RESEARCH ARTICLE

GOVERNANCE QUALITY AND THE RENEWABLE ELECTRICITY TRANSITION: A COMPARATIVE PANEL ANALYSIS OF GCC AND ASEAN ECONOMIES, 2004–2024

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Abstract : This paper examines whether governance quality shapes the renewable electricity transition and whether the hydrocarbon-rentier context mutes this institutional channel. Using a balanced panel of 11 Asian economies—six Gulf Cooperation Council (GCC) and five ASEAN countries—over 2004–2024, we combine Worldwide Governance Indicators with energy data from the Energy Institute/Ember compilation and macroeconomic controls from the World Development Indicators. Two-way fixed-effects estimates with Driscoll–Kraay standard errors show that control of corruption and regulatory quality, lagged two years, significantly raise the renewable share of electricity generation in ASEAN economies: a one-standard-deviation (within-country) improvement in control of corruption is associated with an increase of about 1.3 percentage points, rising to roughly 2.3 percentage points in the long run of a dynamic specification. In the GCC, however, the effect is fully offset: interaction terms are negative, similar in magnitude, and statistically significant, and subsample estimates are near zero. Results are robust to alternative lags, a low-carbon dependent variable, dynamic specifications, and leave-one-country-out tests. The findings support a rentier-state interpretation in which state-led programs, rather than broad institutional quality, drive decarbonization in resource-rich economies, with distinct policy implications for the two regions.

Keyword: Renewable Energy Transition; Governance Quality; Control Of Corruption; Regulatory Quality; Rentier State; GCC; ASEAN; panel data; Worldwide Governance Indicators; energy policy

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Introduction

The decarbonization of electricity systems is now a central policy objective across emerging Asia, yet the pace of the renewable transition differs starkly across the region. By 2024, renewables supplied more than 40% of electricity generation in Vietnam and around 20% in Malaysia and the Philippines, whereas in most Gulf Cooperation Council (GCC) economies the renewable share only recently rose above zero despite abundant solar resources and ambitious national programs such as Saudi Vision 2030 and the UAE Energy Strategy 2050. Understanding why some economies convert policy ambition into deployed capacity faster than others is a first-order question for energy and development economics.

A growing literature argues that institutions are part of the answer. Sound regulation lowers the transaction costs and policy risk that weigh heavily on capital-intensive renewable projects, while corruption distorts licensing, procurement, and grid access in ways that favor incumbent technologies (Cadoret & Padovano, 2016; Fredriksson & Svensson, 2003; Uzar, 2020). At the same time, the political-economy literature on resource-rich states suggests that the institutional channel may operate differently—or hardly at all—in hydrocarbon-rentier economies, where the state itself finances and executes the energy transition through sovereign vehicles and state utilities, and where deployment decisions respond to top-down programs rather than to the broad investment climate (Beblawi, 1987; Ross, 2001; van der Ploeg, 2011).

This paper tests both propositions in a comparative panel of 11 Asian economies—the six GCC members (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) and five ASEAN emerging economies (Indonesia, Malaysia, the Philippines, Thailand, and Vietnam)—over 2004–2024. The pairing is deliberate. The two groups are broadly comparable in trade openness, investment rates, and growth over the sample period, but differ sharply in their hydrocarbon endowments and in the state's role in the power sector, providing a natural contrast for examining whether the governance–renewables link is conditional on the rentier context.

We combine the Worldwide Governance Indicators (WGI) for control of corruption, regulatory quality, and government effectiveness (Kaufmann et al., 2011) with generation-mix data from the Energy Institute/Ember compilation maintained by Our World in Data, and macroeconomic controls from the World Development Indicators. Because governance is slow-moving—its between-country standard deviation is roughly three times its within-country standard deviation in our sample—and because permitting, financing, and construction of renewable capacity take years, we relate the renewable share of electricity generation to governance lagged two and three years, within a two-way fixed-effects framework with Driscoll and Kraay (1998) standard errors.

Three findings emerge. First, control of corruption and regulatory quality significantly predict subsequent renewable penetration in the full panel. Second, this effect is concentrated entirely in the ASEAN subsample: interaction terms with a GCC indicator are negative, of comparable magnitude to the main effects, and statistically significant, and governance coefficients estimated on the GCC subsample alone are economically negligible. Third, the results survive a battery of robustness checks, including alternative lags, a dynamic specification, a low-carbon dependent variable that credits nuclear power, and leave-one-country-out estimation. Government effectiveness, by contrast, enters negatively—a result we interpret in light of the capacity of effective states to sustain incumbent, fossil-based systems.

The paper contributes to the literature in two ways. It provides, to our knowledge, the first direct econometric comparison of the governance–renewables nexus between the GCC and ASEAN, two regions usually studied in isolation; and it documents that the institutional channel emphasized in cross-country studies is conditional on the political economy of resource rents, which matters for how multilateral institutions and investors should read governance indicators when assessing transition prospects. The rest of the paper proceeds as follows. Section 2 reviews the literature and develops hypotheses. Section 3 describes the data and methodology. Section 4 presents the results and robustness checks. Section 5 discusses the findings, and Section 6 concludes.

Literature Review and Hypotheses

2.1 Institutions and the renewable energy transition

The proposition that institutions shape long-run economic outcomes (North, 1990) has a specific application to renewable energy. Wind and solar projects are capital-intensive, have long payback periods, and depend on stable regulatory commitments—feed-in tariffs, auction frameworks, grid-access rules—whose credibility is a function of institutional quality. Cadoret and Padovano (2016) show for European countries that lobbying by incumbent industries retards renewable deployment while the quality of the political system accelerates it. Fredriksson and Svensson (2003) demonstrate theoretically and empirically that corruption reduces the stringency of environmental policy, with the effect conditioned by political stability. In emerging-market settings, Uzar (2020) finds that institutional quality raises renewable energy consumption, and Bhattacharya et al. (2017) report that institutions strengthen the output and emissions benefits of renewables

across regions. Perceived regulatory and political risk has also been shown to be a first-order barrier to renewable investment in the Middle East and North Africa specifically (Komendantova et al., 2012).

Two mechanisms dominate this literature. The corruption channel operates through project selection and licensing: where bribery determines permits and procurement, incumbent fossil technologies with established rent networks are favored, and entry costs for new renewable developers rise. The regulatory channel operates through policy credibility: renewable investors must trust that support schemes and power-purchase agreements will be honored over 20-year horizons, which is more plausible where regulatory quality is high. Both mechanisms imply a lag between institutional improvement and observed generation shares, because permitting, financing, and construction take several years.

2.2 The rentier context

The rentier-state literature suggests that these mechanisms may be muted in hydrocarbon exporters. In rentier economies, the state captures externally generated resource rents and allocates them domestically, so economic outcomes depend less on the private investment climate and more on state allocation decisions (Beblawi, 1987). Resource wealth is also associated with weaker accountability institutions and slower institutional reform (Ross, 2001; Sachs & Warner, 2001; van der Ploeg, 2011). In the GCC power sector specifically, generation has historically been dominated by state utilities, fuel has been supplied at administered prices, and the recent renewable build-out—Saudi Arabia's National Renewable Energy Program, the UAE's Barakah and Mohammed bin Rashid programs, Qatar's Al Kharsaah project—has been executed through sovereign-linked vehicles and competitive auctions designed and underwritten by the state (Griffiths, 2017). In such systems, year-to-year variation in broad governance perceptions need not translate into variation in renewable deployment: the binding constraints are program timing, fuel-pricing policy, and sovereign priorities rather than the general institutional environment facing private investors.

The comparative design follows directly. ASEAN emerging economies rely much more on independent power producers, private and foreign capital, and market-facing support schemes—Vietnam's feed-in-tariff-driven solar boom of 2019–2021 being the canonical example—so the institutional channel should operate there. The GCC provides the contrast where rentier theory predicts the channel is weak. We therefore test:

H1. Governance quality—specifically control of corruption and regulatory quality—is positively associated with the subsequent renewable share of electricity generation.

H2. The association in H1 is significantly weaker in GCC hydrocarbon-rentier economies than in ASEAN economies.

Data and Methodology

3.1 Sample and data sources

The sample is a balanced annual panel of 11 economies over 2004–2024: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (GCC group), and Indonesia, Malaysia, the Philippines, Thailand, and Vietnam (ASEAN group). The sample begin date reflects the first year from which the WGI are available annually. After merging and removing observations with missing macroeconomic controls, the estimation sample contains 224 country-year observations (202 in specifications with two-year governance lags).

The dependent variable is the renewable share of electricity generation (REN, in percent), taken from the Our World in Data energy dataset, which compiles the Energy Institute Statistical Review and Ember electricity data. As a robustness check we use the low-carbon share (LOWC), which additionally credits nuclear generation and is relevant for the UAE after the commissioning of the Barakah plant. Governance is measured by three WGI estimates on the approximately −2.5 to +2.5 scale: control of corruption (CC), regulatory quality (RQ), and government effectiveness (GE) (Kaufmann et al., 2011); we also construct a first-principal-component composite (GOV) that captures 87% of the variance of the three standardized indicators. Macroeconomic controls from the World Development Indicators are real GDP growth (GDPG), consumer price inflation (INFL), trade openness (TRADE, % of GDP), and gross capital formation (GCF, % of GDP); the log of per-capita electricity generation (LNELEC) from the energy dataset controls for the scale and maturity of the power system. Table 1 defines all variables.

3.2 Empirical strategy

The baseline specification is a two-way fixed-effects model with a rentier interaction:

$$REN^{it} = \beta_1 G^{i,t-2} + \beta_2 (G^{i,t-2} \times GCC^{i}) + \gamma' X^{it} + \alpha^{i} + \lambda^{t} + \varepsilon^{it} \qquad (1)$$

where G is one of CC, RQ, GE, or GOV; GCC^{i} is an indicator for Gulf economies; X is the vector of controls; and α^{i} and λ^{t} are country and year fixed effects. β_1 measures the governance effect in ASEAN, $\beta_1 + \beta_2$ the effect in the GCC, and H2 predicts $\beta_2 < 0$. Year effects absorb the global decline in renewable technology costs and common energy-price shocks, so identification comes from within-country deviations relative to the common trend.

Two features of the data motivate the design. First, governance is highly persistent: the within-country standard deviation of CC is 0.19 against a between-country standard deviation of 0.55, so contemporaneous

within-country regressions have little identifying variation and are vulnerable to attenuation. Second, institutional improvements can only affect generation shares after permitting, financing, and construction lags. We therefore enter governance at t−2 in the baseline and t−3 in robustness checks; this timing also mitigates reverse causality from deployment outcomes to perceived governance. Inference uses Driscoll and Kraay (1998) standard errors with a Bartlett kernel (bandwidth 3), which are robust to heteroskedasticity, serial correlation, and cross-sectional dependence—important given common oil-price and technology shocks. A Pesaran (2015) CD test on the baseline residuals does not reject weak cross-sectional dependence (CD = −1.29, p = 0.20), and we additionally report country-clustered standard errors while noting that with 11 clusters they are conservative and imprecisely estimated. Because the renewable share is persistent, we also estimate a dynamic variant of (1) including the lagged dependent variable; with T = 21 the Nickell (1981) bias is of order 1/T and modest, and system GMM is inadvisable with N = 11.

Table 1

Variable Definitions and Sources

Variable	Definition	Source
REN	Renewable share of electricity generation (%)	Our World in Data (Energy Institute/Ember)
LOWC	Low-carbon (renewables + nuclear) share of electricity generation (%)	Our World in Data (Energy Institute/Ember)
CC	Control of corruption estimate (≈2.5 to +2.5)	Worldwide Governance Indicators
RQ	Regulatory quality estimate (≈2.5 to +2.5)	Worldwide Governance Indicators
GE	Government effectiveness estimate (≈2.5 to +2.5)	Worldwide Governance Indicators
GOV	First principal component of standardized CC, RQ, GE (87% of variance)	Authors' calculation
GDPG	Real GDP growth (annual %)	World Development Indicators
INFL	Consumer price inflation (annual %)	World Development Indicators
TRADE	Exports plus imports (% of GDP)	World Development Indicators
GCF	Gross capital formation (% of GDP)	World Development Indicators
LNELEC	Log of electricity generation per capita (kWh)	Our World in Data
GCC	Indicator = 1 for Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE	Authors' classification

Note. The scale note "≈2.5 to +2.5" denotes the approximate range −2.5 (weak) to +2.5 (strong governance).

Table 2

Descriptive Statistics (N = 224, 2004–2024)

Variable	Mean	SD	Min	Max	ASEAN mean	GCC mean
REN	10.05	12.97	0.00	49.46	20.86	0.51
LOWC	10.23	13.03	0.00	49.46	20.86	0.86
CC	0.00	0.54	-1.16	1.37	-0.36	0.33
RQ	0.35	0.43	-0.63	1.18	0.09	0.58
GE	0.31	0.45	-0.76	1.42	0.17	0.44
GDPG	4.41	4.22	-9.52	26.17	4.79	4.08
INFL	3.32	3.37	-4.86	23.11	4.02	2.70
TRADE	108.91	40.67	32.97	210.37	108.47	109.29
GCF	27.37	6.60	12.84	49.49	26.76	27.91
LNELEC	8.53	1.22	6.30	10.08	7.38	9.54

Note. ASEAN: Indonesia, Malaysia, Philippines, Thailand, Vietnam. GCC: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE. The mean renewable share is 20.9% in ASEAN against 0.5% in the GCC, while average governance scores are higher in the GCC, underscoring that a simple cross-sectional association would be misleading.

Table 3

Governance (t−2) and the Renewable Share of Electricity: Two-Way Fixed Effects

	(1) CC	(2) RQ	(3) GE	(4) GOV
Governance (t−2)	6.724***	3.938**	-4.915**	0.422

	(1.141)	(1.706)	(1.911)	(0.442)
Governance (t−2) × GCC	-8.424***	-4.842***	2.042	-1.034**
	(1.171)	(1.811)	(2.207)	(0.403)
Net GCC effect ($\beta_1+\beta_2$)	-1.700***	-0.904	-2.873***	-0.612***
	(0.558)	(1.165)	(0.693)	(0.199)
GDPG	-0.026	-0.037	-0.056*	-0.047*
	(0.029)	(0.026)	(0.029)	(0.026)
INFL	-0.042	-0.026	-0.065	-0.037
	(0.102)	(0.104)	(0.112)	(0.103)
TRADE	-0.039	-0.042**	-0.041**	-0.045**
	(0.024)	(0.021)	(0.019)	(0.022)
GCF	-0.186**	-0.157**	-0.121**	-0.163**
	(0.075)	(0.072)	(0.059)	(0.066)
LNELEC	-2.096	-1.098	2.240	-0.643
	(2.200)	(2.734)	(3.342)	(2.930)
Controls	Yes	Yes	Yes	Yes
Country & year FE	Yes	Yes	Yes	Yes
Observations	202	202	202	202
Within R^2	0.078	0.044	0.058	0.035

Note. Dependent variable: renewable share of electricity generation (%). Driscoll–Kraay standard errors (Bartlett kernel, bandwidth 3) in parentheses. The net GCC effect is the linear combination of the governance main effect and its interaction with the GCC indicator. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 4

Subsample Estimates: ASEAN Versus GCC

	(1) CC, ASEAN	**(2) CC, GCC**	**(3) RQ, ASEAN**	**(4) RQ, GCC**
Governance (t−2)	7.383***	0.244	6.377**	0.447
	(2.329)	(0.447)	(3.013)	(0.585)
GDPG	-0.040	0.014	-0.016	0.020
	(0.207)	(0.018)	(0.203)	(0.020)
INFL	-0.143	-0.029**	-0.118	-0.027*
	(0.188)	(0.013)	(0.174)	(0.016)
TRADE	-0.081*	0.039**	-0.086**	0.038**
	(0.044)	(0.016)	(0.040)	(0.016)
GCF	-0.775***	0.010	-0.779***	0.010
	(0.168)	(0.020)	(0.165)	(0.016)
LNELEC	-4.426	1.493	-4.229	1.426
	(4.056)	(0.999)	(4.432)	(1.108)
Controls	Yes	Yes	Yes	Yes
Country & year FE	Yes	Yes	Yes	Yes
Observations	95	107	95	107
Within R^2	0.158	0.229	0.110	0.211

Note. Dependent variable: renewable share of electricity generation (%). Two-way fixed effects with Driscoll–Kraay standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 5

Robustness: Alternative Lag, Dynamic Specification, and Low-Carbon Share

	(1) CC (t−3)	**(2) RQ (t−3)**	**(3) CC, dynamic**	**(4) CC, LOWC**
Lagged dependent variable			0.767***	
			(0.058)	
Governance	5.889***	5.635**	2.762***	6.783***
	(1.268)	(2.295)	(0.643)	(1.538)
Governance × GCC	-5.957***	-5.052***	-2.743***	-7.208***

	(1.528)	(1.285)	(0.858)	(1.291)
Net GCC effect ($\beta_1+\beta_2$)	-0.068	0.584	0.019	-0.425
	(1.109)	(1.644)	(0.539)	(1.129)
Controls	Yes	Yes	Yes	Yes
Country & year FE	Yes	Yes	Yes	Yes
Observations	191	191	202	202
Within R^2	0.019	-0.007	0.626	-0.003

Note. Columns (1)–(3): dependent variable is the renewable share of electricity (%); governance enters at t−3 in (1)–(2) and at t−2 with a lagged dependent variable in (3). Column (4): dependent variable is the low-carbon share (renewables plus nuclear, %), governance at t−2. All specifications include the full control set and country and year fixed effects; Driscoll–Kraay standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Results

4.1 Descriptive patterns

Table 2 reports descriptive statistics. The contrast that motivates the paper is immediate: the mean renewable share of electricity is 20.9% in the ASEAN group but only 0.5% in the GCC, even though average governance scores are higher in the GCC (CC of 0.33 versus −0.36; RQ of 0.58 versus 0.09). A naïve cross-sectional regression would therefore recover a negative governance–renewables association driven entirely by the resource endowment. This is precisely why the analysis relies on within-country variation, country fixed effects, and an explicit rentier interaction rather than pooled comparisons.

4.2 Baseline estimates

Table 3 presents the baseline two-way fixed-effects estimates of Equation (1). In column (1), control of corruption at t−2 carries a coefficient of 6.72 ($p < 0.01$) for the ASEAN group. The within-country standard deviation of CC is 0.19, so a one-within-standard-deviation improvement in control of corruption is associated with an increase of roughly 1.3 percentage points in the renewable share two years later—large relative to the within-country standard deviation of the renewable share itself (3.1 percentage points). The interaction with the GCC indicator is −8.42 ($p < 0.01$), slightly larger in absolute value than the main effect; the net GCC effect of −1.70 is statistically significant but economically small given the near-zero renewable base in the Gulf over most of the period. Column (2) shows the same pattern for regulatory quality: a positive ASEAN effect of 3.94 ($p < 0.05$), an offsetting interaction of −4.84 ($p < 0.01$), and a net GCC effect indistinguishable from zero. Column (4) confirms the pattern with the composite index: the interaction is negative and significant while the ASEAN main effect, which averages across the three indicators including GE, is positive but imprecise.

Government effectiveness in column (3) is the exception: its coefficient is negative (−4.92, $p < 0.05$). We do not read this as evidence that state capacity retards the transition mechanically; rather, the WGI effectiveness measure captures the quality of public service delivery broadly, and in this sample effective bureaucracies have historically been effective at operating and expanding incumbent fossil-based systems—natural-gas-fired fleets in particular—so that improvements in measured effectiveness do not map into renewable penetration the way anti-corruption and regulatory credibility do. The finding echoes the distinction in the literature between institutions that reduce entry costs for new technologies and generic administrative capacity (Cadoret & Padovano, 2016).

Among the controls, gross capital formation enters negatively, consistent with investment booms in these economies having been concentrated in conventional energy, construction, and infrastructure rather than renewables over much of the period. Trade openness is negative and small, and growth and inflation are statistically indistinguishable from zero throughout.

4.3 Subsample estimates

Table 4 re-estimates the model separately by group, letting all coefficients differ. The split confirms the interaction results. Control of corruption carries a coefficient of 7.38 ($p < 0.01$) in the ASEAN subsample and 0.24 ($p = 0.59$) in the GCC; regulatory quality carries 6.38 ($p < 0.05$) in ASEAN and 0.45 ($p = 0.45$) in the GCC. The governance channel that the cross-country literature emphasizes is thus entirely an ASEAN phenomenon in this panel. H1 is supported for control of corruption and regulatory quality, and H2 is strongly supported: the rentier context does not merely dampen the institutional channel, it effectively switches it off.

4.4 Robustness

Table 5 collects the main robustness checks. Columns (1)–(2) lengthen the governance lag to three years: the CC and RQ main effects (5.89 and 5.64) and their GCC interactions (−5.96 and −5.05) remain significant at the 1% level with net GCC effects near zero, indicating the results are not an artifact of the specific lag. Column (3) adds the lagged dependent variable. The renewable share is highly persistent (coefficient 0.77), and the short-run CC effect falls to 2.76 ($p < 0.01$) with an interaction of −2.74 ($p < 0.01$); the implied long-run ASEAN effect, $2.76/(1 - 0.77) \approx 11.9$, is close to the static estimate scaled for persistence, and translates into roughly 2.3 percentage points for a one-within-standard-deviation improvement in control of corruption.

Column (4) replaces the dependent variable with the low-carbon share, which credits the UAE's nuclear program: the CC results are essentially unchanged. In the dynamic specification the RQ main effect retains its sign but loses significance (coefficient 3.25, p = 0.14), so the evidence for the regulatory-quality channel is somewhat weaker than for anti-corruption; we flag this explicitly rather than overstating the symmetry.

Three further checks are reported in the text. First, leave-one-country-out estimation of the CC specification yields main effects ranging from 2.60 (dropping Vietnam) to 9.82 and interaction terms from −11.81 to −3.96, always with the same signs, so no single economy drives the results. Second, replacing Driscoll–Kraay with country-clustered standard errors—conservative with only 11 clusters—weakens precision as expected (CC main effect p = 0.08; interaction p = 0.07) while leaving point estimates unchanged; with so few clusters the cluster-robust variance is itself imprecisely estimated, which is why the kernel-based estimator is preferred as the baseline. Third, the Pesaran CD statistic on the baseline residuals is −1.29 (p = 0.20), indicating that year effects and the kernel correction adequately absorb common shocks.

Discussion

The results reconcile two literatures that make apparently conflicting predictions. Consistent with the institutional literature (Cadoret & Padovano, 2016; Fredriksson & Svensson, 2003; Uzar, 2020), governance quality—specifically control of corruption and regulatory quality—forecasts renewable penetration where the transition is financed and executed largely by private and foreign capital under market-facing support schemes, as in the ASEAN emerging economies. Vietnam's solar boom, Thailand's adder and feed-in programs, and the Philippines' renewable portfolio standards all required developers to trust permitting processes and long-dated offtake commitments, which is exactly where anti-corruption and regulatory credibility bind. Consistent with the rentier-state literature (Beblawi, 1987; Ross, 2001; van der Ploeg, 2011), the same institutional variation carries no information about deployment in the GCC, where the state finances, procures, and underwrites renewable projects directly. Gulf renewable outcomes over the sample period track program decisions—auction rounds in Saudi Arabia and the UAE, single flagship projects in Qatar and Kuwait—rather than movements in broad governance perceptions, and Gulf governance scores were high throughout years in which renewable shares were essentially zero.

Two implications follow. For investors and multilateral institutions, governance indicators are informative about transition prospects only conditional on the political economy of the power sector: a WGI improvement in an ASEAN economy is a meaningful positive signal for renewable deployment two to three years ahead, whereas in a rentier economy the relevant signals are fiscal capacity, program announcements, and administered fuel-pricing reform. For GCC policymakers, the finding is not that institutions are irrelevant but that the current model substitutes state execution for the institutional channel; as Gulf economies open their power sectors to independent producers under Vision-2030-style diversification agendas, the ASEAN pattern suggests that regulatory credibility and anti-corruption enforcement will begin to matter for sustaining private participation at scale.

The negative government-effectiveness coefficient deserves separate emphasis. It cautions against treating aggregate governance composites as sufficient statistics in energy applications: bundling GE with CC and RQ, as our composite does, attenuates the estimated effect toward zero (Table 3, column 4). Disaggregation is substantively important, echoing arguments that different institutional dimensions bear on environmental policy through different mechanisms.

Conclusion

Using a balanced panel of six GCC and five ASEAN economies over 2004–2024, this paper shows that the governance–renewables nexus is conditional on the rentier context. Control of corruption and regulatory quality, lagged two to three years, significantly raise the renewable share of electricity in ASEAN economies—by about 1.3 percentage points per within-country standard deviation of control of corruption in the short run and roughly 2.3 percentage points in the long run—while the same institutional variation has no detectable effect in the GCC, where state-led programs drive deployment. The results are robust to alternative lags, dynamic specifications, a low-carbon dependent variable, and leave-one-country-out estimation.

The study has limitations that chart the research agenda. The panel is small in the cross-section, so inference leans on kernel-based standard errors and the interaction design rather than large-N asymptotics; the WGI are perception-based measures with known measurement error, which lags and within-transformations mitigate but do not eliminate; and the design identifies conditional associations with a plausible temporal ordering rather than causal effects from quasi-experimental variation. Extending the comparison to sector-level policy variables—auction volumes, administered fuel prices, independent-power-producer shares—would allow the mechanisms proposed here to be tested directly, and the ongoing liberalization of Gulf power markets will, within a decade, provide out-of-sample variation on whether the institutional channel activates as the state's executing role recedes.

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