Managing Climate Change Risks: Sea Level Rise and Mergers and Acquisitions

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"*The evidence on climate risk is compelling [for] investors to reassess core assumptions about modern finance*"

-Laurence D. Fink
(Founder and Chief Executive Officer of BlackRock)

Introduction

Using a large sample over the period 1986 to 2017, we show that companies with higher exposure to climate change risk induced by sea-level rise (SLR) tend to acquire firms that are unlikely to be directly affected by SLR. We find that acquirers with higher SLR exposure experience significantly higher announcement-period abnormal stock returns. Analyses using failed merger bids as an exogenous shock show that post-merger, analyst forecasts become more accurate and environmental-related as well as overall ESG scores improve.

Findings

1. Firms diversify SLR risks by acquire
2. Market reacts positively to this merger
3. Post merger performance increases for the combined firm

Hypothesis

Probability of Merger

1. SLR risk motivates acquisitions
2. SLR risk reduces probability to be acquired
3. SLR risk firms tend to acquire firms without SLR risk

Market Reaction

1. Market reacts positively to deals driven by SLR risk

Post-Merger

1. Forecasts become more accurate for combined firm
2. Environmental-related ESG score improves

Data and Sample

M&A deals between 1986 and 2017-SDC

SLR risk-National Oceanic and Atmospheric Administration(NOAA) SLR database

1st, Latitudes and longitudes of polygon vertices will be flooded

2nd, Shortest distance between the firm's zip and the polygons of projected sea line

3rd, *Inundated6ft* equals one if six feet or less of SLR would flood the firm' headquarter

Merger likelihood sample:

(1) Size and industry match
(2) Size, industry, and M/B match

Regression

$$Merger\ pair_{i,jm,t} = a + \beta_1 SLR\ Risk_{i,jm,t-1} + \beta_2 \boldsymbol{X}_{i,j,t-1} + \rho_{t\times s} + \psi_k (\text{or } \nu_m) + e_{i,jm,t}, \quad (4)$$

Results

Panel A.	Pair	Pair	Pair	Pair	Pair	Pair	Pair
	Conditional logit	Logit	Logit	OLS	OLS	OLS	OLS
Size and industry matched	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SLR	0.206*	0.118**	0.119*	0.030*	0.031	0.024**	0.025*
	(0.117)	(0.059)	(0.067)	(0.018)	(0.021)	(0.012)	(0.013)
	0.040	0.022	0.022				
Acquirer control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Deal	Deal	Zip	Deal	Zip	Deal	Zip
Fixed effects	Deal, State	State, Year, Industry	State, Year, Industry	Deal, State×Year	Deal, State×Year	Industry, State×Year	Industry, State×Year
No of observations	12,308	13,432	13,357	13,109	13,031	13,166	13,091
R-squared				0.162	0.163	0.086	0.088
Pseudo R-squared	0.052	0.018	0.019				

Market Reaction

CARs	[-1,+1]	[-1,+2]	[-1,+3]	[-2,+1]	[-2,+3]	[-3,+1]	[-3,+1]	[-3,+2]	[-3,+3]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Inundated6ft	0.494*	0.654**	0.730**	0.672**	0.828***	0.925***	0.647**	0.806**	0.900***
	(0.292)	(0.317)	(0.330)	(0.297)	(0.308)	(0.320)	(0.323)	(0.327)	(0.340)

Quasi-Experiment-Failed Bids

$$Firm\ Outcome_{i,t} = a + \beta_1 Post-Merger_{i,t} \times Complete_j \times SLR\ Risk_i + \beta_2 Post-Merger_{i,t} \times SLR\ Risk_i + \beta_3 Post-Merger_{i,t} + \beta_4 Complete_j + \beta_5 Post-Merger_{i,t} \times Complete_j + +\beta_6 \boldsymbol{X}_{i,t-1} + \rho_t + \psi_i + \nu_s + e_{im,t}, \quad (5)$$

	No of analysts	No of analysts	Ln(No of analysts)	Ln(No of analysts)	Range	Range	Standard deviation	Standard deviation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inundated6ft×Post×Complete	1.576**	1.156**	0.149**	0.092**	-0.021**	-0.022**	-0.068**	-0.070**
	(0.652)	(0.575)	(0.072)	(0.045)	(0.009)	(0.010)	(0.033)	(0.034)

ESG Scores Post Merger

Panel B	ESG	Env_diff	ESG	Env_diff
	OLS	OLS	Ordered Probit	Ordered Probit
	(1)	(2)	(3)	(4)
Inundated6ft*Post	0.493**	0.099**	0.394**	0.217*
	(0.224)	(0.049)	(0.175)	(0.123)

Conclusion

1. We develop and test the hypothesis that firms manage the sea level rise risk through acquisitions.
2. The market rewards acquisitions made by firms with high SLR risk exposure, as we observe a significant and positive relationship between the acquirers' cumulative announcement return and pre-merger SLR risk.
3. This positive relation is more pronounced for firms with higher analyst coverage.
4. SLR-induced mergers tend to complete faster, and that post-merger, the combined firm experiences a greater increase in analyst coverage, forecast precision, and ESG score when the acquiring firm has a high SLR exposure before the merger.