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Send correspondence to:

Ahrum Yoo
Hankuk University of Foreign Studies
ahrumyoo84@gmail.com

¹ PhD Candidate, Middle East and African Studies, Graduate School of International and Area Studies, Hankuk University of Foreign Studies, Seoul, Republic of Korea.

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Abstract

This study examines the association between oil rent and entrepreneurial activity in seven Middle East and North Africa (MENA) economies over the period 2006–2021, with particular attention to the conditioning role of governance quality. Using an unbalanced country-level panel and Total Early-stage Entrepreneurial Activity (TEA) from the Global Entrepreneurship Monitor (GEM), the study estimates fixed- and random-effects panel models with one-period-lagged oil rent. The baseline estimates provide little evidence of a statistically significant unconditional association between oil rent and TEA. However, the interaction between oil rent and WGI is positive and statistically significant, suggesting that the association between resource dependence and entrepreneurial activity becomes more positive as governance quality increases. A similar conditional pattern is observed when oil income is used as an alternative measure of resource wealth. In contrast, the interaction is not statistically significant when using a dependent variable that captures the perceived desirability of entrepreneurship as a career choice. Overall, the results suggest that the relationship between resource wealth and entrepreneurship in MENA economies is conditional on the institutional environment and may vary across different dimensions of entrepreneurship.

Keywords: Entrepreneurship, Oil rent, GEM data, Institution

JEL Classifications: L26; O13; O53; Q33

ملخص

تتطرق هذه الدراسة إلى فحص العلاقة بين ريع النفط والنشاط الريادي في سبعة اقتصاديات بمنطقة الشرق الأوسط وشمال أفريقيا. خلال الفترة الممتدة من 2006 إلى 2021، مع التركيز بشكل خاص على الدور المشروط لجودة الحوكمة. وباستخدام بيانات سلاسل زمنية مقطعية (Panel Data) غير متوازنة على مستوى الدول، وإجمالي النشاط الريادي في المراحل المبكرة (TEA) الصادر عن المرصد العالمي للريادة (GEM)، تقدر الدراسة نماذج التأثيرات الثابتة والعشوائية مع استخدام ريع النفط المبطل لفترة واحدة (One-period-lagged). لا تقدم التقديرات الأساسية أدلة كافية على وجود علاقة غير مشروطة ذات دلالة إحصائية بين ريع النفط وإجمالي النشاط الريادي في المراحل المبكرة. ومع ذلك، فإن التفاعل بين ريع النفط ومؤشرات الحوكمة العالمية (WGI) إيجابي وذو دلالة إحصائية، مما يشير إلى أن العلاقة بين الاعتماد على الموارد والنشاط الريادي تصبح أكثر إيجابية مع تحسن جودة الحوكمة. كما يلاحظ نمط مشروط مماثل عند استخدام دخل النفط كمقياس بديل للثروة النفطية. في المقابل، لا يكون التفاعل ذو دلالة إحصائية عند استخدام متغير تابع يعكس الجاذبية الملموسة لريادة الأعمال كخيار مهني. وبشكل عام، تشير النتائج إلى أن العلاقة بين الثروة النفطية وريادة الأعمال في اقتصاديات منطقة الشرق الأوسط وشمال أفريقيا تعتمد على البيئة المؤسسية، وقد تختلف باختلاف الأبعاد المختلفة لريادة الأعمال.

1. Introduction

Entrepreneurship is widely viewed as a key driver of economic growth and diversification (Audretsch, 2006). In the Middle East and North Africa (MENA), however, entrepreneurial activities remain limited despite substantial hydrocarbon wealth. This paradox aligns with the resource-curse and rentier-state hypotheses, which argue that large resource revenues can weaken institutional quality, reduce incentives for private-sector activity, and suppress entrepreneurship (Sachs and Warner, 1995, 2001; Tornell and Lane, 1999; Ploeg, 2011). However, the nature and timing of these effects remain empirically contested, and recent evidence suggests that the relationship may be more indirect and context-dependent than early accounts proposed. Although these frameworks have shaped much of the existing debate, recent transformations in the region suggest the need for renewed empirical analysis.

Over the past decade, several MENA economies - including the United Arab Emirates (UAE), Qatar, and Saudi Arabia - have undertaken significant governance reforms, digital transformation initiatives, and policy efforts aimed at stimulating innovation-led growth (Ismail et al., 2017; Tok, Koc and D'Alessandro, 2021). Expanding digital infrastructure and industrial diversification programs, such as the UAE's entrepreneurship initiatives and Saudi Arabia's Vision 2030, have begun to reshape national entrepreneurial environments (Khan, 2016; Facchini, Jaeck and Bouhaddioui, 2020). These developments raise an important question: Does oil rent still influence entrepreneurial activities in contemporary rentier states, or have recent institutional reform and policy changes altered this relationship?

Recent resource-curse literature has produced mixed empirical findings on the relationship between oil rent and entrepreneurship. While some studies emphasize the positive effects of natural resource dependence on entrepreneurship (Ajide and Soyemi, 2022), others suggest the natural resource's adverse effect on entrepreneurship (Baumol, 1990). On the other hand, other studies suggest that natural resource wealth can support development when accompanied by appropriate policy frameworks and effective institutions, such as governance quality (Farzanegan 2014; Majbouri, 2016; Chambers and Munemo, 2018; Jafari, 2024; Haque and Tausif, 2025). However, much of this literature relies on data from earlier periods, often before the mid-2010s, and therefore does not fully capture the recent structural transformation of oil-rich Middle Eastern economies. These developments create a need to reassess the empirical understanding of the resource-curse debate in light of the region's changing economic structure.

Against this background, this study employs GEM data on total early-stage entrepreneurial activity (TEA) to empirically examine whether and how oil rent has been associated with entrepreneurship in MENA countries since the 2000s. In this study, 'oil rent' refers to the sum of oil and natural gas rent.

1.1. Research questions

The analysis is guided by two interrelated research questions that seek to clarify the role of natural-resource wealth in shaping entrepreneurial outcomes in MENA rentier states. The first question examines whether oil rent exerts a measurable influence on early-stage entrepreneurial activity. The second question explores whether this relationship is conditioned by governance quality. Specifically, it asks whether higher levels of governance quality can transform oil rent into an enabling factor for entrepreneurship, thereby moderating or even offsetting potential resource-curse effects.

1.2. Contributions to the literature

The paper makes three main contributions to the literature on resource wealth and entrepreneurship. First, it provides new empirical evidence on the relationship between oil rent and entrepreneurial activity in MENA oil-producing economies using a multi-year panel dataset based on GEM data. Second, rather than treating the resource curse as a uniform relationship, the study examines whether the association between oil rent and entrepreneurship varies with governance quality, thereby highlighting the institutional conditions under which resource wealth may support or constrain entrepreneurial activity. Third, the study evaluates the robustness of the main findings by using alternative measures of both resource wealth and entrepreneurship, replacing oil rent with oil income per capita and TEA with NBGOODC (entrepreneurship as a desirable career choice). These analyses help assess whether the estimated relationship is sensitive to how resource dependence and entrepreneurial activity are measured.

1.3. Structure of the paper

The remainder of this paper proceeds as follows. Section 2 reviews the literature on the resource curse, and the determinants of entrepreneurship in resource-dependent economies and presents hypotheses. Section 3 describes the data sources and section 4 elaborates the empirical strategy underlying the panel regression models. Section 5 presents the empirical results and section 6 provides robustness checks using alternative entrepreneurial indicators to assess the stability of the findings. Section 7 concludes by summarizing the key findings and discussing their implications for policy and the limitations of this study.

2. Literature review and hypotheses

2.1. Resource curse and rentier state theory

The traditional resource curse literature argues that natural-resource abundance may weaken productive economic activity by distorting incentives and encouraging rent-seeking. While early

studies primarily focused on slower economic growth and Dutch Disease effects (Auty, 1993; Sachs and Warner, 2001), subsequent research emphasized the political-economy mechanisms through which resource rents affect the allocation of economic activity. Tornell and Lane (1999) show that resource windfalls can intensify competition for rents and divert resources away from productive investment, while Torvik (2002) demonstrates that higher resource rents may shift entrepreneurial talent from productive activities toward rent-seeking. In rentier economies, oil revenues may also expand public employment, subsidies, and transfers, increasing the relative attractiveness of state-dependent activities and reducing incentives for private-sector entrepreneurship (Beblawi and Luciani, 1987; Hertog, 2010). Empirical studies provide related evidence: Farzanegan (2014) finds a negative association between oil dependence and new business formation, while Majbouri (2016) shows that the adverse association between oil rents and entrepreneurship is particularly evident in more corrupt institutional environments.

More recent research, however, suggests that the effects of natural-resource wealth are not uniform but depend importantly on institutional quality. Mehlum, Moene, and Torvik (2006) distinguish between “grabber-friendly” and “producer-friendly” institutions and argue that strong institutions can reduce the incentives for rent-seeking and allow resource revenues to support productive economic activity. Similarly, Robinson, Torvik, and Verdier (2006) emphasize that the economic consequences of resource booms depend on the political and institutional structures governing the allocation of rents. Under stronger governance, resource revenues may be more effectively directed toward human capital, infrastructure, access to finance, regulatory capacity, and other components of the entrepreneurial ecosystem. Consistent with this conditional resource-curse perspective, empirical studies find that institutional quality can mitigate or alter the adverse relationship between resource dependence and entrepreneurship (Farzanegan, 2014; Chambers and Munemo, 2018; Jafari, 2024).

The empirical literature on oil rent and entrepreneurship nevertheless remains mixed. Farzanegan (2014) reports a negative association between oil dependence and new business formation, while Majbouri (2016) finds that the negative relationship is concentrated in more corrupt environments. Chambers and Munemo (2018) likewise show that oil rent tends to constrain productive entrepreneurship, but that this relationship can be weakened or reversed under stronger institutions. Other studies point to more heterogeneous patterns. Ajide and Soyemi (2022), for example, find a positive association between oil rent and entrepreneurial start-ups in African oil-producing countries, while Awoa et al. (2023) identify a non-linear relationship in which oil rent may initially support entrepreneurship at lower levels of resource dependence but become less favorable as dependence increases. Taken together, these findings suggest that the relationship between resource wealth and entrepreneurship is unlikely to be uniform across countries and institutional environments, providing further motivation for examining governance quality as a conditioning factor.

Despite the growing literature, empirical evidence on the relationship between oil rent and entrepreneurship remains mixed, particularly in the MENA context. Existing studies often rely on broad cross-country samples, single-country analyses, or measures of formal business creation – for example, with New Business Density rate data of World Bank - while multi-year evidence based on GEM entrepreneurial activity remains relatively limited. Moreover, although recent studies increasingly emphasize the role of institutions, relatively little is known about whether governance quality systematically conditions the relationship between oil dependence and early-stage entrepreneurial activity in MENA oil-producing economies. Against this background, this study examines both the association between oil rent and TEA and whether this relationship varies with governance quality.

2.2. Hypotheses

The central research question of this study is: Under what conditions does oil rent support or hinder entrepreneurship in MENA rentier states? The main hypotheses to be tested are: (1) Oil rent is negatively associated with early-stage entrepreneurial activity (TEA); (2) The governance quality moderates the relationship between oil rent and entrepreneurial activity such that stronger governance quality attenuates the negative association of oil rent.

3. Data

3.1. Data description

This section outlines the data sources adopted in this study. The number of entrepreneurship-related statistics for MENA countries was limited, so a panel dataset was constructed and used. All data are national level. Table 1 provides an overview of the variables employed in the analysis, along with their respective data sources.

Table 1. Summary of variables

Category	Variable	Source	Range	Sample
Independent Variable	(Oil rent) The sum of oil rent as % GDP and natural gas rent as % of GDP (lagged 1 period)	World Bank WDI	2006 - 2021	7 nations
Dependent Variable	(TEA) Total early-stage entrepreneurial activity rate (% adults 18–64 nascent entrepreneurs or new business owners < 42 months)	GEM	2006 - 2021	7 nations
Moderating Variable	(WGI) PCA composite of 6 WB Worldwide Governance Indicators; voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption	World Bank WGI	2006 - 2021	7 nations
Control Variables	(FDI) Foreign direct investment net inflows as % GDP	World Bank WDI	2006 - 2021	7 nations
	(Unemployment rate) Unemployment as % of total labor force	World Bank WDI		
	(Higher Education) Gross tertiary enrolment ratio (%)	World Bank WDI, UNESCO		
	(Trade Openness) The sum of exports and imports of goods and services as % GDP	World Bank WDI		

To address these questions, the study uses an unbalanced country-level panel dataset covering up to seven MENA oil-producing economies (Egypt, Iran, Israel, Oman, Qatar, Saudi Arabia, and the UAE) over the period 2006–2021, yielding an unbalanced panel of 76 country-year observations ($n=7$, $T=12\sim16$, $N=76$). The sample includes MENA economies with hydrocarbon production for which sufficiently comparable GEM data are available. Israel is retained despite its relatively low hydrocarbon dependence because it broadens the variation in resource dependence within the sample.

3.2. Dependent variables

The dependent variable is TEA, which is a behavior-based indicator derived from the GEM Adult Population Survey (APS). This is measured as the percentage of the adult population (ages 18–64) who are either actively involved in starting a new business or managing a business less than 42 months old. TEA captures entrepreneurial engagement prior to formal institutional registration — encompassing nascent ventures that may not yet have registered as legal entities — making it well-suited for examining whether oil rent is associated with the underlying propensity for entrepreneurial activity at the individual level, independently of formal institutional requirements.

This study adopts GEM rather than the Global Entrepreneurship Index (GEI) from the Global Entrepreneurship and Development Institute (GEDI), for two reasons. First, GEI relies heavily on GEM data while imputing missing values for non-participating countries using data from 'nearby and similar countries' (Bonyadi and Sarreshtehdari, 2021), introducing measurement error and reducing transparency. Second, GEI updates were discontinued after 2019, limiting its applicability for the study period.

3.3. Independent variables

The key independent variable is oil rent as a percentage of GDP, sourced from the World Bank World Development Indicators. This oil rent variable is the sum of oil rent as a percentage of GDP and natural gas rents as a percentage of GDP. This measure captures the share of national output attributable to oil extraction, after accounting for the cost of production, and provides a standardized and internationally comparable indicator of a country's structural dependence on oil revenues relative to the size of its economy. To address potential endogeneity - whereby higher entrepreneurial activity might itself attract investment and influence oil revenue streams - oil rent is lagged by one period ($t-1$) in all model specifications.

3.4. Control variables and moderating variables

In addition to the main variables, four control variables are included to account for macro-economic and structural factors that may affect entrepreneurial activity. Control variables include trade openness (exports plus imports as a percentage of GDP), higher education enrolment (gross tertiary enrolment ratio), FDI net inflows (percentage of GDP), and unemployment rate, all sourced from the World Bank WDI. Specifically, FDI and trade openness accounts for cross-country differences in market integration and the role of foreign investment, unemployment captures labor market conditions, and higher education reflects human capital (Hector and Salfado-Banda, 2007; Aowa et al., 2023; Matallah et al., 2023). GDP per capita was initially considered as control variable but excluded because of substantial multicollinearity with the composite governance index (WGI) (VIF = 16.09).

The composite governance index (WGI) is constructed by applying principal component analysis (PCA) to the six World Bank Worldwide Governance Indicators - voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption - and retaining the first principal component as a summary measure of overall governance quality. WGI is used as a proxy for governance quality throughout this study. Higher WGI values indicate stronger overall governance quality.

3.5. Descriptive statistics

Table 2 presents descriptive statistics for all variables included in the main estimation sample (N = 76), covering seven MENA countries over the period 2006–2021. The dependent variable, TEA, has a mean of 10.90 percent, ranging from 4.2 to 25.5, indicating considerable cross-national variation in early-stage entrepreneurial activity. The key independent variable, oil rent, averages 13.77 percent, with a wide range from near zero (0.004) to 55.01, reflecting the substantial heterogeneity in resource dependence across MENA economies. The WGI ranges from –2.05 to 4.13, capturing meaningful variation in governance quality across the sample. Among the control variables, trade openness exhibits the largest dispersion, while FDI net inflows remain relatively modest on average. Unemployment rate averages 6.94 percent, ranging from 0.1 to 13.67, reflecting the divergent labor market structures across the sample countries.

Table 2. Descriptive statistics

Dependent Variable: Total early-stage entrepreneurial activity (TEA)

Variable	N	Mean	Standard deviation	Min	Median	Max
TEA	76	10.90	4.14	4.2	10.7	25.5
Oil rent	76	13.77	12.17	0.004	14.18	55.01
WGI	76	1.12	2.07	-2.05	0.62	4.13
Trade openness	76	73.81	39.62	29.85	59.31	185.74
Higher education	76	46.10	17.70	12.89	46.99	79.6
FDI	76	2.03	1.80	-1.68	1.93	5.83
Unemployment rate	76	6.94	3.92	0.1	7.55	13.67

4. Methodology and models

4.1. Empirical strategy

This study employs panel regression models to examine the association between oil rent and entrepreneurial activity, exploiting both within-country variation over time and cross-country variation across the sampled MENA economies. The analysis does not rely on a causal identification strategy; accordingly, the estimated coefficients are interpreted as conditional associations rather than causal effects. To mitigate potential reverse causality, the baseline specifications use one-period-lagged oil rent, while institutional and macroeconomic controls enter contemporaneously. Both fixed- and random-effects specifications are estimated, and the preferred estimator is selected using the Hausman test. Finally, residual diagnostics for heteroskedasticity, serial correlation, and cross-sectional dependence are conducted, and cluster-robust or Driscoll–Kraay standard errors are applied as appropriate. Robustness checks using an alternative independent variable - oil income per capita - and another entrepreneurship indicator - NBGOODC - assess whether the results are sensitive to alternative measures of resource wealth and entrepreneurship.

4.2. Models

Three model specifications are estimated. Model 1 examines the direct association between oil rent and TEA. Model 2 replaces oil rent with WGI as the sole predictor, in order to assess whether governance quality independently predicts TEA. Model 3 introduces oil rent, WGI, and their interaction term simultaneously, to test whether the association between oil rent and TEA is conditioned by the governance quality (WGI). Model 1 tests Hypothesis 1 using oil rent as the independent variable. Model 3 covers Hypothesis 2 by applying a moderating variable. Models 4 to 9 are for the robustness check. The panel regression models of this study are specified as follows:

$$\text{Model 1: } TEA_{it} = \alpha + \beta_1 Oilrent_{it-1} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

$$\text{Model 2: } TEA_{it} = \alpha + \beta_1 WGI_{it} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

$$\text{Model 3: } TEA_{it} = \alpha + \beta_1 Oilrent_{it-1} + \beta_2 WGI_{it} + \beta_3 (Oilrents_{it-1} * WGI_{it}) + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

In all equations, i denotes the country index, t denotes the year, X_{it} is the vector of control variables appropriate to each model set. μ_i captures country-level fixed or random effects, λ_t captures year fixed effects included in all specifications to control for common time trends, and ε_{it} is the error term, capturing unobserved factors. The TEA_{it} refers to the dependent variable of Model. $Oilrents_{it-1} * WGI_{it}$ refers to the conditional association of oil rent with the outcome, depending on governance context: a positive coefficient suggests that higher governance quality is associated with a more positive oil rent association, while a negative coefficient suggests that higher governance quality is associated with a more negative oil rent association.

5. Empirical results

Table 3 reports the panel estimation results for the three main specifications. Model 1 examines the association between one year lagged oil rent and TEA, Model 2 examines the association between WGI and TEA, and Model 3 incorporates oil rent, WGI, and their interaction term. The reported estimates correspond to the panel estimator selected on the basis of the Hausman specification test.

Table 3. Estimated panel results

Main analysis: TEA / Oil Rent → Models 1–3
 Robustness A: TEA / Oil Income → Models 4–6
 Robustness B: NBGOODC / Oil Rent → Models 7–9

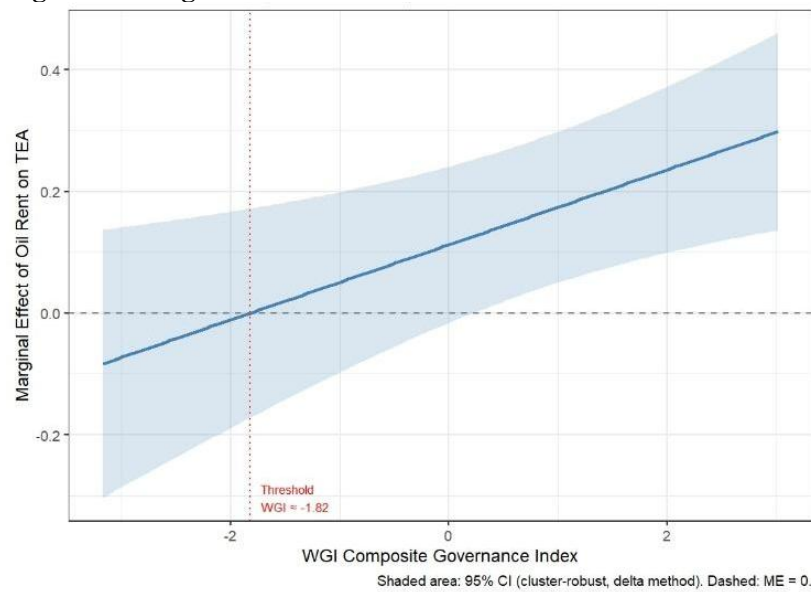
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Oil rent	0.05 (0.08)		0.11 * (0.06)				0.49 (0.36)		0.60* (0.31)
WGI		-0.48 (0.98)	-0.28 (0.69)		0.81 (1.03)	0.55 (0.62)		-2.35 (3.62)	-2.33 (3.55)
Oil rent*WGI			0.06 ** (0.02)						0.14 (0.10)
Oil income				0.39 (0.25)		0.61*** (0.20)			
Oil income*WGI						0.44*** (0.15)			
Trade openness	-0.01 (0.04)	0.01 (0.03)	-0.004 (0.02)	-0.001 (0.02)	-0.01 (0.05)	-0.02 (0.01)	-0.14 (0.11)	-0.05 (0.08)	-0.12 (0.10)
Higher education	0.12* (0.05)	0.10 ** (0.04)	0.12 *** (0.03)	0.07* (0.03)	0.09** (0.04)	0.07*** (0.02)	0.56*** (0.22)	0.43*** (0.14)	0.58** (0.24)
FDI	0.55 (0.32)	0.26 (0.36)	0.28 (0.29)	-0.04 (0.33)	0.16 (0.34)	-0.19 (0.31)	-0.46 (2.21)	-0.81 (2.20)	-0.21 (2.14)
Unemployment rate	-0.20 (0.34)	-0.36 (0.42)	-0.26 (0.37)	-0.15 (0.21)	-0.10 (0.51)	0.15 (0.29)	-1.74* (1.03)	-2.25* (1.16)	-1.97 (1.20)
(intercept)	6.13 (6.50)	8.12 (4.89)	8.94 (2.58)	-0.82 (6.55)		8.94 (2.58)	45.69 (20.85)	58.05 (15.11)	51.48 (19.26)
Observations	76	76	76	70	70	70	76	76	76
Adj.R-squared	0.11	0.11	0.22	0.11	0.08	0.19	0.25	0.23	0.18
Hausman Test	0.48	0.09	0.23	0.28	0.71	0.34	0.81	0.81	0.89

Notes: $p < 0.1$ (*), $p < 0.05$ (**), $p < 0.01$ (***) / The Hausman tests favor the random-effects (RE) estimator across all specifications (Models 1 to 9).

In Model 1, the coefficient on oil rent is positive but statistically insignificant. Thus, when oil rent is considered without the governance interaction, the results provide little evidence of a systematic association between changes in oil dependence and early-stage entrepreneurial activity. WGI is also statistically insignificant when entered separately in Model 2. These results suggest that neither oil rent nor WGI, considered independently, is strongly associated with TEA in the sample.

A different pattern appears in Model 3, which introduces the interaction between oil rent and WGI. The interaction coefficient is positive and statistically significant at the 5 percent level, while the coefficient on oil rent is positive and weakly significant at the 10 percent level. The coefficient on WGI itself remains statistically insignificant. Because the model contains an interaction term, however, the coefficient on oil rent should not be interpreted as an unconditional effect. Rather, the estimates indicate that the association between oil rent and TEA becomes more positive as governance quality increases.

Figure 1. Marginal effect of oil rent on TEA conditional on WGI



Note: Shaded areas indicate 95% confidence intervals based on cluster-robust standard errors (delta method). The dashed horizontal line indicates a marginal effect of zero. The dotted vertical line marks the threshold WGI value at which the marginal effect changes sign. WGI is mean-centered; zero corresponds to the sample mean.

Figure 1 provides a complementary interpretation of this interaction by plotting the estimated marginal association between oil rent and TEA across the observed range of WGI. The estimated marginal effect slopes upward as WGI increases. At relatively low levels of WGI, the confidence interval includes zero, indicating that the association between oil rent and TEA cannot be statistically distinguished from zero. As WGI rises, the estimated association becomes increasingly positive and, over the higher range of the governance distribution, statistically distinguishable from zero. The figure therefore complements the positive interaction coefficient reported in Model 3 and indicates that the relationship between oil rent and TEA varies with the governance quality. Given the observational nature of the analysis, this pattern is interpreted as a conditional association rather than a causal effect.

Among the control variables, higher education exhibits the most consistent relationship with entrepreneurial activity. The coefficient on higher education is positive and statistically significant in all three main specifications. In Model 3, for example, a one-percentage-point increase in tertiary enrolment is associated with approximately a 0.12-percentage-point increase in TEA, holding the other variables constant. By contrast, trade openness, FDI, and the unemployment rate are not statistically significant in the main specifications. Overall, the estimations from Model 1 to 3 indicate that the most consistent correlates of TEA in the models are higher education and the interaction between oil rent and WGI, rather than oil rent or WGI considered separately.

6. Robustness checks

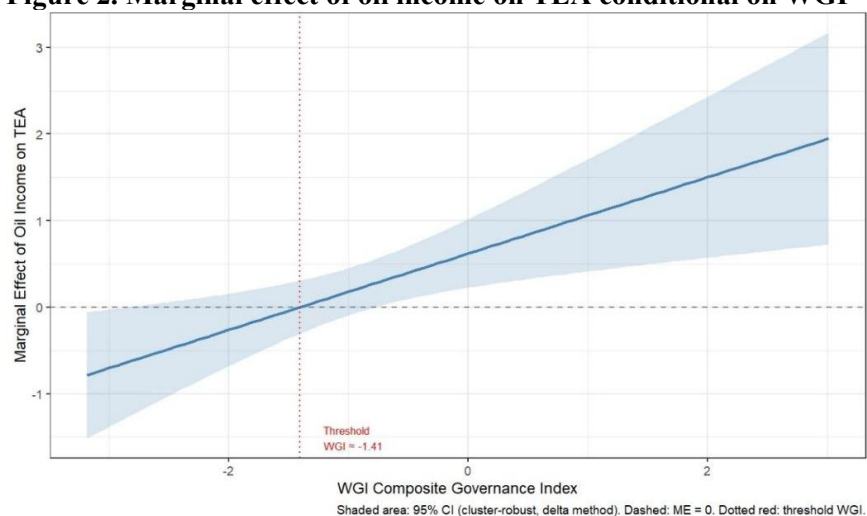
Two sets of robustness tests are conducted to assess whether the main findings are sensitive to alternative measures of resource wealth and entrepreneurship. First, Models 4 to 6, robustness check A, replicate the main specifications by replacing oil rent with Ross and Mahdavi's oil income per capita (2014) measure while retaining TEA as the dependent variable. Second, Models 7 to 9, robustness check B, return to oil rent as the main explanatory variable but replace TEA with NBGOODC from GEM dataset (See Table 3).

6.1. Robustness check a: oil income and TEA

In robustness check A, the oil income, an alternative independent variable, has been updated based on the calculation following Ross and Mahdavi (2014) using production and price data from the EIU and World Bank, adjusted to constant USD. Due to data availability constraints, the estimation sample shrinks slightly to 70 country-year observations ($n=7$, $T=2006\sim 2021$, $N=70$). All empirical results of Models 4 to 6 are presented in Table 3.

In Model 4, the coefficient on oil income is positive but statistically insignificant. WGI is also statistically insignificant when examined separately in Model 5. When the interaction term is introduced in Model 6, however, both the oil income coefficient and the interaction between oil income and WGI become positive and statistically significant. As with Model 3, the positive interaction indicates that the estimated association between oil income and TEA becomes more positive at higher levels of governance quality (WGI).

Figure 2. Marginal effect of oil income on TEA conditional on WGI



Note: Shaded areas indicate 95% confidence intervals based on cluster-robust standard errors (delta method). The dashed horizontal line indicates a marginal effect of zero. The dotted vertical line marks the threshold WGI value at which the marginal effect changes sign. WGI is mean-centered; zero corresponds to the sample mean.

Figure 2 plots the corresponding marginal association between oil income and TEA across the distribution of WGI. The pattern is similar to that observed in Figure 1. At lower levels of WGI, the estimated marginal association is relatively weak and its confidence interval includes zero. As WGI increases, the estimated marginal association becomes more positive and statistically distinguishable from zero over the higher portion of the governance distribution. The similarity between Figures 1 and 2 indicates that the governance-conditioned pattern observed in the main specification is also present when resource wealth is measured using oil income rather than oil rent.

Higher education again shows a positive and statistically significant association with TEA in all three specifications. In contrast, trade openness, FDI, and unemployment do not exhibit statistically significant associations with TEA. The persistence of the higher-education coefficient across both the main and alternative resource specifications suggests that its positive association with early-stage entrepreneurial activity is relatively stable within the estimated models.

6.2. Robustness check b: oil rent and NBGOODC

Models 7 to 9 provide a second robustness check by replacing TEA with NBGOODC from GEM dataset while returning to oil rent as the main resource variable. NBGOODC measures the percentage of adults who agree that starting a business is a desirable career choice in their country, capturing social attitudes toward entrepreneurship rather than actual entrepreneurial behavior. Unlike TEA, which measures actual involvement in nascent or new entrepreneurial activity, NBGOODC captures broader social attitudes toward entrepreneurship as a career choice. The alternative outcome therefore provides a test of whether the patterns observed for early-stage entrepreneurial activity are also present for entrepreneurial attitudes.

In table 3, all empirical results of Models 7 to 9 are presented. In Model 7, oil rent is positively but not statistically significantly associated with NBGOODC. WGI is also statistically insignificant in Model 8. In the interaction specification, Model 9, the coefficient on oil rent becomes positive and marginally significant at the 10 percent level, whereas the interaction term between oil rent and WGI remains statistically insignificant. Thus, unlike the results for TEA in Models 3 and 6 with oil income variable, the estimates do not provide clear statistical evidence that the association between oil rent and NBGOODC varies systematically with WGI.

The absence of a statistically significant interaction in Model 9 indicates that the governance-conditioned pattern identified for TEA is not likely to be reproduced when entrepreneurship is measured as perceived career desirability. This result does not necessarily contradict the main TEA findings, since the two dependent variables capture different dimensions of entrepreneurship –

activity for TEA and perception for NBGOODC. Rather, it indicates that the estimated interaction is sensitive to the dimension of entrepreneurial activity being considered.

Higher education again stands out among the control variables. Its coefficient is positive and statistically significant in all three NBGOODC specifications, ranging from 0.43 to 0.58. The magnitude is larger than in the TEA specifications, although coefficients across different dependent variables should not be compared mechanically. The unemployment rate is negative and marginally significant in Models 7 and 8 but becomes statistically insignificant in Model 9, while trade openness and FDI remain statistically insignificant throughout.

Taken together, the two robustness checks, A and B, show two distinct patterns. First, the positive interaction between resource wealth and governance quality observed in the main TEA analysis is also present when oil income is used as an alternative measure of resource wealth. Second, this interaction is not statistically significant when NBGOODC is used as an alternative entrepreneurship outcome. Across all nine specifications, however, higher education maintains a positive and statistically significant association with the respective entrepreneurship measures.

7. Discussion and conclusion

7.1. Main findings

This study examines the association between oil rent and entrepreneurial activity in seven MENA economies over the period 2006–2021, with particular attention to the moderating role of governance quality. Using an unbalanced country-level panel and GEM TEA as the primary outcome, the analysis finds little evidence of a strong unconditional relationship between oil rent and entrepreneurship. Oil rent is not statistically significant in the baseline specification, and WGI alone is likewise not significantly associated with TEA. These results suggest that neither resource dependence nor governance quality, considered independently, is sufficient to explain variation in early-stage entrepreneurial activity across the sampled economies.

The main finding emerges when the interaction between oil rent and governance quality is explicitly considered. The interaction term is positive and statistically significant, indicating that the association between oil rent and entrepreneurial activity varies with the governance quality. Rather than supporting a uniform resource-curse effect in which greater dependence on hydrocarbons necessarily suppresses entrepreneurship, the findings are more consistent with a conditional interpretation: resource wealth may be associated with more favorable entrepreneurial outcomes where governance quality is stronger. This result supports institutional approaches to the resource curse that emphasize how the economic consequences of resource wealth depend on the institutional structures through which rents are managed and allocated (Chambers and Munemo, 2018; Ajide and Soyemi, 2022; Jafari, 2024).

The robustness analyses provide partial support for this interpretation. Replacing oil rent with oil income produces a similar and positive interaction with WGI, suggesting that the main result is not driven solely by the use of a GDP-based rent measure. However, when TEA is replaced by NBGOODC, which captures the perceived desirability of entrepreneurship as a career choice rather than realized entrepreneurial activity, the interaction between oil rent and governance quality is no longer statistically significant. Taken together, these results suggest that the relationship between resource wealth and entrepreneurship is not only institutionally conditional but also dependent on how entrepreneurship is measured. Governance quality appears to be more relevant to actual early-stage entrepreneurial activity than to general social perceptions toward entrepreneurship, although this interpretation should be regarded as suggestive rather than as evidence of a specific causal mechanism.

The results also highlight the role of human capital. Higher education is positively associated with entrepreneurial outcomes across the main and robustness specifications, suggesting that improvements in tertiary education may complement institutional conditions in supporting entrepreneurship in resource-dependent economies. From a policy perspective, the findings imply that resource revenues alone are unlikely to generate entrepreneurial dynamism. The institutional environment through which resource rents are managed - including the quality of governance, regulation, and public-sector capacity - may be more consequential for whether resource wealth is associated with productive entrepreneurial activity.

7.2. Policy recommendations

The findings suggest that policies in resource-dependent economies should focus not only on the availability of resource revenues but also on the institutional environment through which those revenues are managed. Since the association between oil rent and TEA becomes more positive at higher levels of governance quality, strengthening institutional quality may help create conditions in which resource revenues are more supportive of entrepreneurial activity. The consistently positive association between higher education and both TEA and NBGOODC also points to the importance of sustained investment in human capital, particularly tertiary education and entrepreneurship-related skills. At the same time, because the moderation result is not reproduced for NBGOODC and the analysis does not establish causal effects, these policy implications should be interpreted cautiously. Rather than implying that resource revenues themselves generate entrepreneurship, the results suggest that stronger institutions and human-capital development may be important complementary conditions for entrepreneurial development in resource-dependent MENA economies.

7.3. Limitations and future research

Several limitations should be acknowledged. First, the analysis is based on a relatively small and unbalanced panel of seven MENA economies, reflecting the limited availability of consistent country-year GEM observations. Second, although lagged resource variables and additional endogeneity diagnostics are employed, the empirical strategy does not provide causal identification. The estimated coefficients should therefore be interpreted as conditional associations rather than causal effects. Third, the results may be sensitive to the specific measures of resource dependence, governance quality, and entrepreneurship employed. Future research could extend the analysis using longer country panels, additional resource-rich economies, and alternative measures of entrepreneurial entry and firm formation.

An additional limitation is that the present analysis does not directly identify the fiscal and labor-market mechanisms through which resource rents may influence entrepreneurial activity. In many GCC economies, hydrocarbon revenues are transmitted to households and firms through public-sector employment, government expenditures, subsidies, and, increasingly, policy measures intended to encourage private-sector employment and business activity. These fiscal arrangements may affect the relative incentives to increase entrepreneurship and therefore represent an important channel linking the rentier-state structure to entrepreneurial outcomes. Future research could examine these mechanisms more explicitly by incorporating measures such as government expenditure relative to GDP, public-sector wage and employment expenditure, and subsidies or other fiscal incentives designed to promote private-sector employment and entrepreneurship. Distinguishing among different forms of public spending would help clarify whether resource rents affect entrepreneurship primarily through public-sector crowding-out or through fiscal support for private-sector development.

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