APAEA

Alam, A. W., Xu, H., & Wu, H. (2024). Energy Security Risk and Firm Valuation: Does Political Connectivity Matter? *Energy RESEARCH LETTERS*, *6*(5).
https://doi.org/10.46557/001c.124849

Peer-reviewed research

Energy Security Risk and Firm Valuation: Does Political Connectivity Matter?

Ahmed W. Alam[1a], Haijie Xu[1], Haoran Wu[1]

[1] Department of Accounting and Finance, Kean University, New Jersey, USA

Keywords: Energy security risk, Firm value, Political connectivity, Political insurance, Panel analysis

JEL Classifications: G32 Financing Policy - Financial Risk and Risk Management - Capital and Ownership Structure - Value of Firms - Goodwill, O13 Agriculture - Natural Resources - Energy - Environment - Other Primary Products, P18 Energy - Environment, Q40 General

https://doi.org/10.46557/001c.124849

Energy RESEARCH LETTERS

Vol. 6, Issue 5, 2025

Employing panel regression models on a sample of U.S. energy firms, we document novel evidence suggesting that energy security risk significantly influences firms' market valuation, albeit this effect is attributed largely to small- and medium-sized firms. It is also apparent that political connection mitigates the value erosion of firms with larger political capital. Our findings, therefore, validate the interceding role that political connectivity plays in corporate financial performance during periods of volatile energy markets.

I. Introduction

The energy sector has faced unprecedented challenges in recent years, ranging from geopolitical tensions to supply chain disruptions. Energy security risk, arising from disruptions in energy supply and reduced access to affordable and efficient energy sources, may impair business operations, profitability, and value (Igeland et al., 2024). Such effects are more prevalent for energy firms that are highly vulnerable to shocks and instabilities in the energy market. The recent challenges faced by the global energy industry have reinforced the importance of energy security, requiring firms to implement actions that protect their operations and market values. As traditional characteristics such as a strong capital foundation seem insufficient in the face of these diverse threats, political connection may emerge as an important determinant of company resilience. Connected enterprises may gain easier access to debt financing, lower taxes, and a larger market share (Faccio, 2006), resulting in higher market valuations of such firms during uncertain periods (Goldman et al., 2009). While earlier studies suggest that heightened energy insecurity stifles capital expenditure and leverage decisions of energy firms (Doshi et al., 2018), similar effects on their market valuations and potential remedial measures are yet to be examined in detail.

To fill this gap in the literature, we undertake a novel study to unveil the relationship between energy security risk and financial valuation of energy firms. Furthermore, we investigate whether and how the decision to obtain political connectivity subsides such interaction. Previous literature advocates that politically connected firms exhibit stronger performance and higher value (Brown & Huang, 2020; Chen et al., 2017). Local politicians are given a great deal of power in the local fiscal system, especially in terms of bank credit, tax regulation, and government subsidies (Yu et al., 2020). Zhang et al. (2016) state that government support allows energy firms to generate more free cash flow. Energy companies, having strong ties with local politicians, may obtain more favorable business environments, and thus achieve higher valuations, relative to their non-politically connected peers when affected by energy risks. Politically affiliated energy firms are likely to gain access to critical energy-related policy decisions made by presidential, state, and local administrations. Having early access to crucial energy policy information, these connected firms can devise counteractive measures to safeguard their business operations and profitability against the adverse outcomes of such policies, thus, demonstrating higher market performance and valuations (Lin et al., 2016).

Offering the first empirical evidence on the interlinkage between energy insecurity, political association, and firms' market valuation, our study affirms the interceding role that political connectedness plays in ensuring robust corporate financial performance during periods of volatile energy markets. In addition, our findings propel further research on the subject matter to validate similar inferences using samples across industries and beyond borders.

a Corresponding author email: aalam@kean.edu

II. Data and Methodology

A. Data and sample

We collect energy security data from the website of Global Energy Institute (GEI) of the U.S. Chamber of Commerce.[1] The GEI offers a comprehensive energy security risk index that assesses each country's vulnerability in the global energy market. A higher score indicates a higher level of energy security risk. Firm-level accounting variables have been collected from the Compustat database. To limit our sample to energy firms, we keep only the 'Enrgy' industry from the Fama-French classification of twelve industries that include oil, gas, and coal extraction and products, having 4-digit standard industrial classification (SIC) codes ranging from 1200-1399 and 2900-2999. Political expenditure data is collected from the Center for Responsive Politics (CRP). Merging these datasets yields a final sample of 320 U.S. energy firms over a period from 1996-2018.

B. Model specifications

To gauge the empirical association between firm valuation and energy security risk, we exploit the following econometric model:

$$Firm\_Value_{i,t+1} = \beta_0 + \beta_1 * lnESR_t + \beta_2 * X_{i,t} + FE + \varepsilon_1 \quad (1)$$

Firm_Value$_{i,t+1}$ is measured by the market-to-book ratio of firm *i* in year *t+1*. This measure of firm value, which is popular in comparing firms within the same industry, has been extensively used in previous literature (Dittmar & Mahrt-Smith, 2007; Jory et al., 2020). *lnESR*$_t$ is the natural logarithm of annual U.S. energy security risk score in year *t*. $X_{i,t}$ is a set of firm-specific control variables, including firm size, capital, liquidity, investment, innovation, revenue, profitability, and market power. Appendix Table A1 presents the definitions of the main variables. All regression models include time trend variables, and firm fixed effects (FE).

Next, to investigate the mitigating role of political connectivity, we execute the following specifications:

$$\begin{aligned} Firm\_Value_{i,t+1} &= \gamma_0 + \gamma_1 * lnESR_t \\ &+ \gamma_2 * Pol\_Connection_{i,t} \\ &+ \gamma_3 * lnESR_t * Pol\_Connection_{i,t} \\ &+ \gamma_4 * X_{i,t} + FE + \varepsilon_2 \end{aligned} \quad (2)$$

$$\begin{aligned} Firm\_Value_{i,t+1} &= \delta_0 + \delta_1 * lnESR_t \\ &+ \delta_2 * Pol\_Expenditure_{i,t} \\ &+ \delta_3 * lnESR_t * Pol\_Expenditure_{i,t} \\ &+ \delta_4 * X_{i,t} + FE + \varepsilon_3 \end{aligned} \quad (3)$$

This analysis may be plagued with endogeneity since only less than 20% of the sample consists of politically connected firms. Therefore, to address the concern of endogeneity, we conduct this analysis using matched samples of firms generated through propensity score matching (PSM) estimation. First, firms are treated with a dummy variable, *DPAC*, which is equal to 1 if a firm has political action committee (PAC) contribution in a year and 0 otherwise. Using firm size, capital, investment, and profitability as the matching variables, the treated firms are matched one-to-one without replacement with the controlled firms. Similar matching criteria are employed in prior literature (Alam et al., 2023). Similarly, another dummy variable, *DLOB*, which is equal to 1 if a firm reports lobbying expenditure in a year and 0 otherwise, is used to generate another matched sample based on lobbying. These matched samples are then used separately to execute the empirical specification in Equation (2).

Next, firms are treated with a dummy variable, *PACC*, which is equal to 1 if a firm has increased its PAC contribution from the previous year and 0 otherwise. The treated sub-sample is matched with the controlled counterpart using the matching mechanism mentioned earlier. Similarly, another dummy variable, *LOBB*, which is equal to 1 if a firm has intensified its lobbying expenditure from the prior year and 0 otherwise, is utilized to generate a separate matched sample. These two matched samples are then used to carry out the model specified in Equation (3).

III. Empirical Findings

Table 1 presents the empirical association between energy security risk and firm valuation. Column 1 reports the results from the model without firm controls. Column 2 displays the output of the multivariate model specified in Equation (1), our main baseline model. In both columns, firm valuation exerts a negative relationship with energy security risk. On average, a 1% increase in the U.S. energy security risk score results in about US$0.016 reduction in an energy firm's market value of equity relative to US$1 book value of its equity. This firm-level finding complements prior evidence highlighting the detrimental impact that energy-related uncertainty poses on economic activity and financial performance at the industry level (T. H. N. Dang et al., 2023).

For robustness check, firstly, we repeat the baseline model while including additional regressors. Literature suggests that firm value is adversely influenced by geopolitical risk (Pringpong et al., 2023), climate change risk (Berkman et al., 2024), and economic policy uncertainty (Jory et al., 2020). We include these additional factors into our main regression model to control their potential effects. Secondly, following existing literature (Ma et al., 2024), we exclude the years of the Global Financial Crisis as firm value may be significantly reduced during crisis periods (Enikolopov et al., 2014). Columns 3 and 4 report the results from these robustness tests. In both columns, the negative relationship sustains, confirming the resilience of our baseline finding.

1 The data and details can be found here: https://www.globalenergyinstitute.org/energy-security-risk-index.

Table 1. Energy security risk and firm valuation.

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline		Robustness		Size	
			Additional controls	Excluding CRISIS	Small & medium	Large
lnESR	-2.301***	-1.637***	-2.858***	-2.183**	-5.125**	-0.050
	(0.585)	(0.512)	(0.726)	(0.956)	(1.865)	(0.666)
Size		-1.284***	-1.324***	-1.233***		
		(0.156)	(0.165)	(0.218)		
Capital		-3.718**	-3.768***	-4.109***	-4.285*	-3.534**
		(1.327)	(1.303)	(1.358)	(2.339)	(1.203)
Liquidity		-0.026***	-0.016	-0.015	2.436**	-0.018*
		(0.009)	(0.010)	(0.012)	(1.056)	(0.008)
Investment		-0.488	-0.525	-0.233	0.587	1.464**
		(0.357)	(0.400)	(0.505)	(0.847)	(0.500)
Innovation		-1.651	-0.954	-1.390	-5.379	37.045***
		(2.695)	(2.884)	(3.357)	(3.889)	(8.049)
Revenue		0.815***	0.835***	0.755***	0.506**	-0.275***
		(0.115)	(0.129)	(0.148)	(0.238)	(0.074)
Profitability		0.011***	0.010***	0.011***	-0.091**	0.029***
		(0.003)	(0.003)	(0.002)	(0.041)	(0.002)
Power		0.190*	0.292**	0.271**	0.844**	0.051
		(0.098)	(0.116)	(0.116)	(0.398)	(0.073)
GPR			-0.173*	-0.121		
			(0.086)	(0.109)		
CVI			-50.357***	-66.533***		
			(15.608)	(9.050)		
lnEPU			-0.723**	-1.014***		
			(0.289)	(0.193)		
Constant	20.195***	20.059***	28.686***	23.559***	41.684***	4.913
	(4.452)	(4.097)	(5.502)	(7.380)	(13.876)	(4.502)
Observations	2,007	1,978	1,977	1,790	976	983
Adj. R^2	0.247	0.286	0.289	0.278	0.314	0.208
Year trend	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Clustered standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Prior studies confirm that size plays a significant role in shaping firm performance amidst risk and uncertainty (Ren et al., 2023). To examine the size-effect, we divide our sample into two groups, i.e., small and medium (S&M) firms and large (L) firms. We generate size terciles based on total assets and classify firms belonging to the first two terciles (third tercile) as S&M (L) firms. Similar classification is found in existing literature (e.g., Alam et al., 2024). Columns 5 and 6 report the regression outputs for S&M and L firms, respectively. The results reveal that the value reduction is mainly attributed to the small- and medium-sized firms. This finding is not bewildering as smaller firms are more susceptible to adverse changes in the economic and business environments (H. N. Dang et al., 2019).

Finally, we delve into the main focus of the study, i.e., whether politically connected energy firms are insured against the devaluation. Table 2 presents the results. In columns 1 and 3, the estimated coefficients on *lnESR* (*lnESR*Pol_Connection*) are significantly negative (positive), suggesting that firms making PAC contributions or lobbying members of Congress can mitigate the value erosion caused by high energy insecurity. In columns 2 and 4, the coefficients on *lnESR* (*lnESR*Pol_Expenditure*) also appear as significantly negative (positive), implying that firms with larger political spending are perceived as more valuable by the market. Overall, these findings conclude that political connectivity helps energy firms mitigate the value reduction stemming from high energy insecurity. Furthermore, firms with stronger political ties are perceived to be more valuable by investors during turbulent periods. These findings align with previous literature that validate the benefits

Table 2. Are politically connected firms more valuable?

	(1)	(2)	(3)	(4)
	PAC contribution		Lobbying	
lnESR	-1.956**	-4.541***	-3.063***	-2.785**
	(0.701)	(1.229)	(0.605)	(1.154)
Pol_Connection	-20.069**		-24.965***	
	(7.215)		(4.393)	
*lnESR*Pol_Connection*	2.581**		3.216***	
	(0.930)		(0.570)	
Pol_Expenditure		-5.396***		-2.883**
		(1.430)		(1.319)
*lnESR*Pol_Expenditure*		0.694***		0.373**
		(0.183)		(0.171)
Intercept	21.974***	43.186***	35.468***	30.905***
	(5.914)	(8.540)	(4.732)	(9.279)
Observations	719	936	643	856
Adj. R^2	0.222	0.276	0.293	0.218
Firm controls	Yes	Yes	Yes	Yes
Year trend	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

Notes: Clustered standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

of political connections amidst heightened risk and uncertainty (Li et al., 2021).

IV. Conclusion

This letter investigates the interlinkage between energy security risk, political connectedness, and market value of U.S. energy firms. Our findings indicate that firms suffer from diminished value when energy security is low, and this effect is mainly attributed to small and medium firms. Political connectivity helps mitigate such adverse effects. The findings also suggest that firms spending more on political donations and lobbying members of Congress are perceived to be more valuable in the market. Our paper contributes significantly to the extant literature by offering new evidence on the political insurance gained by connected energy firms amidst heightened energy insecurity. Further research is inevitable to ascertain similar causal inferences across industries and beyond borders, as well as to unveil the potential channel mechanisms.

Submitted: May 23, 2024 AEDT. Accepted: July 17, 2024 AEDT.
Published: December 31, 2024 AEDT.

References

Alam, A. W., Hassan, M. K., & Banna, H. (2024). An empirical investigation of banks' sustainability performance under economic policy uncertainty. *Journal of Sustainable Finance & Investment*, 1–24. https://doi.org/10.1080/20430795.2024.2309499

Alam, A. W., Houston, R., & Farjana, A. (2023). Geopolitical risk and corporate investment: How do politically connected firms respond? *Finance Research Letters*, *53*, 103681. https://doi.org/10.1016/j.frl.2023.103681

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, *131*(4), 1593–1636. https://doi.org/10.1093/qje/qjw024

Berkman, H., Jona, J., & Soderstrom, N. (2024). Firm-specific climate risk and market valuation. *Accounting, Organizations and Society*, *112*, 101547. https://doi.org/10.1016/j.aos.2024.101547

Brown, J. R., & Huang, J. (2020). All the president's friends: Political access and firm value. *Journal of Financial Economics*, *138*(2), 415–431. https://doi.org/10.1016/j.jfineco.2020.05.004

Caldara, D., & Iacoviello, M. (2022). Measuring geopolitical risk. *American Economic Review*, *112*(4), 1194–1225. https://doi.org/10.1257/aer.20191823

Chen, C. R., Li, Y., Luo, D., & Zhang, T. (2017). Helping hands or grabbing hands? An analysis of political connections and firm value. *Journal of Banking & Finance*, *80*, 71–89. https://doi.org/10.1016/j.jbankfin.2017.03.015

Dang, H. N., Vu, V. T. T., Ngo, X. T., & Hoang, H. T. V. (2019). Study the impact of growth, firm size, capital structure, and profitability on enterprise value: Evidence of enterprises in Vietnam. *Journal of Corporate Accounting & Finance*, *30*(1), 144–160. https://doi.org/10.1002/jcaf.22371

Dang, T. H. N., Nguyen, C. P., Lee, G. S., Nguyen, B. Q., & Le, T. T. (2023). Measuring the energy-related uncertainty index. *Energy Economics*, *124*, 106817. https://doi.org/10.1016/j.eneco.2023.106817

Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, *83*(3), 599–634. https://doi.org/10.1016/j.jfineco.2005.12.006

Doshi, H., Kumar, P., & Yerramilli, V. (2018). Uncertainty, capital investment, and risk management. *Management Science*, *64*(12), 5769–5786. https://doi.org/10.1287/mnsc.2017.2815

Enikolopov, R., Petrova, M., & Stepanov, S. (2014). Firm value in crisis: Effects of firm-level transparency and country-level institutions. *Journal of Banking & Finance*, *46*, 72–84. https://doi.org/10.1016/j.jbankfin.2014.04.028

Faccio, M. (2006). Politically Connected Firms. *American Economic Review*, *96*(1), 369–386. https://doi.org/10.1257/000282806776157704

Goldman, E., Rocholl, J., & So, J. (2009). Do Politically Connected Boards Affect Firm Value? *Review of Financial Studies*, *22*(6), 2331–2360. https://doi.org/10.1093/rfs/hhn088

Igeland, P., Schroeder, L., Yahya, M., Okhrin, Y., & Uddin, G. S. (2024). The energy transition: The behavior of renewable energy stock during the times of energy security uncertainty. *Renewable Energy*, *221*, 119746. https://doi.org/10.1016/j.renene.2023.119746

Jory, S. R., Khieu, H. D., Ngo, T. N., & Phan, H. V. (2020). The influence of economic policy uncertainty on corporate trade credit and firm value. *Journal of Corporate Finance*, *64*, 101671. https://doi.org/10.1016/j.jcorpfin.2020.101671

Li, X. L., Li, J., Wang, J., & Si, D. K. (2021). Trade policy uncertainty, political connection and government subsidy: Evidence from Chinese energy firms. *Energy Economics*, *99*, 105272. https://doi.org/10.1016/j.eneco.2021.105272

Lin, C. Y., Ho, P. H., Shen, C. H., & Wang, Y. C. (2016). Political connection, government policy, and investor trading: Evidence from an emerging market. *International Review of Economics & Finance*, *42*, 153–166. https://doi.org/10.1016/j.iref.2015.09.008

Ma, R., Fu, X., Ji, Q., & Zhai, P. (2024). Do climate-exposed firms hold more cash? Global evidence. *Economics Letters*, 111651. https://doi.org/10.1016/j.econlet.2024.111651

Pringpong, S., Maneenop, S., & Jaroenjitrkam, A. (2023). Geopolitical risk and firm value: Evidence from emerging markets. *The North American Journal of Economics and Finance*, *68*, 101951. https://doi.org/10.1016/j.najef.2023.101951

Ren, X., Cao, Y., Liu, P. J., & Han, D. (2023). Does geopolitical risk affect firms' idiosyncratic volatility? Evidence from China. *International Review of Financial Analysis*, *90*, 102843. https://doi.org/10.1016/j.irfa.2023.102843

Yu, X., Yao, Y., Zheng, H., & Zhang, L. (2020). The role of political connection on overinvestment of Chinese energy firms. *Energy Economics*, *85*, 104516. https://doi.org/10.1016/j.eneco.2019.104516

Zhang, D., Cao, H., Dickinson, D. G., & Kutan, A. M. (2016). Free cash flows and overinvestment: Further evidence from Chinese energy firms. *Energy Economics*, *58*, 116–124. https://doi.org/10.1016/j.eneco.2016.06.018

Appendix

Table A1. Variable definitions.

Variable	Definition
lnESR	Natural log of the U.S. annual energy security risk indicator
Firm_Value	Market-to-book ratio of a firm in a year
Size	Natural log of a firm's total assets
Capital	Equity to total assets ratio
Liquidity	Free cash flow
Investment	Capital expenditure scaled by total assets
Innovation	Spending on research and development (R&D) scaled by total sales
Revenue	Natural log of total sales
Profitability	Net profit margin
Power	Measured by the Herfindahl-Hirschman index (HHI) based on 2-digit SIC codes
lnPAC	Natural log of a firm's PAC campaign contribution in a year
lnLOB	Natural log of a firm's lobbying expense in a year
GPR	Annual country-specific geopolitical risk index score for the U.S., developed by Caldara and Iacoviello (2022)
CVI	Annual climate vulnerability index score for the U.S., offered by the Notre Dame Global Adaptation Initiative (ND-GAIN)
lnEPU	Natural log of annual U.S. national economic policy uncertainty index score constructed by Baker et al. (2016)

Note: Variables have been winsorized at the top and bottom 1%.