***Science and the stock market: Investors’ recognition of unburnable carbon***

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## Overview

## This paper documents the stock market’s reaction to findings reported in a 2009 article in the prestigious Nature journal of science reporting that only a fraction of the world’s existing oil, gas, and coal reserves could be emitted if global warming by 2050 were not to exceed 2oC above pre-industrial levels.

## Methods

## We examine those oil and gas firms composing the Datastream Energy Index, consisting of 72 U.S. firms in the Global Industry Classification Standard code 10120 (comprising the sub-codes Integrated Oil and Gas, and Oil and Gas Exploration and Production). Based on this sample, we use an event study method to test our hypotheses by focusing on the relationship between energy firms’ daily excess stock returns and news stories about unburnable carbon.

## Results

## We find a statistically significant negative abnormal stock price response in the three-day window around the Nature publication date. We do not find a statistically significant negative abnormal stock price response in the three-day window around all subsequent news stories about unburnable carbon, although the mean excess return in response to these subsequent media stories is significantly negative over days -1 to 10, and such delayed negative reaction decreases further for firms with proved reserve disclosures in their financial statements. The three-day price reactions to unburnable carbon news are limited economically. For example, based on the coefficients from a regression analysis, the price reactions aggregate to a shareholder loss of $27 billion or 2.48% of total market capitalization of our sample of 63 large U.S. oil and gas firms.

## Conclusions

## This small but detectable market response stands in stark contrast with the prediction of some analysts and commentators of a substantial decline in the shareholder value of fossil fuel firms from stranded carbon (e.g., HSBC, 2013). We also find it interesting that one of the most cited environmental science studies in recent years seems to have had only limited sway with energy company investors, at least those who invest in U.S. oil and gas stocks, and regulators tasked with improving company disclosures about the risks of climate change for balance sheet valuations.

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