

## THE EFFECT OF COMMODITY PRICE RISK ON FIRM VALUE - AN EMPIRICAL ANALYSIS OF FIRM VALUE EXPOSURE TO COMMODITY PRICES

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<b>ARTICLE INFO</b>	<i>Abstract</i>	
<b>Article History:</b> Accepted Fixed Approved	Commodity prices tend to fluctuate more than exchange rates and interest rates, making commodity price risk a potentially larger source of risk for companies. This paper offers a detailed examination of the economic exposure to commodity prices for a broad group of nonfinancial firms. The findings reveal that some corporations have net exposure to specific commodity prices. However, despite the high volatility of commodity prices, the risk associated with them is not found to be more significant than other financial risks. The results suggest that commodity price changes have minimal impact on cash flow and that companies engage in hedging to manage this risk.	
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	<b>Abstraks</b>	
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### INTRODUCTION

Most research on exposure focuses on the impact of unexpected changes in foreign exchange rates or, less frequently, interest rates on company values. In contrast, the effect of commodity price changes on firms has been analyzed in only a few studies, often for specific companies (Bartram et al., 2006; Bilson et al., 1994). Large-scale studies on commodity price exposure for different commodities are lacking. Given the high volatility of commodity prices, they are a significant source of risk for non-financial companies. For instance,

Ford Motor Co. delisted \$1 billion worth of precious metals inventories in 2002 after an unexpected price drop (Bartov et al., 1994).

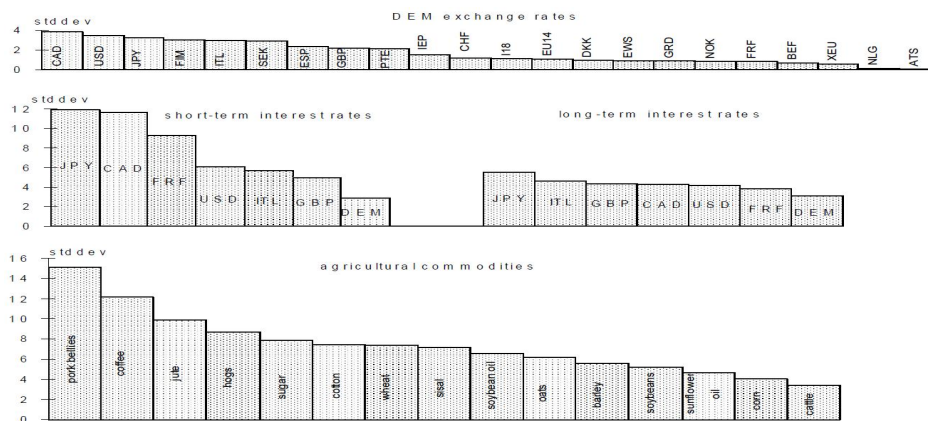
According to financial theory, commodity prices impact a company's value by affecting cash flow through production inputs and outputs. This paper provides a comprehensive analysis of the impact of various commodity prices.

Empirical research on the exposure of non-financial firms and industries has largely focused on foreign exchange risk, suggesting that exchange rates present a greater risk due to their higher

Title: The Effect of Commodity Price Risk on Firm Value-  
An Empirical Analysis of Firm Value Exposure to Commodity Prices

volatility compared to other financial prices (Bartram et al., 2003). From a company's perspective, it makes sense to prioritize managing the most significant risks first. However, comparisons of the standard deviations of various financial metrics have not yet been fully explored. financial prices—such as exchange rates, interest

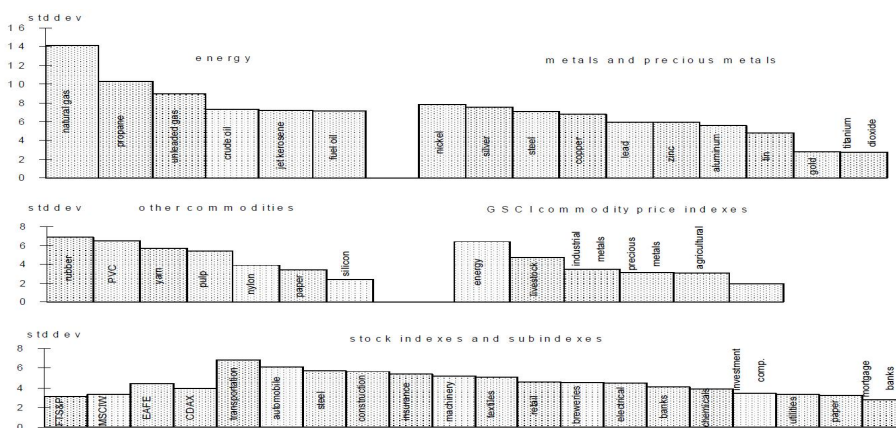
rates, commodity prices, and stock market indices—it is clear that commodity prices exhibit significant volatility, making them, in principle, a key source of risk for non-financial companies. For instance, Ford Motor Co. had to write off \$1 billion in precious metals inventories in 2002 after prices declined.



**Picture 1.** Growth graph Exchange Rate, Interest rates and commodities  
Source: Bloomberg

Unexpectedly (Bartov et al., 1994), financial theory suggests that commodity prices should influence a company's value because they impact the company's cash flow, both as an input and output in the production process. This paper provides an in-depth analysis of how various commodity prices affect individual non-financial firms and different industries. Empirical studies on exposure to foreign exchange risk have primarily focused on the argument that exchange rates

represent a more significant risk due to their higher volatility compared to other financial prices (Bartram et al., 2006). From a company's viewpoint, it makes sense to prioritize the largest risks, or at least initiate risk management efforts in those areas. However, when comparing the standard deviations of different financial prices—such as exchange rates, interest rates, commodity prices, and stock market indices



**Picture 2.** Commodity Price Growth  
Source: Bloomberg

The document discusses the standard deviation of monthly returns for various financial metrics between 1991 and 1995, with natural gas

data starting from December 1993. It mentions currency indices for 18 industrialized countries (I18), 14 EU countries (EU14), and EWS member

nations, calculated by the Bundesbank. The financial metrics include short-term (3-month Eurorates) and long-term (10-year benchmark government bond yields) interest rates, with commodity price calculations based on refunds. According to JP Morgan (1994), other components of commodity returns, like roll returns and collateral returns, do not impact the volatility or correlation of commodities with other financial prices. The commodity price index is based on total returns, while the stock market sub-index refers to CDAX, and currency abbreviations include CAD (Canadian Dollar), USD (American Dollar), JPY (Japanese Yen), and others.

Recent findings indicate that commodity prices have exhibited more volatility than most foreign exchange rates and interest rates. This volatility significantly impacts company values, making corporate risk management crucial. Despite limited empirical evidence, the high volatility of commodity prices necessitates a thorough analysis of commodity price exposure. Various hedging tools are available to manage this risk effectively. The paper's systematic analysis reveals that some firms in the sample were exposed to commodity price changes. However, despite higher volatility, overall exposure to commodity prices does not seem more critical than exposure to foreign exchange rate and interest rate fluctuations. Several factors may explain this outcome. High commodity price volatility may have a minimal impact on a company's cash flow, leading to a relatively small effect on the company's overall size, making commodity price risk potentially less significant than other economic factors with a greater

influence on cash flow.

#### LITERATURE REVIEW

Commodity price exposure describes how unexpected changes in commodity prices affect a company's value, directly impacting its operations. This is more closely tied to the company's business than exposure to foreign exchange rates or interest rates, as commodities are real goods used in production.

Indirect effects can also arise from commodity price risk through transactions with suppliers, customers, and competitors. If commodity price changes have a minor impact on a company's costs and earnings, these changes can be passed on to other firms or hedged. Consequently, the empirical relationship between commodity price changes and stock returns is weak. Therefore, commodity price risk is usually found in unhedged stock prices at the corporate level. Non-financial companies, being experts in their operations, often manage commodity price risk effectively through hedging.

For example, companies in the chemical, rubber, and plastics industries might seem highly sensitive to oil price risk. However, they may also hedge against this risk using oil futures and contracts. While broad data on corporate hedging practices is limited, individual cases, like MGRM (a Metallgesellschaft subsidiary in the US), show that companies in the commodity business can hedge. Similarly, studies on North American gold mining and the gas and oil industries indicate these companies use specific data sets for hedging. In addition to financial or operational hedging, companies might manage commodity price changes effectively.

**Table 1.** Exchange-Traded Commodities

Agricultural Products		Metal	Precious Metals
Grains	Mintak, Fat, Livestock	Aluminum	Gold
Barley	Beef	Antimony	Palladium
Bran	Broiler	Bismuth	Platinum
Canola	Butter	Brass	Rhodium
Corn	Cheese	Cadmium	Silver
Corn Porridge Feed	Coconut oil	Cobalt	
Coupling	Corn Oil	Copper	Energy
Rice	Cottonseed Oil	Titanium Iron	Butane
Sorghum	Egg	Indium	Crude oil
Wheat		Magnesium	Solar
	Other Agriculture	Raksa Water	Petrol
Food and Fiber	Rubber	Nickel	Propane Gas
Burlap Fabric	Wood	Zinc	
Cacao			
Coffee			
Cotton			
Cotton Seed Flour			
Linen Seeds			

Title: The Effect of Commodity Price Risk on Firm Value-  
An Empirical Analysis of Firm Value Exposure to Commodity Prices

Flax
Pepper
Potato
Sugar
Wool Yarn

Source: Data processed (2025)

**Note:** This table lists commodities traded on exchanges as reported by The Financial Times, Wall Street Journal, Handelsblatt, and UNCTAD (1994). The set of available contracts evolves over time as unsuccessful trades are discontinued and new contracts are introduced to customers, possibly resulting in minimal or no net exposure (post-hedging exposure) for them.

While changes in all production factors or product composition have a direct economic impact on a company's costs or earnings, certain inputs or outputs (commodities) are traded on spot exchange markets and international financial market futures. Since the introduction of commodity price derivatives such as forwards, futures, and options in the 19th century, exchange-traded and OTC financial instruments have been used to hedge against commodity price fluctuations. These traded commodities include non-precious metals (e.g., aluminum, copper, nickel, zinc), energy commodities (e.g., crude oil, natural gas, fuel oil), agricultural products (e.g., grains, oil, fat, livestock, fiber), and precious metals (e.g., gold, silver, platinum, palladium), as shown in Table 1. Additional categories include prices for homogeneous industrial products (e.g., semiconductors, electricity) or services (e.g., transportation). Through cross-hedging, the price risk of commodities without traded contracts can be managed if their prices correlate strongly with other commodities whose derivatives are available.

Despite the introduction of these hedging instruments, commodity price risk management at the company level has received limited attention in academia. Notable cases like Metallgesellschaft (MGRM), which incurred significant losses from oil futures market transactions, have been documented. However, the use of financial instruments to reduce cash flow volatility due to commodity price risk is gaining popularity among non-financial companies.

Companies in the North American gold industry are ideal for studying commodity price exposure due to their homogeneous products, straightforward exposure structures, comprehensive risk management practices database, and a liquid hedging market. Consequently, exposure studies on

individual companies and cross-sectoral analyses in the industry have been conducted. Estimated gold price exposures from 48 North American gold companies revealed that more than half of the quarterly exposures were statistically significant at the 5% level (Risman et al., 2021). Gold price exposure showed significant negative relationships with gold price levels, volatility, operational diversification, and financial hedging levels, while a positive relationship existed with financial leverage. An analysis of gold price exposure for American Barrick and Homestake Mining companies indicated that financial and operational hedging, along with financial and operational leverage, impacted company value exposure concerning the analyzed risk factors (Petersen et al., 2000).

Available empirical evidence on commodity price exposure includes a study of the impact of oil price changes on 25 U.S. oil companies, with 52% showing significant oil price exposure at the 5% level (Widyatmoko et al., 1991). American Airlines also demonstrated significant exposure to oil prices in certain regression models (Bilson et al., 1994). In contrast, the Swedish automaker Volvo Cars did not exhibit significant sensitivity to changes in oil or non-energy commodity prices (Oxelheim and Wihlborg, 1995).

The results can serve as a foundation for relevant policy formulation, allowing local governments to obtain a more proportional share of palm oil revenues, thereby incentivizing sustainability.

## RESEARCH METHODS

The effect of unexpected changes in commodity prices on a company's value is primarily influenced by its economic activities (see table 2). The impact of commodity price fluctuations is most apparent for companies involved in the extraction or production of commodities, where their sales prices or quantities are directly impacted by changes in commodity prices. For example, this relationship applies to the agricultural and forestry industries concerning agricultural products, mining companies regarding both precious and non-precious metals and energy resources, and the oil refining sector in relation to rubber and other oil-based products (Wijayanti et

al., 2023).

The analysis of how commodity price changes affect companies will be conducted using regression models focused on individual commodities like oil, copper, or wheat. Given the large number of commodities and the high correlation between prices within the same category (e.g., crude oil, gas, fuel oil), using commodity price indices seems a sensible approach. Price exposure is typically evaluated in the literature (Petersen et al., 2000), (Tufano et al., 1998), Strong [1991]) through regression models that employ OLS:

$$R_{jt} = \alpha_j + \beta_1 R_{Mt} + \chi_j R_{Ct} + \varepsilon_{jt}$$

In this model,  $R_{jt}$  represents the monthly return of

company  $j$  during period  $t$ ,  $R_{Mt}$  is the return on the capital market index  $M$  in period  $t$ , and  $R_{Ct}$  indicates the return on the capital market index  $M$  during period  $t$ , while the percentage change in commodity prices (index)  $C$  refers to the change in the commodity prices during period  $t$ . Although unexpected changes in commodity prices are significant—hence the common use of commodity price changes as regressors to capture commodity price risk (Petersen et al., 2000)—market indices act as control variables for all other systematic factors influencing stock prices. The coefficient corresponding to the commodity price variable is interpreted as the company's exposure to commodity prices, accounting for any existing hedging strategies.

**Table 2.** Exposure Hypothesis

Industri	Hipotesis paparan
Pertanian/kehutanan	gandum (+/-), barley (+/-), oat (+/-), sapi (+), babi (+)
Utilitas publik/pertambangan	minyak mentah (-), minyak alami (-)
Bahan kimia	bensin (+/-), minyak pemanas (+/-), solar (+/-)
Karet/plastik	karet (+), minyak mentah (-)
Logam primer	aluminium (-), tembaga (-), seng (-), timbal (-), nikel (-), timah (-)
Mesin industri Peralatan transportasi	aluminium (-), tembaga (-), titanium (-), karet (-) aluminium (-), tembaga (-), peralatan transportasi (-), titanium (-)
Peralatan listrik	timbal (-), tembaga (-), merkuri (-), silikon (-), selenium (-), besi (-)
Berbagai macam manufaktur Kertas/penerbitan Tekstil/ kulit Makanan/tembakau	aluminium (-), pelat (-), tembaga (-), seng (-) bubur kertas (-), kertas (+/-) katun (+/-), goni (+/-) jelai (-), gandum (-), kopi (-), gula (-)

Source: Data Processed (2025)

Note: This Table Reports Exposure Hypotheses For Different Industry Sectors Based On The Key Input/Output Relationships Of Various Commodities. Signs In Parentheses Indicate Expected Direction Of Exposure (+: Positive, +/- : Direction Is Unclear, -: Negative).

Unexpected changes in relevant commodity prices, or the common practice of using shifts in commodity prices as regressors to represent commodity price risk (Petersen et al., 2000), are often employed in analysis. Market indices act as control variables to account for all other systematic factors influencing stock prices. The coefficient attached to the commodity price variable represents the company's exposure to commodity prices, after accounting for any existing hedging strategies. It is important to note that the risk

management literature typically distinguishes between a company's sensitivity to financial risk (exposure) and how risk factors are priced in financial markets. For example, significant studies, such as those by Blake et al. (1991), have examined the foreign exchange exposure of non-financial firms (Meijaard et al., 2020), (Pamungkas

et al., 2024). As illustrated in equation 1, this is a time series regression that evaluates the sensitivity of a company's stock to a risk factor (such as exchange rate changes), while controlling for

variables like market indices. Additionally, there are studies that explore whether exchange rate risk can be diversified across firms and if foreign exchange risk is already incorporated into the financial market, thereby being compensated with a risk premium in the cross-section.

## RESEARCH RESULTS AND DISCUSSION

To evaluate the impact of commodity prices on the sample companies, a regression analysis was conducted using commodity prices or indices, with CDAX as a control variable. The Newey-West procedure was used to adjust standard coefficient errors for auto-correlation and heteroscedasticity. The findings indicated significant exposure in certain instances and time frames. For the commodity price index, the percentage of companies with significant exposure ranged from 5.9% to 15.6% in agriculture, 6.9% to 15.1% in livestock, 8.7% to 15.9% in industrial metals, 4.5% to 10.7% in precious metals, and 6.1% to 14.4% in energy over various periods. Likewise, 5.9% to 15.4% of the sample companies were exposed to crude oil, while 7.5% to 10.1% and 8.7% to 12.8% were significantly affected by changes in copper and wheat prices, respectively. The results also demonstrated that commodity exposure could be both positive and negative, highlighting the importance of commodities as input/output factors and/or the influence of corporate hedging strategies.

Interestingly, despite the higher volatility of commodity prices compared to other financial variables like foreign exchange rates and interest rates, commodity price risk was not found to be statistically more significant. For instance, the percentage of non-financial companies with considerable foreign exchange exposure typically ranges from 5% to 20% (Blake et al., 1991), with similar results for interest rate exposure in comparable non-financial firms. These findings imply that although commodity prices are more volatile, they tend to impact only a small portion of a company's cash flow, suggesting that the overall economic effect of commodity price risk is relatively minor compared to the firm's size.

## CONCLUSION

Financial risk for non-financial institutions typically includes unexpected changes in foreign exchange rates, interest rates, and commodity prices. Despite the higher volatility of most commodity prices compared to exchange rates and interest rates, research on a company's

exposure to commodity prices is scarce. Commodity price changes can affect a company's value because they serve as input or output factors in the production process. There may also be an indirect impact on shareholder value through changes in customer, supplier, or competitor behavior, influencing the company's competitive position.

This paper provides a comprehensive analysis of non-financial firms' exposure to various commodity prices, examining 490 firms from 1987 to 1995. Generally, more than 5% of companies show significant exposure to commodity prices. Although commodity prices are highly volatile, the proportion of firms with significant commodity price exposure is similar to those with foreign exchange rate exposure. This suggests that commodity price risk is relatively minor for many companies and can often be mitigated. Non-financial firms manage this risk through hedging strategies, such as derivatives or commodity-linked debt, and may pass on the impact of commodity price risks to customers if market conditions allow.

Global evidence indicates that commodity price derivatives are mainly used in industries like utilities, oil, mining, steel, and chemicals. Additionally, commodity price-indexed debt is crucial in the gold mining sector. Consequently, companies facing volatile commodity prices may show minimal net exposure if they hedge effectively. Future research could explore the impact of derivatives on commodity price exposure using a sample of companies with corporate hedging data. This study could also validate commodity price exposure results by incorporating alternative control variables in regression analysis, such as Fama and French factors (1992) and macroeconomic variables like inflation changes, industrial production, and proxy time frame structures. Moreover, it would be insightful to examine foreign exchange rate risk, interest rates, and commodity prices simultaneously in a regression model that includes proxies for all three risks in one equation. Investigating whether commodity price risk is considered a risk factor in the cross-section of stock returns and if it carries a time-varying risk premium would also be interesting.



## REFERENCES

- Bilson, JFO 1994. Managing economic exposure to foreign exchange risk: A case study of American airlines. In Amihud, Y., and Levich, R. M. (eds). *Exchange rates and company performance*. New York: Irwin 221-246.
- Ainunnisa, D., Oktaviani, D., & Risman, A. (2024). The Effect of Risk Management on Profitability: Empirical Study of Banking Companies Listed in Indonesian Stock Exchange 2019-2023. *Indicator: Scientific Journal of Management and Business*, 8(3), 99-109. doi:<http://dx.doi.org/10.22441/indikator.v8i3.28287>
- Alwan, R., & Risman, A. (2023). Determinants of Firm's Value through Capital Structure, Financial Performance, and Company Growth. *Indicator: Scientific Journal of Management and Business*, 7(2), 81 - 89. doi:<http://dx.doi.org/10.22441/indikator.v7i2.18585>
- Bartov, E., and Bodnar, G.M. 1994. Company valuations, earnings expectations, and the effects of exchange rate exposure. *Journal of Finance* 44 (5): 1755-1785.
- Bartram, SM, and Karolyi, GA 2006. The impact of the introduction of the euro on foreign exchange rate risk. *Empirical Journal of Finance* 13(4-5):519-549.
- Bartram, SM; Brown, G.; and Fehle, F. 2003. *International evidence of the use of financial derivatives*. Lancaster University working paper, University of North Carolina, University of South Carolina.
- Blake, M., and Mahady, N. 1991. How mid-sized companies manage risk. *Journal of Applied Corporate Finance* 4 (1): 59-65.
- Chrisnando, N., Nilmawati, N., Widjanarko, H., & Hikmah, K. (2024). Factors Affecting Profitability of Food and Beverage Industries: A Resource-Based View and Competitiveness Approach. *Indicator: Scientific Journal of Management and Business*, 8(2), 39-50. doi:<http://dx.doi.org/10.22441/indikator.v8i2.25861>
- Huda, N., & Risman, A. (2024). The Behavioral Finance of MSMEs: Financial Inclusion and Financial Technology. *Indicator: Scientific Journal of Management and Business*, 8(2), 19-29. doi:<http://dx.doi.org/10.22441/indikator.v8i2.26780>
- Meijaard, E., Brooks, T.M., Carlson, K.M. *et al.* The environmental impacts of palm oil in context. *Nat. Plants* 6, 1418-1426 (2020)
- Ningrum, M., & Risman, A. (2022). Performance Analysis of Protected Fund and Equity Fund Using Sharpe, Treynor, Jensen. *Indicator: Scientific Journal of Management and Business*, 6(1), 52 - 62. doi:<http://dx.doi.org/10.22441/indikator.v6i1.15228>
- Nurfatriani, F., Ramawati, Sari, G. K., Saputra, W., & Komarudin, H. (2022). Oil Palm Economic Benefit Distribution to Regions for Environmental Sustainability: Indonesia's Revenue-Sharing Scheme. *Land*, 11(9), 1452. <https://doi.org/10.3390/land11091452>
- Pamungkas, A., & Risman, A. (2024). Literature Review: Environmental, Social, and Governance (ESG) Risk Management in Sustainable Business. *Journal of Doctoral Management (JDM)*, 7(2), 124-131. doi:<http://dx.doi.org/10.22441/jdm.v7i2.28308>
- Wijayanti, M., & Hikmah, K. (2023). Comparative Analysis of Financial Performance of BUKU 4 Conventional Banks Before and During Covid-19 Pandemic. *Indicators: Scientific Journal of Management and Business*, 7(3), 43 - 50. doi:<http://dx.doi.org/10.22441/indikator.v7i3.21302>