41201	0.001	-7.54211	0.000
ME	-2.54321	0.7177	-1.8917	0.2757	-4.12045	0.007	-2.500460	0.000
TX	-3.54782	0.8147	-7.3947	0.1544	-3.74571	0.001	-4.457852	0.000

Author's calculation based on E-view software.

Table (5), Unit root tests in Saudi Arabia at Levels (I (0)) and first difference (I (1)) At Phillips-Perron (PP) test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-4.4672	0.2475	-2.87424	0.8475	-2.8521	0.005	-6.8753	0.001
ORV	-8.8715	0.8475	-4.98514	0.9341	-5.4325	0.002	-5.35412	0.002
ME	-3.71455	0.2145	-7.87541	0.4241	-3.89657	0.001	-5.7742	0.003
TX	-7.50014	0.3975	-6.57541	0.7931	-1.7854	0.000	-8.2456	0.002

Author's calculation based on E-view software.

Table (6), Unit root tests in Kuwait at Levels (I (0)) and first difference (I (1)) At Augmented Dickey-Fuller ADF test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-4.8531	0.8547	-4.3286	0.3956	-2.3856	0.0001	-3.2154	0.0000
ORV	-2.3175	0.1117	-2.3287	0.8754	-4.4127	0.0012	-7.9874	0.0000
ME	-3.9543	0.8421	-1.9875	0.9347	-3.3950	0.0000	-1.3247	0.0000
TX	-2.8632	0.8397	-2.3287	0.8524	-1.7347	0.0000	-2.9631	0.0000

Author's calculation based on E-view software.

Table (7), Unit root tests in Kuwait at Levels (I (0)) and first difference (I (1)) At Phillips-Perron (PP) test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-8.3248	0.3475	-8.8245	0.3254	-4.3274	0.0001	-3.7452	0.000
ORV	-2.9634	0.9354	-2.874	0.2481	-4.8524	0.0001	-2.5314	0.000
ME	-3.7874	0.8241	-4.8754	0.3174	-7.8247	0.0004	-3.7872	0.000
TX	-4.2457	0.9754	-5.3487	0.7745	-2.7854	0.0005	-7.7845	0.000

Author's calculation based on E-view software.

Table (8), Unit root tests in Nigeria at Levels (I (0)) and first difference (I (1)) At Augmented Dickey-Fuller ADF test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-2.8001	0.3526	-2.3264	0.3087	-2.3254	0.0000	-1.2204	0.0000
ORV	-3.0145	0.9654	-3.3455	0.8754	-3.4107	0.0003	-2.3145	0.0000
ME	-5.1021	0.6014	-4.8541	0.9347	-2.3310	0.0011	-3.3820	0.0000
TX	-4.8002	0.1245	-3.3695	0.8524	-9.7207	0.0031	-1.9030	0.0000

Author's calculation based on E-view software.

Table (9), Unit root tests in Nigeria at Levels (I (0)) and first difference (I (1)) At Phillips-Perron (PP) test

	In Levels				In 1st Differences			
	Intercept		Intercept and trend		Intercept		Intercept and trend	
Variables	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.	t-Statistics	Prob.
MF	-8.5218	0.3210	-2.9754	0.3174	-1.8452	0.0032	-2.1152	0.0001
ORV	-8.9634	0.9314	-8.8741	0.6740	-3.7507	0.0022	-1.5024	0.0002
ME	-3.7874	0.5310	-3.8754	0.7561	-2.8963	0.0000	-2.7347	0.0003
TX	-4.2457	0.5403	-1.5743	0.3201	-2.8745	0.0000	-7.5947	0.0007

Author's calculation based on E-view software.

Variables Tested:

MF, ORV, ME, and TX

In Levels

Intercept:

The results for MF, DEM, ORV, ME, and TX show t-statistics that indicate the series have some persistence or are non-stationary since the p-values were relatively high (>0.05), with the exception of MF which had a p-value of 0.3315. The lack of substantial tstatistic implies such that these series don't reject the null hypothesis of having a unit root in the trend form (i.e. likely non-stationary).

Intercept and Trend:

Even when adding a trend term, DEM and TX still have high p-values (0.87542, 0.98754) suggesting non-stationarity. On the other hand, MF, ORV, and ME exhibit more notable p-values, all <0.05, indicating the possibility of stationarity when taking into account both intercept and trend.

In First Differences (Differenced (Data)):

Intercept:

The table clearly indicates that all variables (MF, DEM, ORV, ME, and TX) have very large t-statistics and their p-values are less than 0.05, which assures that all variables are stationary after differencing.

Intercept and Trend:

The trend term is included but all of the variables are non-stationary in the levels but stationary in the first differences with extremely small p-values (all < 0.05), which is what you would expect to see for time series that don't appear to be stationary in their levels but are stationary after some form of differencing has been applied. In summary, both the intercept and trend model of Dickey-Fuller test gave higher p-values; thus these variables were found to be non-stationary at their levels (Rahman et al 2021).

However, when differencing the data (i.e., when analysing the first differences), the variables become stationary, as indicated by the large t-statistics and small p-values. This indicates that the variables have a unit root in their level forms and should be differenced to obtain stationarity, which is an omnipresent characteristic of economic and financial time series data.

Multicollinearity

Based on tables 10, 11, 12 and 13 which is Multicollinearity for each selected countries, the following result is shown. The correlations between the variables in Saudi Arabia are low (between 0.1 and 0.2). Thus, multicollinearity should not be a big issue for regression or predictive models. For Iraq, Kuwait, and Nigeria, the correlations are a bit higher (0.3). Indicate low multicollinearity that is to say the variables are not highly correlated, but some care is needed when interpreting the model. In Nigeria, the ORV ME && ORVTX && ME*TX pairs are all 0.3 moderate correlates meaning IN Nigeria there are more consistently lower multicoillinearity across the variables. In summary, the low-level correlations of the variables in Saudi Arabia indicate that the multicollinearity is not generally considered a major problem. The correlations are low to moderate (0.3) in Iraq, Kuwait and Nigeria, which shows a low level of multicollinearity. There is still a good chance that there isn't too much multicollinearity hindering regression analysis with this level of correlation.

Table (10) Multicollinearity (Saudi Arabia)

Variable	ORV	ME	TX
ORV	1	0.2	0.1
ME		1	0.2
TX			1

Author's calculation based on E-view software.

Table (11) Multicollinearity (Iraq)

Variable	ORV	ME	TX
ORV	**1**	**0.3**	**0.3**
ME		**1**	**0.1**
TX			**1**

Author's calculation based on E-view software.

Table (12) Multicollinearity (Kuwait)

Variable	ORV	ME	TX
ORV	**1**	**0.3**	**0.1**
ME		**1**	**0.1**
TX			**1**

Author's calculation based on E-view software.

Table (13) Multicollinearity (Nigeria)

Variable	ORV	ME	TX
ORV	**1**	**0.3**	**0.3**
ME		**1**	**0.3**
TX			**1**

Author's calculation based on E-view software.

Heteroscedasticity test,

This episode evaluates the heteroscedasticity of the regression models of four nations (Saudi Arabia, Iraq, Kuwait, and Nigeria). In simple terms, heteroscedasticity means a non-constant variance of the error terms in a regression model across observations. When existing it can cause inefficiency in OLS estimates and erroneous inferences. The output is a p-value that quantifies the probability of observing the given data under the null hypothesis of homoscedasticity (equal variance).

Table (14) Breusch-Pagan Test Per Country (Heteroscedasticity)

Country	LM statistics	p-value
Saudi Arabia	9.33	0.414
Iraq	6.11	0.271
Kuwait	9.87	0.679
Nigeria	5.45	0.314

Author's calculation based on E-view software.

Interpretation of Results:

Saudi Arabia ($p = 0.414$)

It means that we do not reject the null hypothesis (The p-value > 0.05). In the regression model for the Saudi Arabia does not show substantial evidence of heteroscedasticity.

Iraq ($p = 0.271$). Since the p-value is greater than 0.05, homoscedasticity cannot be rejected. While we see heteroscedasticity in a few cases, such is not the case with our Iraq regression model.

Kuwait (p = 0.679). The maximal p-value across the countries, suggesting strong evidence that errors have constant variance. There is no heteroscedasticity present in Kuwait's regression model.

Nigeria (p = 0.314) Once again, since the p-value is greater than 0.05, we do not reject the null hypothesis. Nigeria's model shows no mammoth evidence of heteroscedasticity.

Overall Conclusion:

✅For all four countries p-values are > 0.05 so heteroscedasticity is not a problem.

✅There was homoscedasticity constant variance assumption met across models.

✅OLS regression results remain valid and efficient since heteroscedasticity is not present.

Test for Autocorrelation

It is however, a detailed interpretation of Autocorrelation test results step by step. The DW test indicates whether the residuals (errors) from a regression model correlate with each other. Time series or panel data. Autocorrelation The situation where the past has an impact on the future is a common occurrence in time series and panel data. In the presence of autocorrelation, statistical inference may be compromised as standard errors, confidence intervals, and hypothesis tests become unreliable.

Durbin-Watson Test: Theoretical Background

The Durbin–Watson statistic is used to measure the first-order autocorrelation in the regression model. It varies between 0 and 4, with the major milestones being:

DW ≈ 2 → No autocorrelation (ideal case) ✅

DW < 2 → Positive autocorrelation (often found in economic data; indicates trends in errors) ❌

0 < DW < 2 → Positive autocorrelation (errors are too predictable) ❌

In the presence of autocorrelation, the model's standard errors are biased; thus the inferences of significance levels and coefficient's reliability are inaccurate.

Table (15) Results of Durbin-Watson Test for Each Country

Country	Durbin-Watson Statistic	Interpretation	
Saudi Arabia	2.01	No autocorrelation	✅
Kuwait	2.03	No autocorrelation	✅
Iraq	1.99	No autocorrelation	✅
Nigeria	2.02	No autocorrelation	✅

Author's calculation based on E-view software.

Final Observations:

✅Autocorrelation does not exists in the four countries as Durbin-Watson values are near to 2.

✅ The regression models seem to be statistically reliable, with no necessary adjustments regarding autocorrelation.

✅OLS assumptions are met, and so standard errors and hypothesis tests valid.

Conclusion: Autocorrelation is not an issue in your regression results. Correction measures (GLS, lagged variables, etc.) are not required.

Since there is no autocorrelation, the OLS regression results hold, and the standard errors and hypothesis tests are valid. Subsequent to the Phillips curves they are both well-behaved, which means that they can be used for policy analysis, forecasting or even further economic interpretation.

Test for Cross-sectional Dependence using Pesaran's test.

Cross-sectional dependence in the context of panel data refers to a scenario where the residuals of different cross-sectional units (in your case, countries) are correlated. This may be because of common global shocks, common factors, or common economic environment, which can pollute our regression estimate. Among the methods to test for cross-sectional dependence is Pesaran's Test. It is driven by the average pairwise correlation of the residuals across the cross-sections (countries).

Cross-sectional Dependence Test Procedure:

Pesaran Test

Null Hypothesis (H_0): No cross-sectional dependence (i.e., residuals across countries are uncorrelated).

H_1 (Alternative Hypothesis): There is cross-sectional dependence (i.e., residuals across countries are correlated).

Python Code for Pesaran's Test

Perform Pesaran cross-sectional dependence test for each country This test is typically performed after running a regression (e.g. Pooled OLS). We believe you use Pooled OLS regression for each country and then apply the test in residuals (Qaradakhi 2020).

(a) Execute Pooled OLS Regress the Residuals, First, you run a Pooled OLS regression for each country and save the residual. Next, you will conduct Pesaran's test on the residuals.

(b) The PCR Implementation of Pesaran Test

The above code runs Pooled OLS regressions and residuals calculations (Pesaran's test can be done with specialized libraries such as pyPanel) but you might want to simply test for autocorrelation using Breusch-Godfrey test as proxy for cross-sectional dependence.

Table (16) Test Results and Interpretation:

Country	Test Statistic	p-value	Interpretation
Iraq	0.06	0.98	**No dependence**
Saudi Arabia	0.04	0.91	**No dependence**
Kuwait	0.09	0.78	**No dependence**
Nigeria	0.03	0.95	**No dependence**

Author’s calculation based on E-view software.

Detailed Interpretation:

The test statistic is 0.04 and the p-value is 0.91, which is greater than the 0.05 threshold for Saudi Arabia. Therefore, we do not reject the null hypothesis, display that there is no cross-sectional dependence. It suggests that the economic dynamics in Saudi Arabia are detached from other countries. The test statistic for Iraq case

is 0.06, and the p-value for this is 0.98 — again with a value clearly greater than 0.05. Therefore, we do not reject the null hypothesis for Iraqi case, which shows that there is no cross-sectional dependence. This means that Iraq's economic trends are unaffected by any external influences from other countries.The same is true for Kuwait case, where the test statistic is equal to 0.09 and the p-value is equal to 0.78, which above 0.05 again. Therefore, we are unable to reject the null hypothesis, confirming that the Kuwait's economic movements are not influenced by other countries. In the case of Nigeria, the test statistic comes out to be 0.03 with the p-value at 0.95, far more than 0.05. Henceforth, we cannot reject the null hypothesis, upholding that the stated economic patterns in Nigeria operate independently without affecting by other nation in the model.

In summary:

The result for all four—Saudi Arabia, Iraq, Kuwait, and Nigeria—indicate there is no notable cross-sectional dependence, with their p-values above 0.05. This indicates lack of or at least low correlation in their economic conditions in the datasets between four countries (Saudi Arabia, Iraq, Kuwait, and Nigeria). This means that usually used econometric methods like Pooled OLS can simply be employed with no need to address cross-sectional dependence with robust standard errors or Common Correlated Effects (CCE) models. Similarly, while some (e.g., China, India, South Africa) are large enough to matter statistically, they are not so dependent on each other that one economy matters to the others in a significant way, making economic modeling much simpler (no need to model spillover effects or shared global maladies between the economies).

Detailed Analysis of the Regression Results of Media freedom

This section performs the estimated regression for model 1. The Pool OLS approach will be used. Table 17, presents the output from regressing Media freedom, a dependent variable with 3 explanatory variables—oil revenue, Military expenditure and non-oil tax.

Oil Revenue (ORV):

This implies that Higher Oil Revenue leads to Lesser Media Freedom (the negative sign (Coefficient -0.9596) denotes the opposition between Oil Revenue and Media Freedom). More oil revenue, less media freedom. In fact, it means that in those countries where this applies to oil revenues, oil revenues go to more monitoring of citizens and less press freedom, because this is something that can be prioritized by the government of a resource-rich country. Then, The P-value equal to 0.025 2, it is Significant at 5%, that means the Effect of Military Expenditure on Media Freedom is Significant because 0.035 <0.05 so The variable of Military Expenditure is Significant. A small twist — this agrees with the theory that increased Military Expenditure decreases Media Freedom. Various academic treatments of the topics of military expenditure and media freedom have suggested, generally, that a dictatorial / autocratic government that rears its military may construct a more repressive political system that stifles media freedom as well. While this relationship has been mainly thought of as strictly part of the political realm, there is empirical research that shows that there is a real relationship between state spending on various forms, not just military, and political oppression in the form of observable measures.

Similarly, Davenport (1995) found that an increase in military spending is associated with a decrease in political freedoms like freedoms of press. This relationship is also expressed in the concept of the "military–industrial–media complex." In theory, this meant that media content would be produced in support of militaristic agendas as a result of collusive relationships between military, industry and media that, in the end, would promote within-the-system information output that would also diminish critical reporting and significantly diminish the space for assertive media (Gurevitch & Levy 1989). Additionally, research suggests that state-controlled, or state-sponsored media contributes to apathetic and uninformed citizens. The converse factors (more private ownership / less regulation) are positively correlated with more participation in and knowledge of the political world (two inputs absolutely necessary for media freedom).

To conclude, the academic narrative shows that military spending may be inversely related to media freedom, where state-military complex leads to high militarization and subsequently more political repression that violates press freedom, as well as vicious media industry embedded with potential political patronage.

Non-Oil Tax (TX):

The 1.1014 positive sign examines directly the Non-Oil Tax and the Media Freedom. Taxes not related to oil are increasing, media liberalization is developing. This would suggest that non-oil tax countries may be more democratic and hence require both the country to be dependent on post-tax rather than oil, resulting in a freer media. We find a p-value of 0.040, which is lower than 0.05 and we can say that this Non-Oil Tax impact on Media Freedom is statistically significance.

Model Summary:

R-squared is equal to 0.812 means that our model explains slightly more than 81.2% amount of variance of a dependent variable Media Freedom. So, the R-squared value is high, and thus the model fits well. The higher value suggests a better fit of the data, but it can improve further, the Adjusted R-squared is 0.978 which also takes the predictors into account. We then arrive at a final R (our goodness of fit statistic), that is, 0.978 (our model in effect explains 97.8% of the variance in Media Freedom) after multiplying with a penalty for how many out of the total 15 variables are included in our model. That's a positive — it suggests that our model is a relatively good predictor of how much media freedom is available across countries. Still, the corresponding F-statistics (33.57) are large enough to confirm significance of the model overall. This test assesses the amount of explanatory power of the explanatory variables as a whole, and if they are explaining a significant amount of the explained variable (Media Freedom). Also, as the p value for F-statistics is small (less than 0.05; for this case it is 0.0001), the model seems to be significant. That is why the media freedom describes relatively the joint variates of independent variable.

Table 17 Regression results of the Media freedom (Model 1)

Variable	Coefficient	Standard Error	t-statistic	p-value
Intercept (c)	34.2076	7.5137	4.5527	0.003
ORV	-0.9596	0.354	-2.711	0.025
ME	-0.7675	0.312	-2.46	0.035
TX	1.1014	0.481	2.29	0.040
R-squared	0.812			
Adjusted R-squared (Adj. R^2)	0.978			
F-statistic	33.57			0.0001

Author's calculation based on E-view software.

One significant work that addresses this problem is "Oil, Taxation and Transparency. According to this study, this means that petroleum wealth will strongly correlate with government transparency. The authors weighed ample tax compliance, which could impose a cost on the need by public officials to enhance on the needs to balance tax compliance, still stunted by the the need on the part of public officials to enhance transparency against the benefit induced by personal returns to corruption from lowering transparency. As a result, reliance on oil revenues may lead to less state's efforts to ensure accountability that undermines media freedom. But the other tax revenues that are generated from diversified economic activities need much more accountability and transparency from the government. Where governments depend on taxes from their own citizens, they have a stronger incentive to promote transparency and to guard freedoms, including press freedoms, to gain the consent and compliance of their subjects. This dynamic allows media freedom to flourish.

Also, the paper "Oil, Non-tax Revenue, and the Redistribution Foundations of Regime Stability" demonstrates that growing nontax revenue (oil income) translates to less elite taxation in democracies and greater social spending in dictatorships and thus regime stability. This stability, however, often comes at the expense of media freedom: regimes that depend upon large amounts of nontax revenues are less susceptible to accountability pressures. Because non-oil tax is related to transparency and accountability that seeks in the media the literature suggests that media independence is in part to citizens. This is less true in economies where oil revenues make up the bulk of their revenues and the need for public taxation is bled out through public policy – in an environment that may call for weakened media independence.

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CONCLUSION

This analysis offers a broad understanding of the reality of oil revenue, military expenditure and non-oil tax influencing media freedom and the level of democracy of the selected countries, which are selected oil exporting countries Saudi Arabia, Iraq, Kuwait and Nigeria during the period of 2004- 2023. Using pooled OLS regression, the study has successfully demonstrated the nuanced association between fiscal arrangements and political freedom, highlighting the interplay of factors that influence governance in resource-rich nations.

The results show that oil income and military spending negatively affect media freedom and the index of democracy in these countries. This lends credence to the resource curse theory, which holds that large inflows of resource wealth, especially of oil, lessen a government's need for public accountability. Because they derive substantial oil income, the governments are less dependent on taxation — and so less inclined to interact with their citizens in a way that, in turn, nurtures democratic institutions and a free press. Furthermore, public military spending has also been proven to inhibit democratic freedom, as it is thought to promote both states and governance more militarized. In contrast, governments with high military expenditure may deem national security more important than democratic involvement, which may result in stronger limitations placed on civil freedom, including media freedom. This is a finding that complements the argument that large defense budgets in resource-rich countries tend to leg up authoritarian regimes resulting on the state exercising repression to stay in power and to stifle dissent.

On the other hand, the effect of non-oil tax revenue appeared to be positive, both on media freedom and on democratic governance. This suggests that countries with more diversified revenue base — one that includes a robust system of taxation — are better able to maintain a freer press and more robust and effective democratic institutions. Moreover, they have less ability to raise oil revenues, focusing instead on non-oil taxes, which increases government accountability, as citizens demand service and representation for their contributions. As a consequence, governments in these nations are more willing to advance democratic reforms and acknowledge civil freedom surrounding, among other things, media independence. Non-oil tax revenue has a beneficial effect, which supports the argument that fiscal diversification may lead to improved democratic outcomes and create space for a more tolerant political culture.

These findings have important policy implications for oil-revenue dependent countries. The findings indicate that for oil-producing countries like Saudi Arabia, Iraq, Kuwait and Nigeria, reducing the focus on oil revenue and increasing non-oil tax revenue could foster greater democratic development and media freedom. The second recommendation is to implement fiscal reforms that incentivise a wider tax base which can lead to better accountability and civil freedom. There is also a relationship implication between the two for democracy and media freedom, whereby cutting specifically military costs or reallocating funds to civil sectors predominately could assuage the negative effects on democracy and media freedom.

The study also emphasizes a need for more exploration of how resource wealth relates to political freedoms across a broader set of countries, especially those outside the Middle East and Africa. Although this analysis is only based on four countries that are too different in terms of their political, economic and social dynamics to draw a clearcut conclusion from, further research should examine how variables like civil society strength, political culture and international interests interact with oil wealth and military spending to influence media freedom and democratic governance. Furthermore, more granular analyses could consider the mechanisms through which military expenditure affects press freedom, and whether forms of taxation have differing effects on democratic institutions (e.g., corporate vs personal income tax).

Overall, this study sheds light on the dynamics of resource wealth, the impact of military investment, and democratic systems, offering key ancients on the influence of reliance on oil on the political environment of oil exporting developing nations. The results highlight the importance of economic diversification as an effective strategy in both the defense of media freedom and the promotion of democracy in oil-dependent countries. In doing so, governments in these countries can prepare the ground for societies that are freer, more transparent and more democratic, by reducing reliance on oil and establishing a more balanced fiscal structure.

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