Commodity Markets and Investment Behavior: The Unintended Consequences of Financialization

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Abstract

This paper examines the effect of commodity financialization on the cost of capital and investment behavior of firms exposed to commodity price risk. Due to financialization, commodity markets' co-movement with other financial markets increases. This, in turn, increases the systematic risk of commodity-exposed firms' revenues and returns. The resulting 4.7% higher cost of equity translates to a 36.6% decrease in investment. I explain these empirical regularities in a parsimonious investment model.

Introduction

In this paper, I show that commodity financialization led to a structural increase in the cost of equity for firms with a high exposure to the commodity markets (e.g. commodity producers). Furthermore, in turn I find a decrease in their investment. The channel through which commodity financialization affects investment decisions of producers can be split in three parts. First, financialization increases the co-movement between commodity index and market index returns (Fig. 1). Thus, the commodity-exposed firms' returns, start co-moving more with the market returns through their affected cashflows. Second, the producer's cost of equity increases along with their CAPM β which drives their weighted average cost of capital (WACC) (Fig. 3). Finally, I see this increase in WACC translate to a decrease in investment (Fig. 4). Such a decrease in investment by commodity exposed firms could prove welfare destroying as we are on the precipice of a commodity-intensive green transition.

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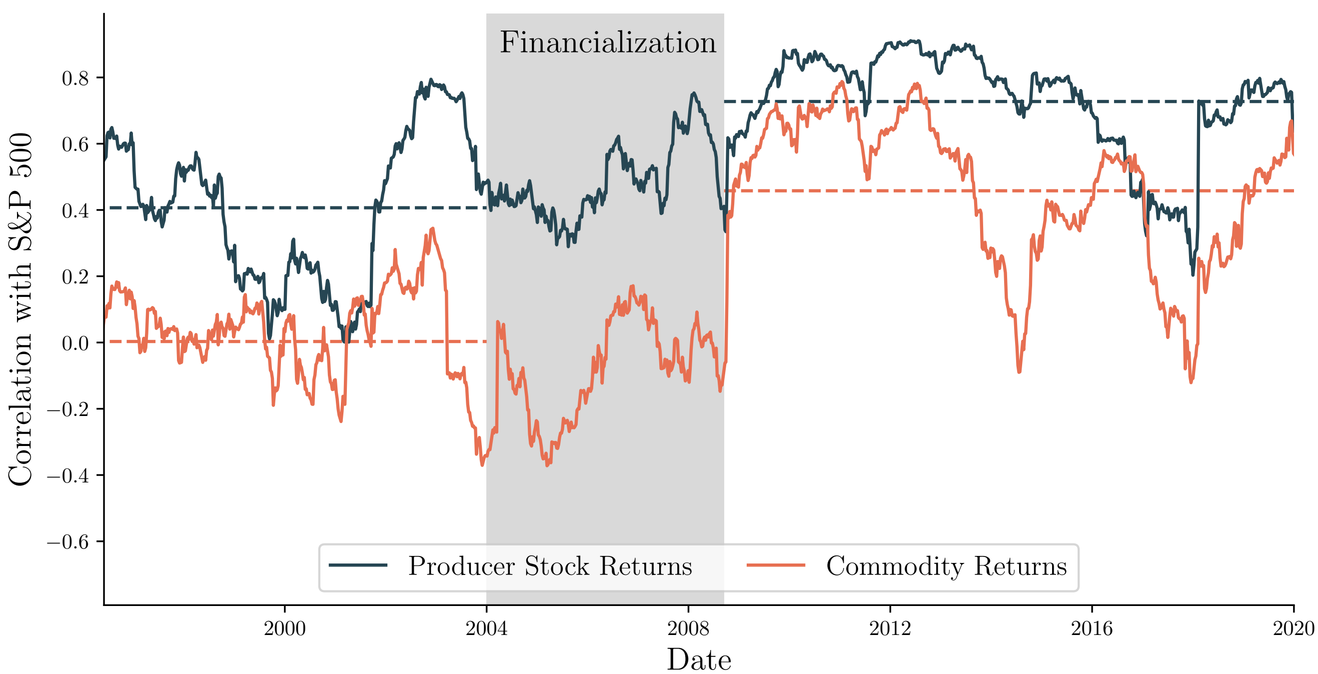
Figure 1: Commodity and Producer Return Co-movement with the S&P 500



Methodology: The correlations were calculated using a 1-year rolling window on weekly return data. The commodity index is the S&P GSCI and the commodity producer index is a constructed index using tickers that are classified under "Oil, Gas & Consumable Fuels" in GICS. They were selected based on data availability and the index was weighted using their market capitalization.

The road from commodity futures to commodity financialization has been long. The first commodity futures date back to Japan's pre-industrial Dojima rice exchange and have since become a key tool for both commodity producers and consumers to hedge against price changes. While large future exchanges like the Chicago Board of Trade (1848) or the London Metal Exchange (1877) have long existed, commodity futures were often out of reach for ordinary investors. This changed with the creation of commodity indices such as the S&P GCSI and the Dow Jones Commodity Index. These are constructed by rolling over near-term future contracts of a wide range of commodities. Their popularity saw an increase in the early 2000s as investors were looking for alternatives following the dot-com bubble and it became known that commodities had a plethora of attractive characteristics (Erb & Harvey, 2006; Gorton & Rouwenhorst, 2006; Bessembinder, 1992; De Roon, Nijman, & Veld, 2000). Moreover, the futures indices are a convenient tool for those who wish to speculate on the commodity market. This led to an inflow of capital into the commodity futures market and through portfolio rebalancing aligned its returns with the market returns (Irwin & Sanders, 2011; Tang & Xiong, 2012).

As index traders enter the commodity future sphere and compete for contracts, there are two effects on commodity prices. First, commodity prices increase (decrease) when the general market does well (poorly), as those returns are partially reinvested into (divested from) commodities; driving up market co-movement. Second, future prices increase as now hedgers and commodity consumers must compete for the same supply. This drives up their hedging costs and decreases the commodity producer's hedging costs. For the commodity producers, this means that its revenues start co-moving more closely with the market, and consequently their stock returns start co-moving more strongly as well.

As investors see the returns of commodity producers correlate more closely to the market and thus their betas increase, they start expecting a higher return on their investments (Sharpe, 1964; Lintner, 1965; Fama & French, 2004). This leads to an increase in the cost of equity for these commodity producers, who will in turn invest in fewer projects (Modigliani & Miller, 1958). It is important to note that this is not the consequence of changing fundamentals but rather due to market integration. Moreover, whereas financialization of a firm itself leads to a decrease in its cost of capital (Boot, Gopalan, & Thakor, 2008; Hail & Leuz, 2009), the financialization of its main product leads to an increase. In this paper, I give a partial answer to what the real effects of commodity financialization were.

This paper contributes to two different strands of literature: financialization and corporate investment behavior. First, the effect of financialization on firm investment behavior is an extension of the existing financialization literature. While financialization itself has been extensively documented by Henderson, Pearson, and Wang (2014), Tang and Xiong (2012), and Irwin and Sanders (2011), its effects on the real economy are largely undocumented. Goldstein and Yang (2022) explore some of the effects on the real economy using a theoretical framework with financial speculators and hedgers. They find that higher future prices caused by financialization, lead producers to supply more commodity, which in turn reduces the future spot price. My paper extends the connection between commodity financialization and its real-world effects by looking at companies' investment decisions.

Second, there is a large literature describing the effects of the stock market on corporate decisions (Hayashi, 1982; Dow & Gorton, 1997). However, considering the importance of market co-movement in asset pricing (Markowitz, 1952; Fama & French, 2004), research documenting the relationship between a stock's market co-movement and its investment behavior is scant. Berk, Green, and Naik (1999) posit a model that explains the relationship between the systemic risk of a firm's capital stock and the firm's book-to-market ratio. They find that investments with high systemic risk are less desired by firms. In this paper, I show that as the systemic risk of commodities increases through commodity market integration, exposed firms' investments decrease.

Data

In this paper, I rely on three main data providers: Bloomberg Terminal for our time-series analysis, CRSP for my cross-sectional results, and Compustat. I am interested in firms with an exposure to commodity markets and thus a particular subset are commodity producers. In order to create a representative index for commodity producers, I collect data from all companies contained in the *FlexShares Morningstar Global Upstream Natural Resources Index Fund* ETF between 1990 and 2022. When calculating the index characteristics over time, I limit myself to those tickers in the ETF that have data for the characteristic over the entire period of interest and also have market capitalization data so I can weight them appropriately. It is important to note, that this might lead to different index compositions between plots, but the number of constituents will always be mentioned in the notes. Figure 5 shows the total return and volatility of the most prominent commodity index, the S&P GSCI, over time.

My second dataset is CRSP weekly stock returns from 1980 to 2022. This dataset allows me to look at all publicly traded US firms. I use these data to calculate the exposure of every firm to the commodity index using a factor approach for firm i:

$$r_{i,t} - r_{rf,t} = \alpha + \beta_1(r_{m,t} - r_{rf,t}) + \beta_2(r_{c,t} - r_{rf,t}) + \varepsilon_{i,t} \tag{1}$$

where r_m, r_i, r_{rf}, and r_c are the 10-year treasury bill (FRED), the returns of firm i, the S&P 500 and the S&P GSCI, respectively. β_2 is what will be considered a firm's exposure to the commodity market. Additionally, I calculate the cost of equity implied by the stock returns as:

$$\text{Cost of Equity}_i = \bar{r}_{rf} + \underbrace{\frac{\text{Cov}(r_i, r_m)}{\text{Var}(r_m)}}_{\text{CAPM } \beta}(\bar{r}_m - \bar{r}_{rf}) \tag{2}$$

using the CAPM betas calculated using weekly returns data. I do not include a commodity factor since there is no risk premium related to it (Fig 7).The summary statistics from this data can be seen in Table 1.

Table 1: Summary Statistics

Variable	Period	Mean	Std. Dev.	Min	Max
Market Return	Pre	0.112	0.163	-0.245	0.354
	Post	0.086	0.203	-0.429	0.320
	All	0.101	0.179	-0.429	0.354
Risk-Free Rate	Pre	0.058	0.014	0.040	0.084
	Post	0.024	0.007	0.009	0.036
	All	0.043	0.020	0.009	0.084
Commodity Index Return	Pre	0.098	0.242	-0.379	0.430
	Post	-0.042	0.246	-0.560	0.358
	All	0.037	0.251	-0.560	0.430
Commodity Exposure	Pre	0.063	0.389	-7.074	5.538
	Post	0.100	0.431	-4.597	12.565
	All	0.082	0.411	-7.074	12.565
Market Index Correlation	Pre	0.329	0.184	-0.405	0.962
	Post	0.468	0.192	-0.394	0.978
	All	0.399	0.200	-0.405	0.978
Cost of Equity	Pre	0.090	0.182	-1.193	2.249
	Post	0.108	0.261	-2.971	7.180
	All	0.099	0.225	-2.971	7.180
5-year Capex Intensity	Pre	1.889	2.546	0.002	32.946
	Post	1.583	2.287	0.000	33.036
	All	1.745	2.432	0.000	33.036

Methodology: Daily CRSP data is aggregated to the weekly level and used to calculate the commodity exposure, the market index correlation and CAPM beta together with the S&P 500 and S&P GSCI index return data. The data is then further aggregated to the annual level and presented in the above table. Post-financialization is every week/year after September 15 2008.

My third dataset is the Compustat US annual data from S&P Global Market Intelligence. While my Bloomberg data allows me to widen my scope to non-US producers, this data allows me to look more closely at the within-firm dynamics of exposed firms. I calculate 5-year capital expenditure intensity as the sum of the capital expenditure in the next 5 years divided by the net property, plant, and equipment. I winsorize at their 1st and 99th percentile to remove those observations with unreasonable values. Financials and utilities are also dropped from the sample for non-comparative business models and high levels of regulation, respectively.

Additionally, to capture the financialization of commodity markets through their indexation, I will rely on data from the Commodity Futures Trading Commission (henceforth CFTC) which reports weekly open interest of both index and non-index traders. This data contains agricultural futures from the Chicago Board of Trade and starts in 2006. This allows us to see the second part of the financialization period but not the earlier one in 2004. However, the earlier upward trend can be seen in Irwin and Sanders (2011), whose sample went back to 2004.

Empirical Methodology and Results

Commodity financialization increased the market co-movement of commodity exposed firms (1), which in turn increased their risk premium and cost of equity (2). As the exposed firms are confronted with a higher cost of capital they decrease their investments (3). In this section, I present the main empirical results corroborating these three causal links. While financialization was a slow event that happened between 2004 and 2008 as shown by the CFTC open interest data (Fig. 6) and in Tang and Xiong (2012), I will use the fall of Lehman Brothers as the start of my treatment. Seeing the precipitous increase in market co-movement on this date (Fig. 1) buttresses its importance.

Commodity financialization as a market integration event led to an increase in co-movement between the commodity future prices and the S&P 500 more generally. Moreover, I am able to show a higher than normal increase in market co-movement for commodity exposed firms after financialization in Table 2 using the following specification on weekly data:

$$\text{Corr}_{i,t}^{\text{market}} = \alpha + \beta_1 \text{Post}_t + \beta_2 \text{Exposure}_{i,t}^{\text{comm}} + \beta_3 (\text{Post}_t \times \text{Exposure}_{i,t}^{\text{comm}}) + \eta_t + \varepsilon_{i,t} \tag{3}$$

where exposed firms are defined as those in the top ventile of the commodity exposure (β_2) distribution. The firms in the bottom ventile are considered the control group. After financialization, exposed firms correlate more strongly with the market than the control group. I see a 65.34% increase in commodity exposed firms' co-movement after financialization while the control group only saw a 23.2% increase.

Table 2: Diff-in-Diff Results (Market Correlation)

	(1)	(2)
High Commodity Exposure	-0.054***	-0.064***
	(0.009)	(0.009)
Post-Financialization	0.071***	0.086***
	(0.011)	(0.012)
High Commodity Exposure × Post-Financialization	0.093***	0.087***
	(0.013)	(0.014)
Constant	0.305***	
	(0.007)	
R-Squared	0.081	0.209
Observation	833,599	833,599
Year FE		Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

As firms co-move with the market, their systemic risk, betas and eventually cost of equity increases. This can be seen in Figure 3. When comparing the means of the bottom, middle and top ventile (Fig. 2), it shows that exposed firms' cost of equity increases after financialization while the control group's cost of equity actually decreases. I further test this hypothesis with the following specification on annual data:

$$\text{Cost of Equity}_{i,t} = \alpha + \beta_1 \text{Post}_t + \beta_2 \text{Exposure}^{\text{comm}}_{i,t} + \beta_3 (\text{Post}_t \times \text{Exposure}^{\text{comm}}_{i,t}) + \varepsilon_{i,t} \tag{4}$$

for which we find the results in Table 3. Exposed firms see a statistically significant 4.7% higher cost of equity after financialization. This is significantly higher than the 1.8% decrease in cost of equity for the control group. Since our treated group is fixed per firm and treatment variable is determined per year, no fixed effects were added.

Table 3: Diff-in-Diff Results (Cost of Equity)

	(1)
High Commodity Exposure	-0.011*
	(0.006)
Post-Financialization	-0.018***
	(0.006)
High Commodity Exposure × Post-Financialization	0.065***
	(0.007)
Constant	0.082***
	(0.005)
R-Squared	0.009
Observation	18,179

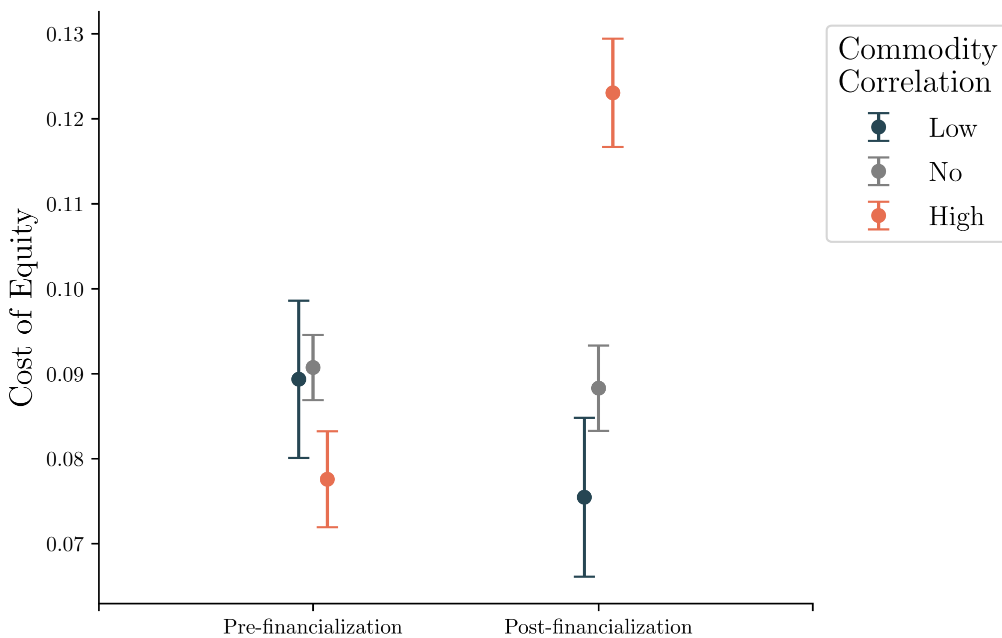
Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

With the cost of equity for commodity exposed firms increasing, their investment decisions will adjust downwards as financing capital becomes more costly. This can be seen in Figure 4 for commodity producers and I will show it holds more generally for commodity exposed firms with the following specification:

$$\text{5-year CapEx Intensity}_{i,j,t} = \alpha + \beta_1 \text{Post}_t + \beta_2 \text{Exposure}^{\text{comm}}_{i,j,t} + \beta_3 (\text{Post}_t \times \text{Exposure}^{\text{comm}}_{i,j,t}) + \nu_j + \varepsilon_{i,t} \tag{5}$$

where ν_j are the industry fixed effects. The results are given in Table 4. While commodity exposed firms already invested less relative to the control group before the treatment, we can see

Figure 2: Effect of Financialization on the Cost of Equity



Methodology: The cost of equity is calculated using a simple CAPM model: $r_e = r_{rf} + \beta(r_m - r_{rf})$ *where* β *is the OLS coefficient when regressing excess firm returns on excess market returns. Commodity exposure is calculated as* β_2 *in an expanded CAPM model:* $r_i - r_{rf} = \alpha + \beta_1(r_m - r_{rf}) + \beta_2(r_c - r_{rf})$ *where* r_m *and* r_c *are the returns on the S&P 500 and S&P GSCI, respectively. High- and low-commodity exposure are the top and bottom ventile in the sample. I use the middle ventile to represent the no-correlation firms.*

a 36.9% decrease in investment with respect to the mean after financialization. Adding industry fixed effects switches the sign of our commodity exposure but this can be explained by the high correlation between industries and commodity reliance. Thus the fixed effects soak up a lot of the effect found in column (1).

Table 4: Diff-in-Diff Results (5-year CapEx Intensity)

	(1)	(2)
High Commodity Exposure	-0.750***	0.533*
	(0.206)	(0.319)
Post-Financialization	-0.114	-0.436**
	(0.218)	(0.213)
High Commodity Exposure × Post-Financialization	-0.649***	-0.290
	(0.242)	(0.233)
Constant	2.815***	1.957***
	(0.188)	(0.241)
R-Squared	0.046	0.111
Observation	7,872	7,864
Industry FE		Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Theory

The financialization of commodities had two main effects for commodity producers: an increase in commodity prices (or decrease in hedging costs) and an increase in their co-movement with the market. My model will create a structural framework through which to disentangle both effects and estimate their magnitudes. A simple firm optimization model with atomistic competition will be our starting point. I have a simple profit maximizing commodity producer with a production function $F(K_t) = AK_t^{\alpha}$ with decreasing returns to scale where K_t is capital at time t. This will ensure the absence of economies of scale, a requirement for perfect competition. This results in prices for our producer P_t being exogenous but not representative of market price levels (i.e.

idiosyncratic). Price growth follows the following process:

$$\log\left(\frac{P_{t+1}}{P_t}\right) = \varepsilon_{t+1} \quad \text{where} \quad \varepsilon_{t+1} \sim \mathcal{N}(0, \sigma_P) \tag{6}$$

To model the change in commodity prices, I will shock commodity prices as the result of commodity financialization at the unforeseen time $\tilde{t}$.

Furthermore, I assume an endowment economy with a representative agent with power utility:

$$\Delta c_{t+1} = \log\left(\frac{C_{t+1}}{C_t}\right) = \mu + \eta_{t+1} \quad \text{where} \quad \eta_{t+1} \sim \mathcal{N}(0, \sigma_M) \tag{7}$$

which implies the following SDF:

$$m_{t,t+1} = \log\left(M_{t,t+1}\right) = \log\beta - \gamma\Delta c_{t+1} \tag{8}$$

where γ and β are the risk aversion and time discount rate, respectively. As I am interested in a change in market co-movement, I want to shock the correlation between the market shocks η_t and the idiosyncratic shocks ε_t:

$$\text{Corr}(\varepsilon, \eta) = \begin{cases} \rho_{pre} & \text{if } t < \tilde{t} \\ \rho_{post} & \text{if } t \geq \tilde{t} \end{cases} \quad \text{where} \quad \rho_{pre} < \rho_{post} \tag{9}$$

The producer has the following maximization problem:

$$\begin{aligned} \max_{\{I_t\}} \quad & \mathbb{E}_0 \sum_{t=0}^{\infty} M_{0,t} D_t, \quad \text{where} \quad D_t = P_t F(K_t) - I_t \\ s.t. \quad & K_{t+1} = (1-\delta)K_t + I_t \end{aligned}$$

I can rewrite this as a value maximization function:

$$V_0^* = \max_{\{K_{t+1}\}} \quad \mathbb{E}_0 \sum_{t=0}^{\infty} M_{0,t}\left[P_t F(K_t) + (1-\delta)K_t - K_{t+1}\right] \tag{10}$$

where V_0^* is the optimal firm value at time 0. We find the following first-order condition for capital:

$$\frac{\partial V_0}{\partial K_{t+1}} = \mathbb{E}_0\left[M_{0,t} + M_{0,t+1}P_t\alpha A(K_{t+1}^*)^{\alpha-1} + M_{0,t+1}(1-\delta)\right] = 0$$

which I will rewrite as:

$$K_{t+1}^* = \left[\frac{1 - \overbrace{\mathbb{E}_t[M_{t,t+1}]}^{\text{Market Risk}}(1-\delta)}{\alpha A \underbrace{\mathbb{E}_t[M_{t,t+1}P_{t+1}]}_{\text{Market}\times\text{Firm Risk}}}\right]^{\frac{1}{\alpha-1}} \tag{11}$$

Using the processes described in equations (6) and (7) and the definition of the mean of a log-normal distribution, I further simplify the policy function:

$$\mathbb{E}_t[M_{t,t+1}] = \exp\left(\log\beta - \gamma\mu + \frac{\gamma^2\sigma_M^2}{2}\right)$$
$$\mathbb{E}_t[M_{t,t+1}P_{t+1}] = P_t\exp\left(\log\beta - \gamma\mu + \frac{1}{2}(\gamma^2\sigma_M^2 + \sigma_P^2 - 2\rho\gamma\sigma_P\sigma_M)\right)$$

which helps us rewrite our policy function:

$$K_{t+1}^* = \xi P_t^{\frac{1}{1-\alpha}} \quad \text{where} \quad \xi = \left[\frac{\alpha A\exp\left(\log\beta - \gamma\mu + \frac{\gamma^2\sigma_M^2 + \sigma_P^2 - 2\rho\gamma\sigma_P\sigma_M}{2}\right)}{1 - \exp\left(\log\beta - \gamma\mu + \frac{\gamma^2\sigma_M^2}{2}\right)}\right]^{\frac{1}{1-\alpha}} \tag{12}$$

When evaluating this policy function, I am particularly interested in the effect of $\rho = \text{Corr}(\varepsilon_{t+1}, \eta_{t+1})$ on K_{t+1}^* since it represents the correlation between market- and firm-level shocks and is comparable with market co-movement as introduced in the sections above. So as ρ increases, the market co-movement decreases. In Equation (12), I can see that an increase in market co-movement would result in a decrease in optimal investment by the producer.

Going forward, I plan on solving this model and calibrating it specifically for commodity producers as I have data on their capital stock, employment, and market co-movement. Then I will be able to evaluate the joint effect of a commodity price increase and an increase in market co-movement to a commodity producer's investment behavior.

Conclusion

From previous research on the real effects of market integration, e.g. financialization of the commodity market. It is known that it should have no real impact on the investment decisions of firms. Commodity financialization gives us a unique opportunity to study these real effects. I show that this event, did in fact lead to an increase in market co-movement and cost of equity for exposed firms, and finally a decrease in investment. Structural changes in financial markets have real effects on the economy and measuring these is crucial. Going forward it will be important to further document other real effects of commodity financialization.

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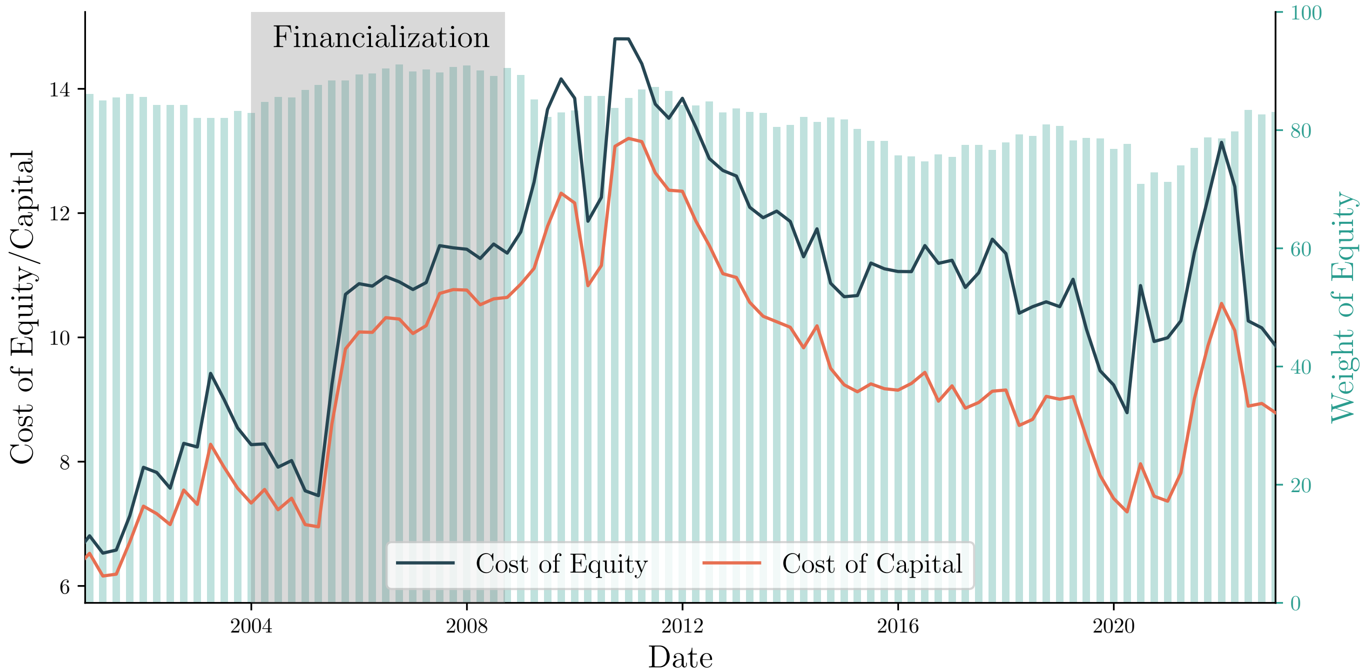
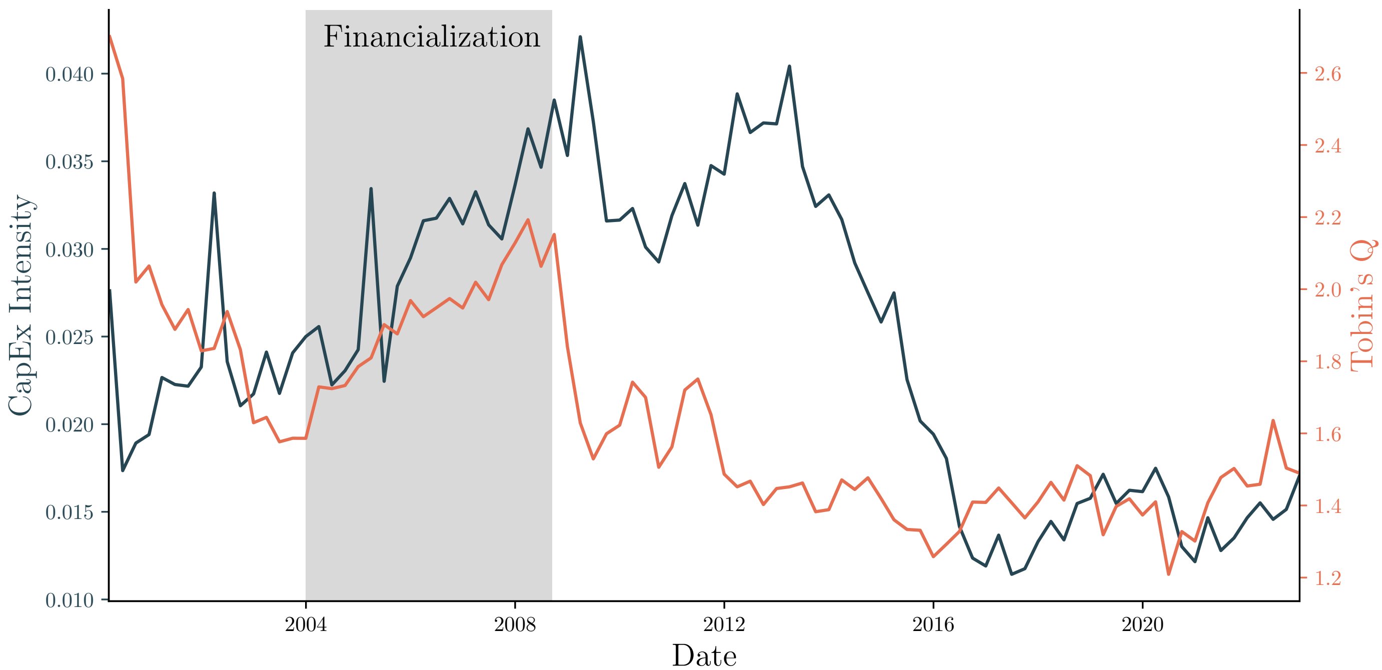
Appendix A: Additional Figures

Figure 3: WACC Decomposition for Commodity Producers



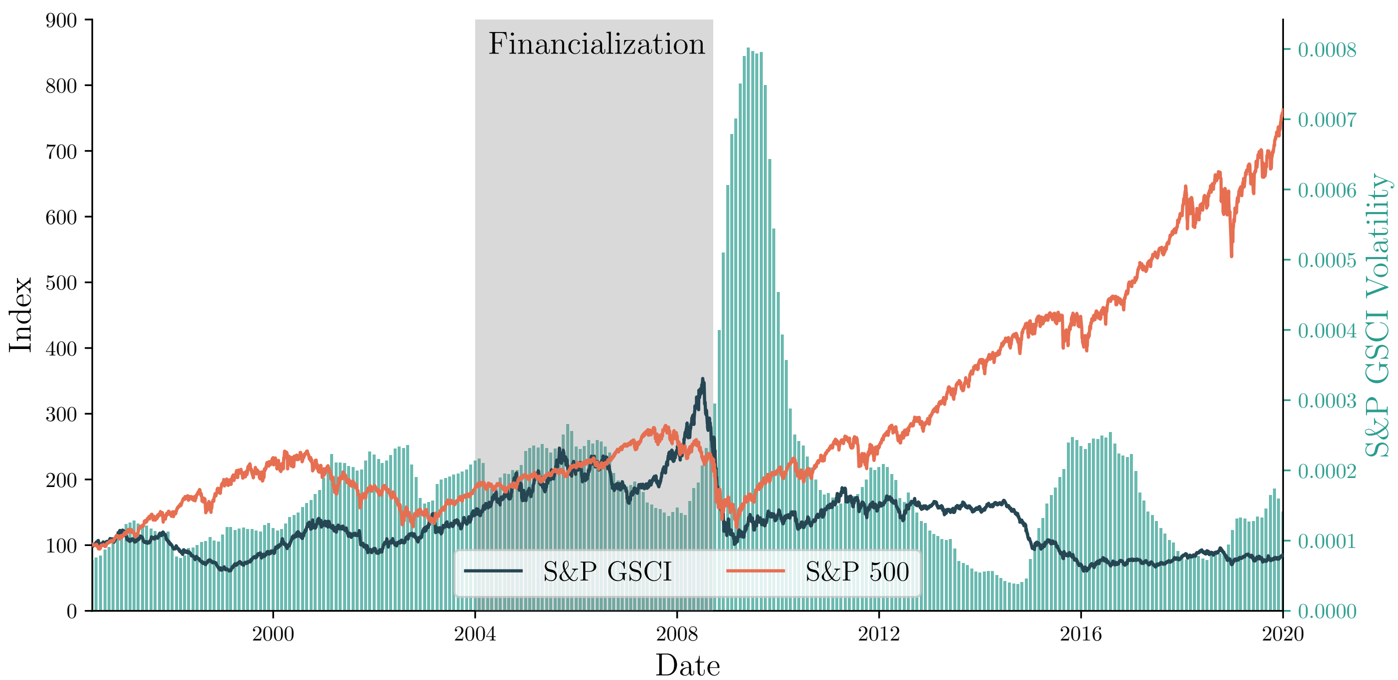
Methodology: We use quarterly WACC data reported by Bloomberg for 59 commodity producers. The index value uses market capitalization as weight. Commodity producers are selected based on data availability and inclusion in the "FlexShares Morningstar Global Upstream Natural Resources Index Fund". Weighted average cost of capital is defined as the weighted sum of the cost of equity and debt including a tax rate correction for debt. The cost of equity is assumed to be the expected return on equity of the stock according to the CAPM model.

Figure 4: Capital Expenditure Intensity for Commodity Producers



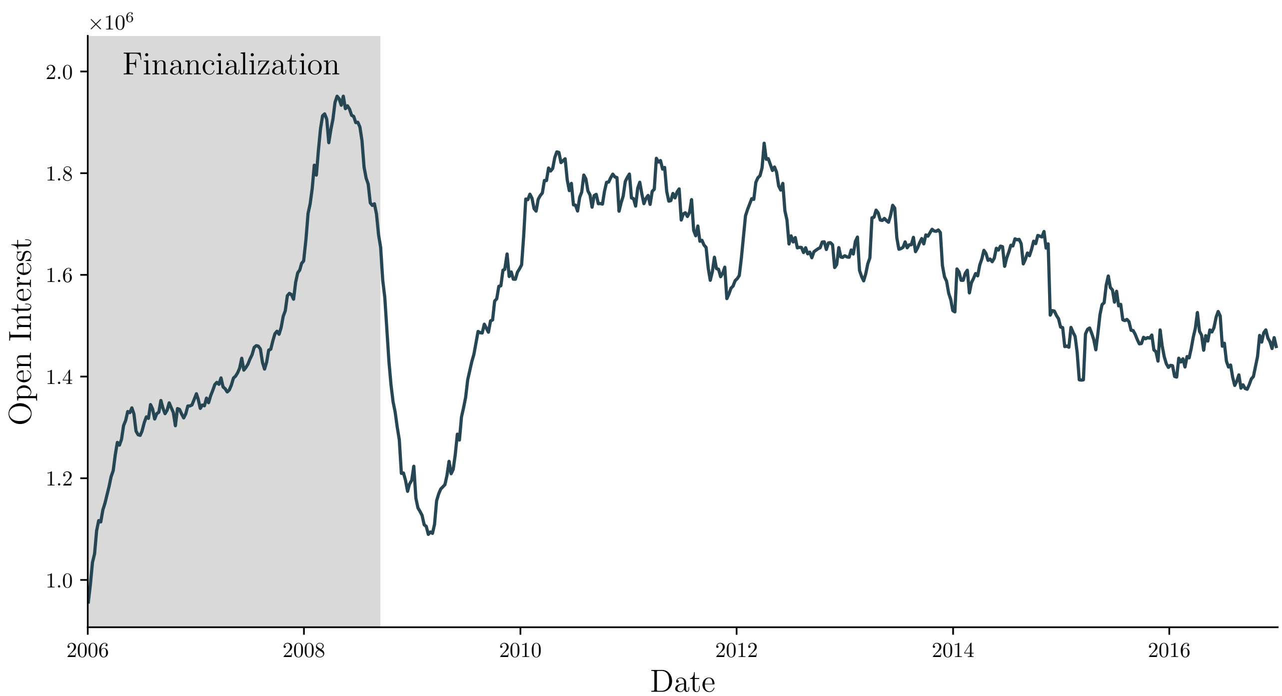
Methodology: We use quarterly Capital Expenditure and Gross Fixed Assets data reported by Bloomberg for 49 commodity producers. The index value uses market capitalization as weight. For the Tobin's Q Ratio we have an index of 65 commodity producers. Commodity producers are selected based on data availability and inclusion in the "FlexShares Morningstar Global Upstream Natural Resources Index Fund".

Figure 5: S&P Index Facts



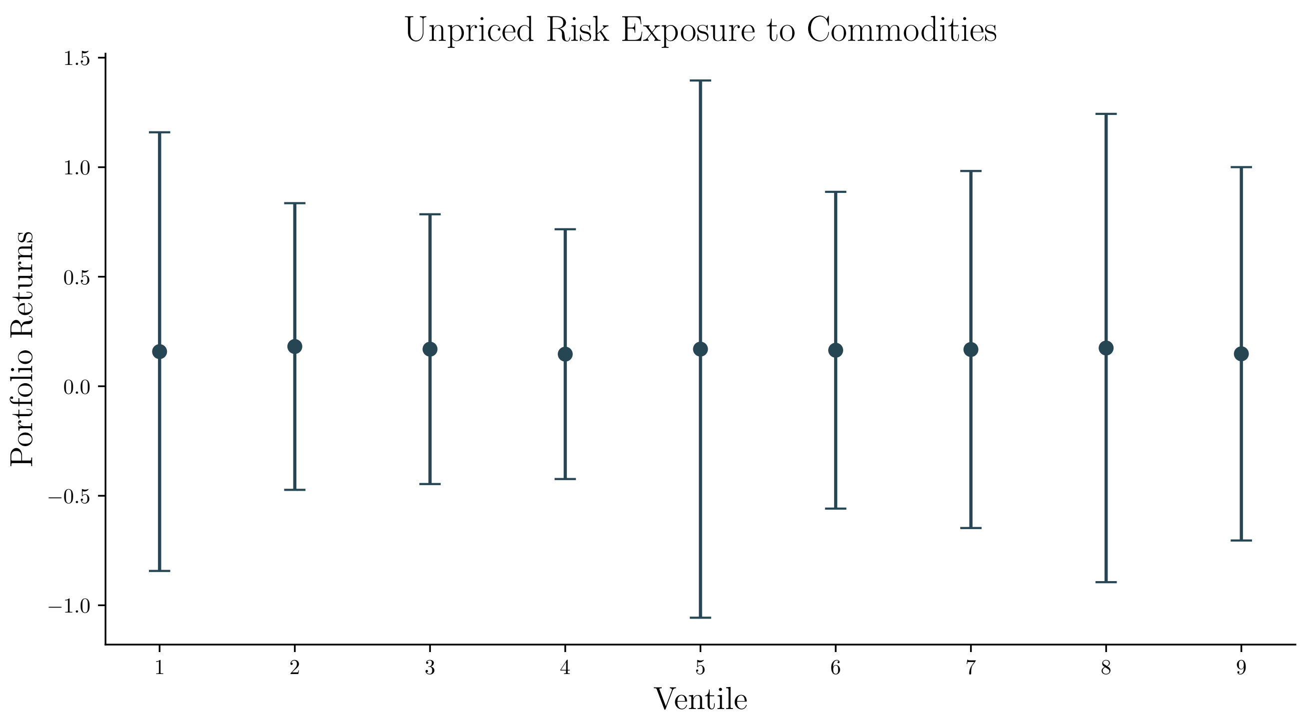
Methodology: I collect total return data from the S&P GSCI and S&P 500 indices and calculate its volatility over a one-year rolling window. The indices are 100 on July 1st 1996.

Figure 6: Commodity Index Traders Long Open Interest



Methodology: We use weekly commitment of traders data from the Commodity Futures Trading Commission to gauge the increase in commodity index popularity. it should be noted that the futures included here are mostly agricultural.

Figure 7: Effect of Financialization on the Cost of Equity



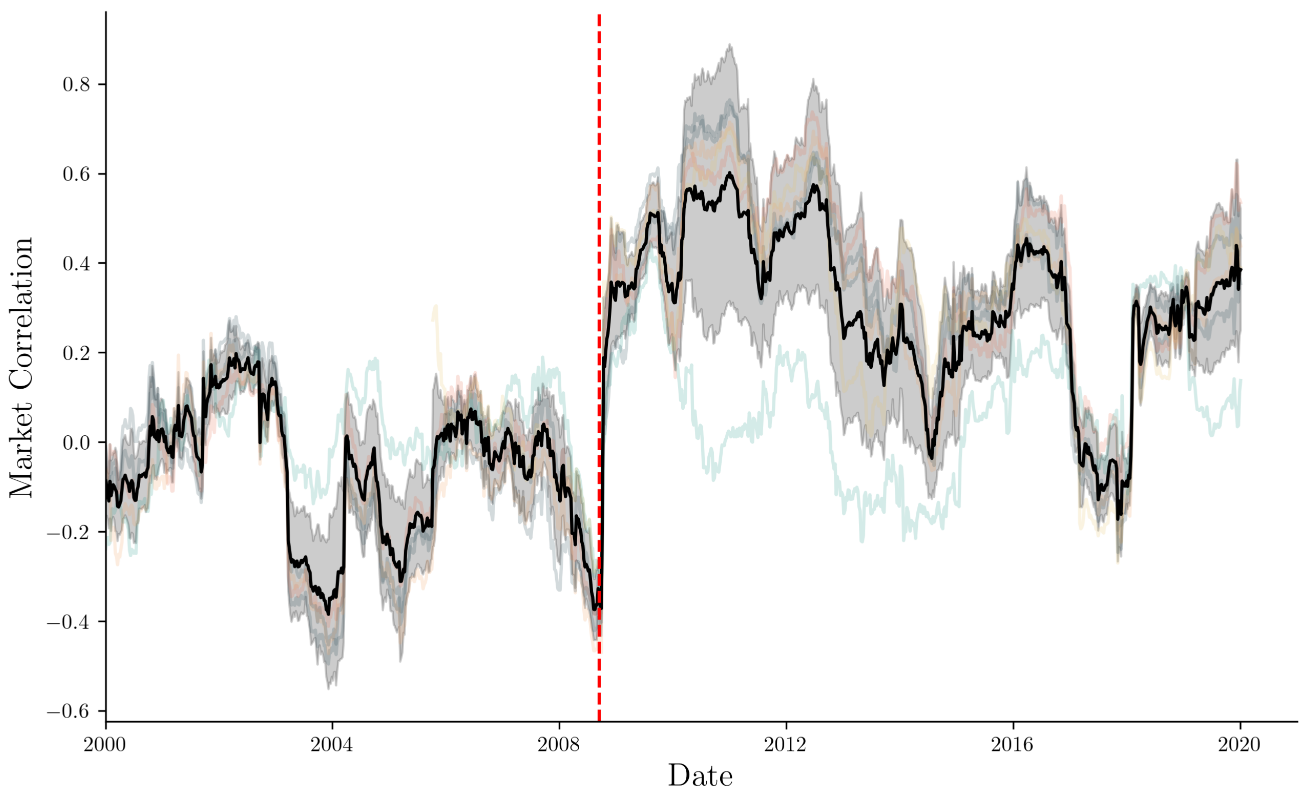
Methodology: Commodity exposure is calculated as β_2 *in an expanded CAPM model:* $r_i - r_{rf} = \alpha + \beta_1(r_m - r_{rf}) + \beta_2(r_c - r_{rf})$ *where* r_m *and* r_c *are the returns on the S&P 500 and S&P GSCI, respectively. We split these up in ventiles and see that there is no risk-premium related to commodity exposure.*

Appendix B: Application to Oil

In 2023, the S&P GSCI allocated 61.47% of its basket to energy commodities, more specifically 21.83% and 19.94% to WTI- and Brent crude oil, respectively. Hence, it is important to focus on energy commodities, as they could significantly influence my results. In Figure 8, I can see an increase in correlation between energy commodities and the S&P 500 after the fall of Lehman Brothers on September 21st, 2008. This stands in stark contrast to the market correlation of metals (see Figure 9) in which we see no persistent increase post-financialization. Quickly recapitulating the core idea, (1) as commodities themselves start co-moving more with market returns so do the firms exposed to their prices through revenue or cost channels. (2) This increases the systemic risk of these firms and leads investors to demand a higher cost of equity. (3) As exposed firms' cost of equity increases, they are forced to reduce investment. I will show the three steps of the mechanism separately below.

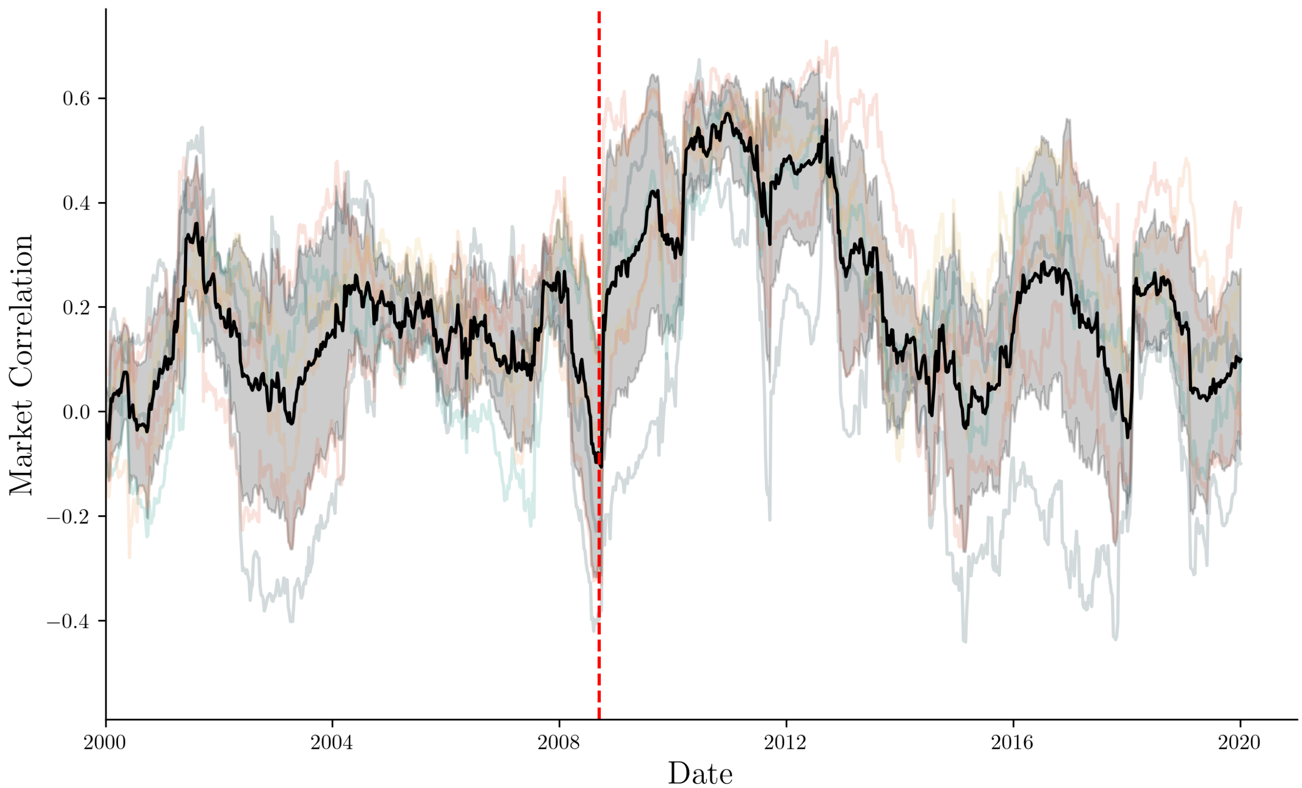
Applying our difference-in-difference strategy on oil-exposed firms (WTI crude oil) shows how firms with a high exposure to WTI crude oil started co-moving more with the market ex-post than those firms with little exposure to the energy markets (see Table 5). Interestingly, firms exposed to energy markets have a lower market correlation (S&P 500) ex-ante, but a higher one ex-post. Figure 10 shows that, ex-ante, exposed firms have a lower cost of equity (CoE) than the unexposed firms. Table 6 shows a 4.5% increase in CoE for exposed firms after financialization. This translates into a 30.2% decrease in investment; however this result is not statistically significant.

Figure 8: Financialization of Energy Commodities



Methodology: The correlations were calculated using a 1-year rolling window on weekly return data for energy commodities. The black line give the aggregate (unweighted mean) correlation of the separate energy commodities included in the S&P GSCI (colored lines). I mark a structural break at the fall of Lehman Brothers on September 21th 2008.

Figure 9: Financialization of Metal Commodities



Methodology: The correlations were calculated using a 1-year rolling window on weekly return data for metal commodities. The black line give the aggregate (unweighted mean) correlation of the separate metal commodities included in the S&P GSCI (colored lines). I mark a structural break at the fall of Lehman Brothers on September 21th 2008.

Table 5: Diff-in-Diff Results (Market Correlation)

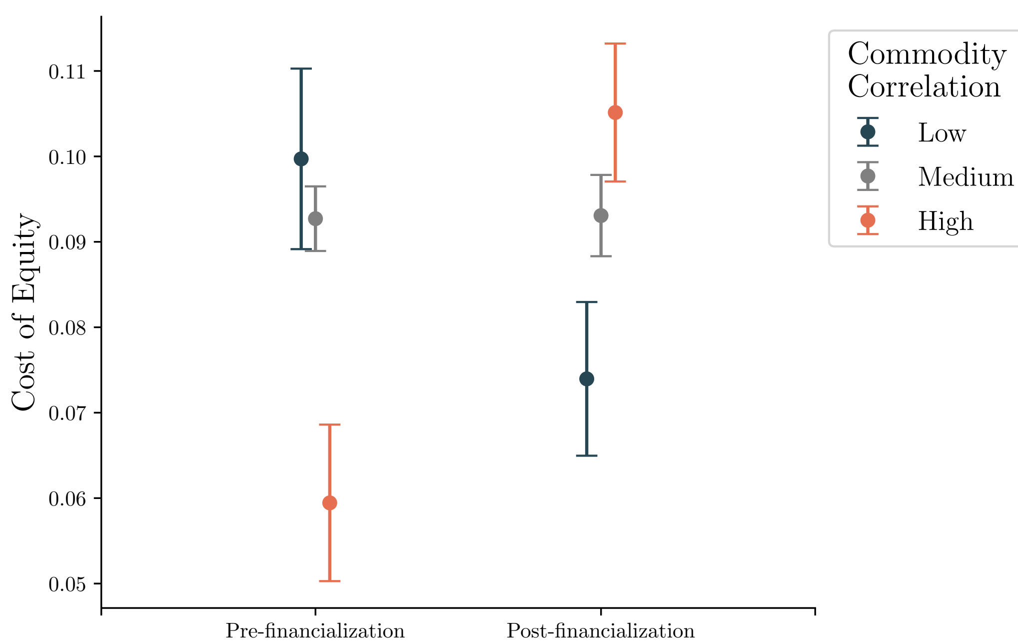
	(1)	(2)
High Oil Exposure	-0.036***	-0.048***
	(0.010)	(0.010)
Post-Financialization	0.047***	0.101***
	(0.011)	(0.012)
High Oil Exposure × Post-Financialization	0.086***	0.089***
	(0.013)	(0.013)
Constant	0.308***	
	(0.008)	
R-Squared	0.049	0.168
Observation	600,951	600,951
Year FE		Yes

Methodology: We run the following regression:

$$Corr_{i,t}^{market} = \alpha + \beta_1 Post_t + \beta_2 Exposure_{i,t}^{comm} + \beta_3(Post_t \times Exposure_{i,t}^{comm}) + \eta_t + \varepsilon_{i,t}$$

on weekly correlation data where the financialization event happens during the fall of Lehman borther on September 21th 2008. Exposed (treated) firms are those in the top nonile and control (untreated) firms are in the bottom nonile. The standard errors are clustered at the firm-level.

Figure 10: Effect of Financialization on the Cost of Equity of Oil-exposed Firms



Methodology: The cost of equity is calculated using a simple CAPM model: $r_e = r_{rf} + \beta(r_m - r_{rf})$ where β is the OLS coefficient when regressing excess firm returns on excess market returns. Commodity exposure is calculated as β_2 in an expanded CAPM model: $r_i - r_{rf} = \alpha + \beta_1(r_m - r_{rf}) + \beta_2(r_{oil} - r_{rf})$ where r_m and r_{oil} are the returns on the S&P 500 and WTI Crude, respectively. High- and low-commodity exposure are the top and bottom ventile in the sample. I use the middle ventile to represent the no-correlation firms.

Table 6: Diff-in-Diff Results (Cost of Equity)

	(1)
High Oil Exposure	-0.040***
	(0.008)
Post-Financialization	-0.026***
	(0.007)
High Oil Exposure × Post-Financialization	0.071***
	(0.009)
Constant	0.100***
	(0.005)
R-Squared	0.004
Observation	13,815

Methodology: We run the following regression:

$$Cost\ of\ Equity_{i,t} = \alpha + \beta_1 Post_t + \beta_2 Exposure^{comm}_{i,t} + \beta_3 (Post_t \times Exposure^{comm}_{i,t}) + \varepsilon_{i,t}$$

on annual correlation data where the financialization event happens during the fall of Lehman borther on September 21th 2008. Exposed (treated) firms are those in the top nonile and control (untreated) firms are in the bottom nonile. The cost of equity is calculated using a simple CAPM model: $r_e = r_{rf} + \beta(r_m - r_{rf})$ *where* β *is the OLS coefficient when regressing excess firm returns on excess market returns. The standard errors are clustered at the firm-level.*

Table 7: Diff-in-Diff Results (5-year CapEx Intensity)

	(1)	(2)
High Oil Exposure	-0.582***	0.170
	(0.210)	(0.287)
Post-Financialization	-0.378*	-0.440**
	(0.216)	(0.205)
High Oil Exposure × Post-Financialization	-0.280	-0.365
	(0.251)	(0.243)
Constant	2.756***	2.356***
	(0.182)	(0.201)
R-Squared	0.028	0.070
Observation	5,440	5,432
Industry FE		Yes

Methodology: We run the following regression:

$$\textit{5-year CapEx Intensity}_{i,j,t} = \alpha + \beta_1 Post_t + \beta_2 Exposure^{comm}_{i,j,t} + \beta_3(Post_t \times Exposure^{comm}_{i,j,t}) + \nu_j + \varepsilon_{i,t}$$

on annual correlation data merged with Compustat (1990-2022) where we drop Financials and Utilities. The financialization event happens during the fall of Lehman borther on September 21th 2008. Exposed (treated) firms are those in the top nonile and control (untreated) firms are in the bottom nonile. 5-year CapEx Intensity is the 5-year ahead sum of all CapEx divide by the current property, plants, and equipment. The standard errors are clustered at the firm-level.