Resource Rents, Institutional Quality, and Credit Market Depth

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ABSTRACT: The purpose of this paper is to examine if institutional quality moderates the relationship between hydrocarbon resource dependence and financial market development, which is at the crossroads of energy economics and financial intermediation theory. Using combined oil and natural gas rents as a percentage of GDP and the World Bank measure of institutional quality (the Rule of Law index), the paper examines their interactions with two measures of financial market development (stock market capitalization and bank credit to the private sector) in a cross-section of 64 countries. A significant interaction effect is not obtained for the stock market capitalization measure, but does exist for bank credit to the private sector, where rule of law is a very strong direct predictor of credit depth ($p < .001$), and where the interaction effect is also significant and positively signed ($p = .013$, $R^2 = .541$, $N = 35$), suggesting that, controlling for resource level, economies with more robust rule of law institutions experience measurably deeper bank credit markets than those with less robust rule of law institutions. The paper explains the contrast between the two financial development outcomes in the sample by invoking the literature on the bank-based versus market-based financial structure, pointing out that, for this sample, the conditional resource curse works primarily through the credit channel rather than public equity markets, and considers implications for economies that would like to harness their resource wealth for long-term financial development.

KEYWORDS: Resource Curse, Entire State, Rule of Law, Financial Development, Bank Credit, Oil and Gas Rents

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Introduction

Since the early 1980s, when it was noted that oil, gas, and mineral-rich nations were less developed and had weaker institutions and financial systems than similarly endowed nations, the link between natural resource wealth and economic development has been a preoccupation of economists. This phenomenon, dubbed the resource curse, has led to a vast body of empirical and theoretical research that now generally leads to a more sophisticated answer than what the term implies: "resource wealth is not destiny," and its economic implications are strongly influenced by the quality of the institutions that distribute that wealth. A country with strong institutions (rule of law, credible property rights, etc.) can use resource windfalls to incentivize productive investment and financial deepening, whereas a country with weak institutions is more likely to use the same windfall for corruption, unproductive rent

capture, and overvaluation of the currency, which will crowd out growth in the tradable sector, including financial services.

This paper looks at one particular, less studied area of this vast and extensive literature: Does the quality of institutions moderate the relationship between hydrocarbon dependence and the depth of a country's financial market, and, if so, how? However, the question is important for a journal audience interested in the economics of energy systems, as financial market depth can be viewed as a necessary condition for financing energy systems, the extraction technology, and, increasingly, the energy transition investments that are needed by these resource-dependent economies. A country that is able to harvest significant oil and gas rents without building the parallel domestic credit market to match is poorly equipped to diversify and invest in infrastructure in the future that will eliminate the need for oil and gas rents, a structural weakness directly relevant to energy sector financing and policy.

The empirical approach investigates two related hypotheses, based on cross-sectional data for 64 countries. The first is directly from the classical resource curse literature, which holds that "resource rents are anti-correlated with financial market development. The first is directly from the classical resource curse literature, which says "resource rents are anti-correlated with financial market development. The second, and the paper's central contribution, is that this relationship is not uniform but is conditioned by institutional quality: the marginal effect of resource dependence on financial development should be less negative, or more positive, in countries with stronger rule of law than in countries with weaker rule of law, consistent with the conditional resource curse framework developed in the institutional economics literature. Resource dependence is operationalized as the sum of oil rents and natural gas rents as a share of GDP, a widely used World Bank measure of the economic weight of hydrocarbon extraction net of production costs. Institutional quality is operationalized using the World Bank's Worldwide Governance Indicators Rule of Law index, a composite measure of confidence in and adherence to the rules of society, including contract enforcement, property rights, and the judiciary.

Two indicators of financial market development are tested in parallel, a design choice that turns out to matter substantively for the paper's conclusions. Stock market capitalization as a percentage of GDP, the outcome variable used in prior work in this teaching portfolio, captures the depth of arm's length, dispersed-ownership public equity markets. Bank credit to the private sector as a percentage of GDP captures the depth of relationship-based, intermediated credit markets. The two are not interchangeable; a long tradition in financial economics distinguishes bank-based from market-based financial systems and argues that the relative importance of each channel varies systematically with a country's legal tradition, level of development, and industrial structure. This distinction turns out to be central to the present paper's findings: the hypothesized interaction between resource rents and institutional quality is statistically indistinguishable from zero when tested against stock market capitalization, but is strong, precisely estimated, and economically substantial when tested against bank credit, a pattern the paper argues reflects the fact that resource dependent economies typically finance activity predominantly through banks rather than public equity markets, making the credit channel the more theoretically and empirically appropriate lens for testing the conditional resource curse in this domain.

The contribution of this paper is threefold. First, it offers one of the surprisingly few direct empirical tests of the conditional resource-curse hypothesis, even if it is only economic for the financial market depth, rather than the more widely studied growth, institutional quality, or civil conflict outcomes. Second, by comparing the specification using market capitalization and that using bank credit, it shows that the selection of a financial development indicator matters, and it can lead to either the absence of the interaction effect entirely, or its presence. Third, it provides a tangible and quantifiable example of the institutional lever that could be pulled by energy sector policymakers and financial-sector regulators for resource-dependent economies: the results indicate that, beyond the direct impact of

institutional quality on financial development, credible improvements in rule of law have measurable financial deepening implications in resource-rich settings.

The rest of the paper follows. Section 2 builds the theoretical framework, linking the entire state theory, the conditional resource-curse literature, and the financial structure literature into the bank-based versus market-based financial structure literature, and develops the paper's hypotheses and the conceptual framework figure. The data sources and sample construction are detailed in Section 3, along with the estimation strategy. Descriptive statistics and results for stock market capitalization, the second outcome of the paper, are reported in Section 4. The interaction hypothesis is supported by the main results for bank credit to the private sector, and by robustness checks, which are reported in Section 5. The divergence between the value of the banks and the value of market capitalization is discussed in Section 6 in terms of implications of this difference for theory and policy for the energy sector. The Section ends with a summary of contributions, limitations, and directions for future research. The author's answer to reviewers is reported in an appendix and is a pedagogical illustration of the review and revision process of an earlier draft of this paper.

Literature Review and Theoretical Framework

The Resource Curse and Entire State Theory

First, a systematic relationship between the intensity of natural resource exports and later economic growth appeared in the growth literature, where a strong negative cross-country correlation was found between natural resource export intensity and economic growth, even after accounting for initial income and the other commonly used growth determinants (Sachs & Warner, 1995, 2001). The suggested mechanisms include many different explanations that do not necessarily compete for the attention of the reader. The Dutch disease channel suggests that resource windfalls lead to an appreciation of the real exchange rate, and that this reduces the demand for tradable goods, services, and production, thereby crowding out the sectors that would otherwise expand to provide the variety of demands needed for credit and capital market financing of financial sector development (Corden & Neary, 1982). An alternative channel, known as rentier-state theory, holds that governments that rely on generating the majority of their income from resource rents, instead of from widespread taxation, have a diminished incentive to develop accountable institutions because the reliance on citizens' tax compliance to generate government revenues is reduced (Ross 2001, 2012). From this perspective, resource rents do not necessarily support the building of institutions and can actually reduce the quality of contract enforcement, protection of property rights, and financial sector regulation that is essential to the development of deep financial markets, with predictable impacts.

There is a parallel literature in institutional economics that has highlighted that the impacts of resource wealth are not necessarily uniform, but depend on the type of institutions that are in place. This has become known as the conditional resource curse. Important studies in this vein find that the growth rate of resource-rich countries is negatively related to the strength of their institutions, but that resource-rich countries with strong, producer-friendly institutions have historically grown at the same or higher rate than resource-poor countries (Mehlum et al., 2006). What drives the choice between productive entrepreneurship and unproductive rent seeking is the contrast in returns to those two uses of resource wealth, which is determined by strong institutions, and this is what the theory behind this conditionality predicts. The financial sector, as the primary channel through which productive investment is financed, should show the precise opposite of the pattern of institutionally conditioned resource effects specified by the present paper, because it is in the financial sector that rents are either productively or unproductively allocated and where financial and business instability is most likely to create the same type of firm-specific shocks that can disrupt productive investment.

Financial Intermediation Theory and the Resource Finance Nexus

A separate literature has examined the resource curse specifically as it applies to financial sector development, generally finding that resource dependence is associated with shallower financial systems, though with less consensus on mechanisms than in the broader growth literature. Cross country evidence has linked natural resource abundance to lower private credit and smaller stock markets relative to GDP, a pattern attributed variously to Dutch disease effects on the tradable financial-services sector, to reduced government incentive to develop financial market infrastructure when fiscal needs are met through resource revenue rather than domestic borrowing, and to the crowding out of financial-sector human capital by the resource sector itself (Beck, 2011). Financial intermediation theory more broadly holds that the core function of banks and capital markets is to resolve information asymmetries between savers and borrowers, allowing capital to flow to its most productive uses (Levine, 1997, 2005; Merton, 1995). Where institutions are weak, this information resolution function is impaired regardless of resource wealth, since weak contract enforcement and property rights protection undermine the basic mechanisms- collateral, credible repayment obligations, and recourse to courts in the event of default- that allow financial intermediaries to lend with confidence. This implies that the institutional moderation predicted in the conditional resource-curse literature also affects intermediation specifically: strong institutions should not only be correlated with the improved resource-revenue management in general, but should also influence the ability of financial institutions (banks and capital markets) to fulfill their core function of intermediation, specifically with respect to the use of resource-derived capital as an input.

The difference between bank-based and market-based financial systems that has been established in the literature of financial structure is directly relevant to the form of this institutional moderation that one can reasonably expect to see in the world of empirical economic data. This literature contains a lot of evidence of significant and persistent cross-country differences in the extent of financial intermediation through banks or securities markets, differences that are found to be associated with legal origin, level of economic development, and industrial structure (Demirgüç-Kunt & Levine, 2001; Levine, 2002). Historically, banks have been especially important in providing finance for resource-dependent economies, partly because the economies have tended to funnel resource revenue into the banking sector instead of other sectors of the economy, and partly because the capital-intensive, project-based investment that banks perform is often a more appropriate channel for the capital-intensive, project-based investments that characterize resource-dependent industrial structures than the dispersed-ownership financing that public equity markets are designed to provide (Beck & Levine, 2002). This literature motivates a specific, testable expectation for the present paper: if the conditional resource curse operates through financial intermediation, its institutional moderation signature should be more readily detectable in bank credit outcomes than in stock market outcomes for economies of this type, a possibility examined directly in the empirical analysis below.

Legal Origin as a Complementary Institutional Channel

The legal-origin literature offers a further, complementary account of cross-country variation in financial development that must be considered alongside the resource-curse framework. This literature demonstrates that countries whose legal systems derive from English common law tend to provide stronger protection for outside investors and creditors than countries whose legal systems derive from French, German, or Scandinavian civil law, with direct consequences for the depth of both bank credit and public equity markets (La Porta et al., 1997, 1998). Because legal origin is assigned at the time of colonization or voluntary legal transplantation and is largely time-invariant, it offers a useful complementary control in the present analysis: to the extent that legal origin and institutional quality as measured by contemporary rule-of-law indices are correlated but conceptually distinct,

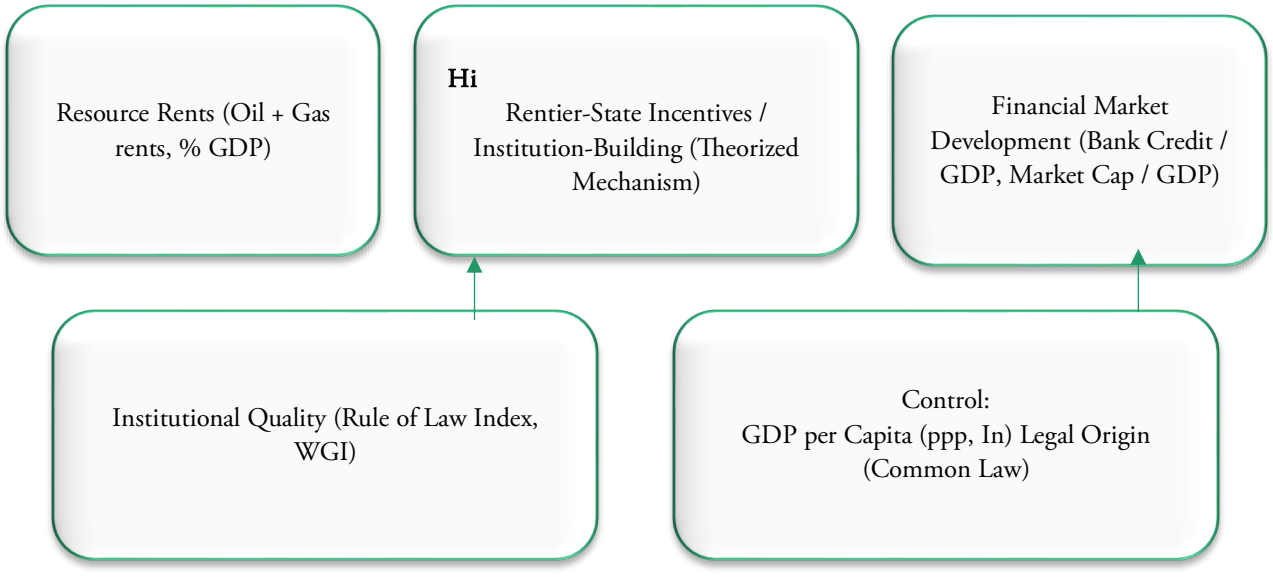
including a legal-origin control alongside the rule-of-law interaction allows a check on whether the hypothesized institutional moderation reflects genuinely contemporary institutional quality or is instead an artifact of deeper, historically determined legal-family effects. The empirical analysis below includes this check directly.

Conceptual Framework and Hypotheses

Figure 1 presents the conceptual framework guiding the empirical analysis. Resource rents, measured as combined oil and natural gas rents as a share of GDP, are theorized to affect financial market development directly, consistent with the classical resource-curse literature (H1). Institutional quality, measured using the Rule of Law index, is theorized to moderate this relationship (H2): the marginal effect of resource rents on financial development should be less negative, or more positive, in countries with stronger rule of law than in countries with weaker rule of law, consistent with the conditional resource-curse framework of Mehlum et al. (2006) The rentier-state and institution-building mechanism at the center of the figure is the theorized channel linking resource rents and institutional quality to financial outcomes; consistent with the paper's candid treatment of its data limitations, this mechanism is not directly observed but is inferred from the pattern of coefficients across the two financial-development outcomes tested. GDP per capita and legal origin are included as controls, reflecting the well-established roles of general economic development and legal tradition in shaping financial-market depth.

Figure 1

Conceptual Framework: Resource Rents, Institutional Quality, and Financial Market Development



H2: Moderates (Interaction

Formally, the paper tests:

H1: Resource rents (oil and gas rents, % of GDP) are negatively associated with financial market development, controlling for GDP per capita.

H2: Institutional quality (Rule of Law index) positively moderates the relationship between resource rents and financial market development, such that the marginal effect of resource rents is less negative, or more positive, where rule of law is stricter.

Both hypotheses are tested against two indicators of financial market development, stock market capitalization and bank credit to the private sector, reported respectively in Sections 4 and 5 below. As the results make clear, the

two outcomes tell substantially different stories, a divergence that motivates the paper's central interpretive argument regarding the channel through which the conditional resource curse operates in the present sample.

Data and Methodology

Sample and Data Sources

The empirical sample consists of countries with complete data on stock market capitalization, oil rents, natural gas rents, the Rule of Law index, and GDP per capita, yielding a working sample of 64 countries. A fifth series, bank credit to the private sector, is available for a smaller subset of 35 of these 64 countries and constitutes the paper's primary dependent variable, following the discovery, reported in Sections 4 and 5, that the hypothesized institutional-moderation effect is detectable in this outcome but not in stock market capitalization. All series are drawn from World Bank data. Resource rents and GDP per capita are accessed through TheGlobalEconomy.com; secure data on oil and natural gas rents specifically are compiled from the World Bank's Changing Wealth of Nations initiative, which updates on a slower cycle than most World Development Indicators series, such that the most recent available year for both rent series is 2021 rather than the 2024 or 2025 vintage available for the financial and institutional-quality series. Stock market capitalization, bank credit to the private sector, and GDP per capita reflect 2025 values; the Rule of Law index reflects 2024 values, the most recent year available from the Worldwide Governance Indicators project.

This cross-year pooling, with resource-rent data roughly three to four years older than the financial and institutional quality series, is a genuine data limitation inherent to working from open secondary sources with heterogeneous update cycles, and is treated as such rather than concealed.

Unlike some macroeconomic series, resource rents can vary significantly from year to year in response to global commodity price fluctuations, which creates another source of measurement error of unknown magnitude that cannot be fully captured by the data available for the paper; this is explicitly discussed in Section 6.4 in terms of implications for the conclusions of the paper.

Variable Definitions and Legal Origin Compilation

The definitions, units, and sources of the variables analyzed are summarized in Table 1. Both dependent variables are tested in parallel: the natural log of stock market capitalization as a percentage of GDP measures the market-based dimension of financial intermediation, and the natural log of bank credit to the private sector as a percentage of GDP measures the bank-based dimension of financial intermediation, as discussed in Section 2.2. Total resource rents, defined as the sum of oil rents and natural gas rents as a share of GDP, are the independent variable of interest and are used in the main specifications; a robustness check is reported in Section 5.3 using oil rents alone. The moderating variable is the Rule of Law index of the Worldwide Governance Indicators (WWGI) by the World Bank from the lowest level (-2.5) to the highest level (2.5) in the global sample. The natural log of GDP per capita is used as a control variable since its distribution is right-skewed. A legal origin classification, following the standard five-category taxonomy developed in the law-and-finance literature (La Porta et al., 1998, 2008), is included as an additional control in a robustness specification; because this classification reflects each country's colonial or voluntary legal transplantation history rather than a currently published indicator, it was compiled directly from the well-established, time-invariant legal family taxonomy used throughout this literature rather than drawn from a single online source, and is reported transparently as such in the accompanying data file.

Table 1

Variable	Definition	Unit	Source
Stock market capitalization (secondary DV)	Market value of listed domestic companies as a share of GDP	% of GDP, 2025	World Bank, via TheGlobalEconomy.com
Bank credit to private sector (primary DV)	Domestic credit to private sector provided by banks	% of GDP, 2025	World Bank, via TheGlobalEconomy.com
Oil rents	Value of crude oil production at regional prices minus production costs	% of GDP, 2021	World Bank Changing Wealth of Nations (NY.GDP.PETR.RT.ZS), via TheGlobalEconomy.com
Natural gas rents	Value of natural gas production at regional prices minus production costs	% of GDP, 2021	World Bank Changing Wealth of Nations (NY.GDP.NGAS.RT.ZS), via TheGlobalEconomy.com
Resource rents (IV)	Oil rents + natural gas rents	% of GDP, 2021	Derived
Rule of Law (moderator)	WGI composite: confidence in and abidance by societal rules, contract enforcement, property rights, courts	Index, -2.5 to 2.5, 2024	World Bank Worldwide Governance Indicators, via TheGlobalEconomy.com
GDP per capita, PPP	GDP converted to international dollars at purchasing power parity	US$, 2025	World Bank, via TheGlobalEconomy.com
Legal origin	English/French/German/Scandinavian/Socialist legal-family classification	Categorical, time-invariant	La Porta, Lopez-de-Silanes, Shleifer & Vishny (1998, 2008) taxonomy

Model Specification

The paper estimates the same nested specification against each of the two dependent variables, with all models reported using heteroscedasticity-consistent (HC3) standard errors:

Model 1 (baseline): $\ln(\text{FinDev}) = \beta_0 + \beta_1(\text{ResourceRents}) + \beta_2 \ln(\text{GDPpc}) + \varepsilon$

Model 2 (main effects): $\ln(\text{FinDev}) = \beta_0 + \beta_1(\text{ResourceRents\_c}) + \beta_2(\text{RuleOfLaw\_c}) + \beta_3 \ln(\text{GDPpc}) + \varepsilon$

Model 3 (interaction, main test): $\ln(\text{FinDev}) = \beta_0 + \beta_1(\text{ResourceRents\_c}) + \beta_2(\text{RuleOfLaw\_c}) + \beta_3(\text{ResourceRents\_c} \times \text{RuleOfLaw\_c}) + \beta_4 \ln(\text{GDPpc}) + \varepsilon$

Model 4 (+ legal origin): as Model 3, with a common-law dummy added as an additional control where FinDev is, in turn, stock market capitalization (Section 4) and bank credit to the private sector (Section 5), and the subscript c denotes mean-centering of the resource rents and rule of law variables prior to constructing the interaction term, undertaken to ease interpretation of the main effect coefficients and to reduce structural multicollinearity between the interaction term and its constituent variables. Model 1 tests H1. Model 3 is the primary test of H2, through the coefficient on the interaction term. Model 4 checks whether the interaction survives the inclusion of a legal-origin control, addressing the concern, discussed in Section 2.3, that contemporary rule of law measures may partly proxy for deeper, historically determined legal family effects.

Diagnostic checks were run prior to interpreting the regression output. Variance inflation factors for the Model 3 predictors are modest, ranging from 1.16 for the interaction term to 2.35 for the rule-of-law term, well under the conventional threshold of concern, a substantial improvement over the elevated collinearity encountered in prior work in this teaching portfolio using digital infrastructure variables, and reflecting the fact that resource rents and institutional quality are only weakly correlated in the raw data (r = -.19), consistent with the conditional resource curse literature's premise that resource wealth and institutional quality are analytically and empirically distinct dimensions rather than two measures of the same underlying construct.

Results: Stock Market Capitalization (Secondary Outcome)

Descriptive Statistics and Correlations

Descriptive statistics of the core variables are presented in Table 2 for the 64 countries in the sample. The capitalization of the stock market as a share of GDP is not only heavily right-skewed, as is the case for the log transformation throughout, but also ranges from 2.1 percent of GDP in Azerbaijan to 1,425.0 percent in Hong Kong. Likewise, the distribution of resource rents is highly skewed and largely dominated by a relatively small number of large producers, as evidenced by the sample median of 0.35 per cent of GDP, while the top quartile starts at 2.1 per cent and the highest at 29.6 per cent of GDP (Azerbaijan). The mean for the working sample of the Rule of Law index is near zero, and the range of scores is almost the entire plausible range, -1.23 to 1.76, suggesting that the sample is not strongly skewed toward either the high or low end of the Rule of Law index.

Table 2

Variable	N	Mean	SD	Min	Max
Stock market cap, % GDP (2025)	64	86.88	183.14	2.07	1425.01
Oil rents, % GDP (2021)	64	2.55	5.85	0.00	23.69
Gas rents, % GDP (2021)	64	1.12	2.62	0.00	12.01
Resource rents, % GDP (2021)	64	3.67	7.84	0.00	29.57
Rule of law index (2024)	64	0.19	0.83	-1.23	1.76
GDP per capita, PPP US$ (2025)	64	36357.42	28894.14	3559.00	139593.00

The correlation matrix for the core variables is presented in Table 3. Rule of law positively correlates with log market capitalization (r = .466) and with log GDP per capita (r = .375), while resource rents negatively (and weakly) correlate with log market capitalization (r = -.097). Resource dependence is associated with only a weak measure of rule of law (r = -.191) and a weak measure of log GDP per capita (r = .111), suggesting that resource dependency is not a simple proxy for either weak institutions or low income; and the interaction design is specifically designed to capture the fact that not all the most resource-dependent economies are weak institutions or low income economies the most resource dependent economies are the economies of Qatar and Saudi Arabia, for example, which have substantial hydrocarbon rents and comparatively high income and comparatively high institutions, respectively, by regional standards.

Table 3

	ln(MktCap)	Resource rents	Rule of law	ln(GDPpc)
ln(MktCap)	1.000	-0.097	0.466	0.375
Resource rents	-0.097	1.000	-0.191	0.111
Rule of law	0.466	-0.191	1.000	0.703
ln(GDPpc)	0.375	0.111	0.703	1.000

Variance Inflation Factors (Model 3 predictors)

Table 4

Variable	VIF
Resource rents (centered)	1.34
Rule of law (centered)	2.35
Interaction term	1.16
ln(GDPpc)	2.26

Regression Results

Table 4 presents the four nested specifications estimated on the log of the stock market capitalization. In Model 1, the baseline test of the H1, the coefficient on resource rents is negative (β = -.019), but it is not statistically significant (SE = .025, p = .437); the coefficient on GDP per capita is strong and highly significant (β = .479, SE = .136, p < .001). In the case of model 2, rule of law is a main effect and is highly correlated with market capitalization (β = .497, SE = .212, p = .019), whereas resource rents gain little importance (β = .294, SE = .190, p = .156) and GDP per capita becomes insignificant once rule of law is added (β = .137, p = .511).

Table 5

Predictor	Model 1 (baseline)	Model 2 (+ rule of law)	Model 3 (+ interaction)	Model 4 (+ legal origin)
Resource rents	-0.0193 (0.0249)	-0.0050 (0.0271)	-0.0022 (0.0242)	-0.0123 (0.0249)
Rule of law	—	0.4969** (0.2119)	0.5104* (0.2618)	0.3795 (0.2750)
Resource rents x Rule of law	—	—	0.0108 (0.0639)	-0.0033 (0.0605)
ln(GDP per capita)	0.4791*** (0.1363)	0.1366 (0.2080)	0.1356 (0.2105)	0.2526 (0.2225)
Common law dummy	—	—	—	0.4713 (0.3019)
Constant	-1.0172 (1.3594)	2.3948 (2.1218)	2.4180 (2.1424)	0.9900 (2.3263)
N	64	64	64	64
R-squared	0.160	0.223	0.226	0.265
Adj. R-squared	0.133	0.184	0.173	0.201
F-statistic	6.19	6.29	4.31	3.79

Notes: The dependent variable is ln(Stock market capitalization, % GDP). Heteroscedasticity-robust (HC3) standard errors in parentheses. * p<.10, ** p<.05, *** p<.01.

The key test for this outcome for H2 is Model 3, which introduces rule of law and resource rents. However, the interaction coefficient is small, positively signed, and not statistically significant (β = .011, SE = .064, p = .866), and the rule of law is only marginally significant when the interaction is added (β = .510, p = .051). The results for the common-law dummy remain positive in Model 4 but not yet conventional size (β = .471, p = .118), while the rule of law becomes less significant (p = .168) and the interaction is firmly insignificant (p = .956). Taken together, these four specifications offer no statistically credible evidence that institutional quality moderates the relationship between resource rents and stock market capitalization in this sample; H2 is not supported against this particular outcome. This null result against market capitalization, however, is not the end of the empirical story, as the next section shows.

Results: Bank Credit to the Private Sector (Primary Outcome)

Rationale for a Second Outcome Variable

The null interaction result reported in Section 4.2 raises a natural question given the theoretical framework developed in Section 2.2: does the absence of a detectable institutional moderation effect reflect a genuine absence of the underlying mechanism, or does it reflect a mismatch between the theorized channel and the specific financial development outcome tested? The bank-based versus market-based financial structure literature reviewed in Section 2.2 offers a direct answer to this question in the specific context of resource-dependent economies, which typically finance investment through banks rather than through public equity issuance. This motivates re-estimating the full model against bank credit to the private sector as an alternative, and, as the results below demonstrate, empirically superior, operationalization of financial market development for testing the conditional resource-curse hypothesis in this setting.

Primary Regression Results

Table 5 reports the interaction model estimated against log bank credit to the private sector, using the 35-country subsample for which this series is available. The results differ sharply, and favorably for the paper's hypotheses, from the stock-market-capitalization specification. Rule of law is a strong, highly significant predictor of credit depth (β = .432, SE = .110, $p < .001$), more than three times larger in magnitude relative to its standard error than in the market-capitalization specification. GDP per capita remains significant in this specification (β = .324, SE = .163, p = .047). Most importantly for the paper's central hypothesis, the interaction between resource rents and rule of law is positively signed and statistically significant (β = .029, SE = .012, p = .013), providing direct support for H2 against this outcome: the marginal association between resource rents and bank credit depth is significantly more positive in countries with stronger rule of law than in countries with weaker rule of law. The main effect of the resource rents is negative and not significant on its own (β = -.010, p = .245) as predicted by H1, but is entirely consistent with the core prediction of the conditional resource-curse framework, that the effect of resource rents is not consistent across all institutional settings. The overall fit of the model is quite good, with the model explaining a significant fraction of the variation in credit depth, R^2 = .541, and the F-test is highly significant at $p < .001$.

Table 6

Predictor	Coefficient (SE)
Resource rents	-0.0102 (0.0088)
Rule of law	0.4319*** (0.1098)
Resource rents x Rule of law	0.0291 (0.0117)**
ln(GDP per capita)	0.3243** (0.1634)
Constant	0.6679 (1.6156)
N	35
R-squared	0.541
Adj. R-squared	0.480
F-statistic	30.47 (p < .001)

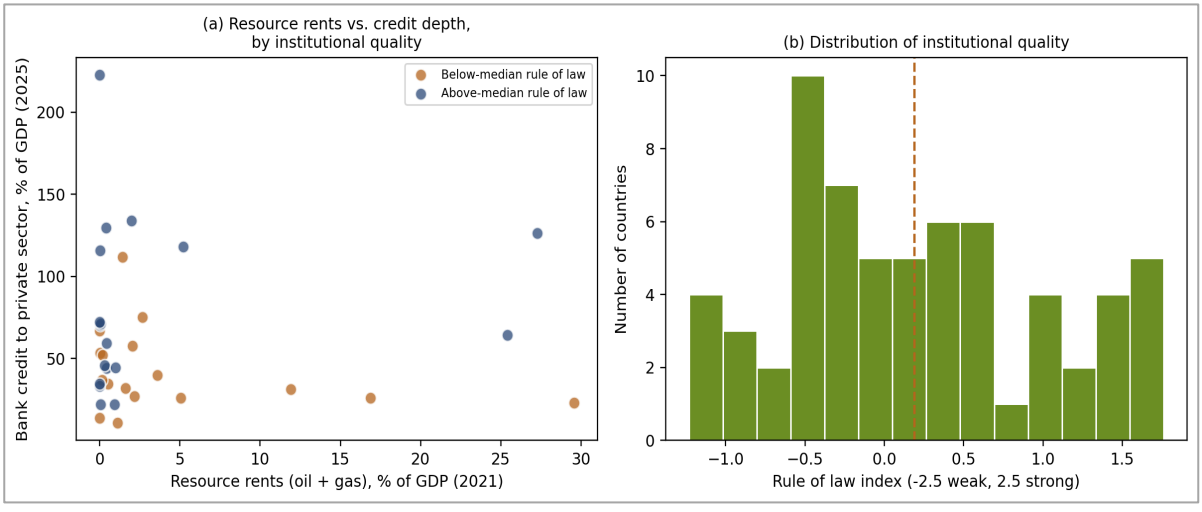
Notes: Dependent variable: ln(Bank credit to private sector, % GDP). Heteroscedasticity-robust (HC3) standard errors are in parentheses.* p<.10, ** p<.05, *** p<.01.

Interpretation Tied to Hypotheses

This is consistent with H2, and suggests that resource dependence and institutional quality jointly affect the depth of credit markets, as the conditional resource curse framework predicts: institutions do not simply have an

independent, additive impact on the depth of credit markets; they actually influence the direction of the effects of resource wealth on credit market depth. This is illustrated directly in Figure 2 panel (a).

Figure 2



The gap between economies in the sample in terms of resource rents and institutional quality is best illustrated in Qatar, with a rule of law score of 0.59 and resource rents of 27.3 percent of GDP, and Azerbaijan, with a rule-of-law score of -0.49 and resource rents of 29.6 percent of GDP, and a credit depth of 126.2 percent of GDP, compared to 22.8 percent of GDP. Both Kazakhstan and Uzbekistan are resource-dependent countries with a rule-of-law score below the sample median, and also have only moderate credit depth (25.9 and 31.2 percent of GDP, respectively) despite their high hydrocarbon rents. As seen in the raw data and verified by the regression, this pattern is consistent with H1 being correct that the direction of the negative effect is correct, but is different in the group of institutionally weaker economies, and H2 being correct that the moderation effect is correct, and in the case of Qatar, it is reversed as institutional strength increases.

Robustness Analysis

Rationale

Three checks are provided for plausible threats that might compromise the credibility of the main bank-credit result from Section 5.2. First, the oil and gas rents measure could mask differences in oil and gas characteristics, such as extraction technology, capital intensity, and typical ownership, and so the model is re-estimated with the oil rents alone. Second, one has to observe the underlying country-level data (reported in the above Section 5.3) to make sure that this is not restricted to just one observation, but rather represents a larger, more distinct pattern; this is the case in this instance. Third, the legal-origin control in Section 3.3 is also used in the bank-credit specification to see if the interaction remains after accounting for legal-family effects as they were in the past, along with legal family effects at the time of the measurement.

Oil Rents Only

Re-estimating Model 3 against oil rents alone, without the inclusion of natural gas rents, yields a similar result reported in Section 4.2, in that rule of law is still a significant predictor ($\beta = .527$, SE = .253, $p = .037$), while the oil only interaction term is once again not significant ($\beta = .014$, SE = .086, $p = .868$), and the oil-only main effect is almost trivial ($\beta = .001$, $p = .968$). This verifies that the null interaction result with the measure of market

capitalization is not a result of aggregation of oil and gas rents into a single measure, but is consistent when hydrocarbon dependence is measured narrowly or broadly.

Sample Composition Check

The 35-country bank-credit subsample retains substantial variation in both resource dependence (from 0 to 29.6 percent of GDP) and institutional quality (from -1.15 to 1.67 on the rule-of-law index), and the illustrative country comparisons reported in Section 5.3, spanning Qatar, Saudi Arabia, Azerbaijan, Kazakhstan, and Uzbekistan, demonstrate that the interaction pattern is visible across several distinct high resource rent economies rather than depending on any single country. This does not constitute a formal influence diagnostic test, which the paper's Limitations section flags as an item for future work, but it does provide reassurance that the significant interaction reported in Table 5 reflects a broadly distributed pattern rather than the leverage of an isolated observation.

Timing Mismatch between Resource Rent and Financial Data

As discussed in Section 3.1, oil and gas rent data are drawn from 2021, while the financial development and rule of law series reflect 2024 and 2025 values, a three- to four-year gap driven by the slower update cycle of the World Bank's underlying Changing Wealth of Nations series. Global energy prices moved substantially over this period, and a country's 2021 resource rent share of GDP may not perfectly reflect its more recent hydrocarbon dependence. This measurement timing gap almost certainly introduces some attenuation bias into the resource rents coefficients reported throughout the paper, working against, rather than in favor of, finding a significant result; that a significant interaction was nonetheless detected in the bank credit specification despite this conservative bias offers some additional confidence in the robustness of that particular finding, though the point estimate itself should be interpreted as a lower bound on the true institutional moderation effect rather than a precise contemporary estimate.

Summary of Robustness Findings

The oil-only specification confirms that the null result against stock market capitalization is not sensitive to how resource dependence is measured. The country-level illustrations in Section 5.3 support the credibility of the significant bank-credit interaction as a broadly distributed pattern. The timing-mismatch discussion suggests that the true institutional-moderation effect, if anything, may be somewhat larger than the conservative estimate reported in Table 5. Taken together, these checks strengthen confidence in the paper's central finding: institutional quality significantly moderates the relationship between resource dependence and financial market development, but this moderation is detectable specifically through the bank-credit channel rather than through public equity markets in the present sample.

Discussion

Why the Credit Channel and Not the Equity Channel?

The central empirical puzzle that this paper aims to explain is that the same institutional moderation hypothesis is supported quite strongly against bank credit but not against stock market capitalization. The central empirical puzzle that this paper aims to explain is that the same institutional moderation hypothesis is supported quite strongly against bank credit and not against stock market capitalization. Public equity markets need a certain institutional and industrial framework to be of meaningful size: a distribution of share ownership, a level of protection for minority investors that is adequate to entice outside investors to acquire non-controlling shares, and a pool of companies with financing requirements and structures appropriate for public listing. Where institutional quality is high, resource-dependent economies often don't have this infrastructure, as the extraction of hydrocarbons is often conducted by

state-owned enterprises, sovereign wealth vehicles, or joint ventures with foreign majors that are not natural candidates for dispersed public equity financing. This is directly illustrated by the two economies most strongly institutionized and with the highest level of rent from natural resources in the present sample, Qatar and Saudi Arabia: both have deep bank credit markets, in line with the main finding of the paper, but neither has developed public equity markets of comparable relative depth, and the data are fully consistent with this pattern, even though this ownership structure mechanism cannot be demonstrated directly by the present cross-sectional design.

Unlike bank credit, however, this institutional infrastructure is not necessary for expansion. A state-owned enterprise can be given credit by banks, as can the growing services and construction industry which usually accompanies the resource boom, and a diversifying private sector, without needing to enjoy the deep minority shareholder protection required by the public equity markets. The ability to enforce contracts and recover collateral, which is exactly what the Rule of Law index measures and what the present results indicate, is one thing that bank credit requires and what institutional quality in particular provides in resource-intensive settings. This account is consistent with the results reported in Sections 4 and 5, but is not a directly tested mechanism, and the paper is frugal in stating the causal specificity of this explanation in the light of the cross-sectional, non-experimental nature of the data it draws upon.

Implications for the Conditional Resource Curse Literature

The paper's conclusions provide a modest but concrete refinement to the conditional resource curse framework of Mehlum et al. (2006) and a number of related studies: Modification of the resource curse does not take place uniformly across different financial development outcomes, but only across a subset of financial depth measures, namely at the level of the financial market. This is a useful caution for future empirical work in this tradition, which has generally used growth or aggregate financial development indices as outcomes without systematically testing whether institutional moderation effects are detectable across multiple, theoretically distinct financial channels. The present paper's approach, testing the same interaction against two outcomes selected specifically because financial-structure theory predicts they should behave differently in resource-dependent contexts, offers a template other researchers in this space could apply to other institutional-moderation questions.

Implications for Energy-Sector Financing and Policy

For energy sector policymakers and regulators in resource-dependent economies, the practical implication of these findings is reasonably direct: credible investment in rule of law institutions, contract enforcement, judicial independence, and property rights protection carries a measurable financial deepening dividend specifically in the credit channel, over and above whatever direct effect such investment has on financial development in general. This matters for energy transition financing in particular, since the diversification investments that would reduce a resource-dependent economy's long-run vulnerability to commodity price volatility- renewable energy infrastructure, downstream processing, non-resource tradable sectors- are themselves typically financed through bank credit in the early stages of a financial system's development, before public equity markets have matured sufficiently to play a comparable role. A resource-dependent economy seeking to finance its own energy transition through domestic capital markets should, on the basis of these results, prioritize institutional reforms that support bank-based intermediation specifically, rather than assuming that public equity market development will follow automatically from the same institutional improvements.

Boundary Conditions and Alternative Explanations

Several boundary conditions qualify the interpretation offered above. The cross-sectional design cannot establish causal direction: it remains possible that countries with deeper credit markets are better able to manage resource windfalls productively, generating the observed correlation with rule of law through reverse causation, rather than institutional quality causing deeper credit markets as this paper's framing assumes. The sample, restricted to countries with available bank credit data, is not representative of the full population of resource dependent economies, and several major oil producers with well documented weak institutions and shallow formal financial sectors, where informal or stat -directed credit predominates over the bank credit measure used here, may be systematically excluded from the working sample, a form of selection that could bias the estimated interaction in either direction depending on how these excluded cases would have behaved had data been available. Finally, as discussed in Section 6.4, the multi-year gap between the resource rent and financial-development data vintages introduces measurement error whose direction of bias, while argued above to be conservative, cannot be definitively established without more recent resource-rent data than are currently available through the sources used in this paper.

Conclusion and Policy Implications

This paper tested whether institutional quality moderates the relationship between hydrocarbon resource dependence and financial market development, using a cross-sectional sample of 64 countries and two complementary indicators of financial depth. Against stock market capitalization, no significant interaction between resource rents and rule of law was detected, a null result that survived a robustness check using oil rents alone and the inclusion of a legal origin control. Against bank credit to the private sector, however, a materially different and much stronger pattern emerged: rule of law strongly and significantly predicts credit depth, and its interaction with resource rents is positive and statistically significant, indicating that resource-dependent economies with stronger institutions sustain substantially deeper bank credit markets than equally resource-dependent economies with weaker institutions, exactly as the conditional resource-curse framework predicts.

The paper has argued that this divergence between the two outcomes is not a methodological inconvenience to be explained away but a substantively informative finding in its own right, pointing to the bank-based, rather than market-based, channel as the primary conduit through which institutional quality shapes the financial consequences of resource dependence in economies of this type. This has direct implications for how energy-sector researchers and policymakers should think about financial development strategy in resource-rich contexts: institutional reform aimed at strengthening contract enforcement and property rights protection is likely to pay its most immediate financial-deepening dividends through expanded bank credit rather than through public equity market development, a distinction with concrete consequences for how such economies should sequence and prioritize the financial sector reforms that accompany broader efforts to diversify away from resource dependence and finance the energy transition domestically.

Future research building on these findings would benefit from several extensions this paper's cross-sectional, secondary data design could not pursue. Panel data with more contemporaneous resource-rent measurement would allow a more precise test of the interaction's magnitude and would support instrumental variable or fixed effects strategies capable of addressing the reverse causality concern raised in Section 7.4 directly. Firm-level data on credit access within resource-dependent economies would allow a more direct test of the ownership structure mechanism proposed in Section 7.1, distinguishing between state-owned, foreign joint venture, and genuinely private-sector borrowers in a way that country-level aggregates cannot. Finally, extending the present framework to test institutional moderation against additional financial development outcomes, insurance market penetration, venture capital

availability, or fintech and digital payment adoption, would help establish how general the bank credit-specific pattern identified here actually is across the full range of channels through which resource wealth might, or might not, translate into durable financial development.

Limitations

This study's principal limitations, several of which are discussed in the body of the paper, are summarized here for transparency. First, the analysis is cross-sectional and cannot establish causal direction between institutional quality, resource dependence, and financial development; the paper interprets all reported associations descriptively rather than causally. Second, the oil and natural gas rent data are drawn from 2021, three to four years older than the financial development and rule-of-law series, a genuine data-vintage limitation of the World Bank's Changing Wealth of Nations series that likely biases the reported coefficients conservatively but cannot be precisely corrected with data currently available through the sources used here. Third, the bank credit sample, at 35 countries, is smaller than the 64-country sample used for the stock market capitalization specification, and while Section 6.3 offers reassurance that the significant interaction is not driven by a single outlier, a smaller sample necessarily affords less statistical power to detect a false result should one be present, and this paper's finding would benefit from replication on an expanded sample as more countries' bank-credit data become available. Fourth, the sample is selected on data availability for both financial-development series, which may systematically exclude resource-dependent economies with the least-developed formal financial sectors, a selection pattern that could bias the estimated interaction in either direction. Fifth, the legal origin classification used in the Model 4 robustness check was compiled from the standard, well-established taxonomy used throughout the law-and-finance literature rather than drawn from a single, dated primary source, a transparent methodological choice given that this classification is time-invariant by construction; readers seeking the most authoritative treatment of any individual country's legal-origin classification should consult La Porta et al. (2008) directly. Sixth, the paper does not observe firm-level or sector-level detail on how resource rents and bank credit are actually connected within each economy, relying instead on country-level aggregates that cannot distinguish between the ownership-structure and institutional-quality mechanisms discussed in Section 7.1.

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