CAN HEDGING AFFECT FIRM VALUE?
AN OIL, GAS AND MINING PERSPECTIVE

by

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN FINANCE

In the Master of Science in Finance Program
of the
Faculty of Business Administration

SIMON FRASER UNIVERSITY

Fall 2013

Approval

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Degree: Master of Science in Finance

Title of Project: Can Hedging Affect Firm Value? An Oil, Gas and Mining Perspective

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Abstract

Our paper investigates the impact of financial hedging on the firm value of a sample of mining, oil and gas companies that are publicly listed on the Toronto Stock Exchange.

Employing a Tobin's Q model for the sample of companies, the study finds that hedging does not significantly affect a firm's valuation while other financial factors impact it in a statistically and economically significant manner. The results add further evidence to the current research literature that has reported contradictory empirical findings from prior research.

Our observations are consistent with the school of thought that the firm valuation effect associated with hedging is insignificant. In these resource sectors, commodity price exposure is transparent and easy to hedge by investors, so there is no reason to expect that oil, gas and mining companies hedging their production price risk(s) should have higher firm values.

JEL Classification: G1, G3, G15, G32

Keywords: derivatives; options; futures; forwards; hedging; risk management; market risk; mining; oil; gas; firm value; profitability; executive compensation

Acknowledgements

We wish to extend our sincere thanks to Dr. Christina Atanasova and Dr. Evan Gatev for their guidance, feedback, and helpful comments. We would also like to acknowledge our gratitude to the faculty of the Beedie School of Business at Simon Fraser University and to our fellow classmates for making the last sixteen-months positively memorable. More importantly, we owe a debt of gratitude to our families and friends for their unconditional support during this hectic and demanding time. Thank you.

"Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young."

— Henry Ford

"Intellectual growth should commence at birth and cease only at death."

— Albert Einstein

"The man who graduates today and stops learning tomorrow is uneducated the day after."

— Newton D. Baker

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1.0 Introduction

Berkman et al. (1996); Bodnar et al., (1996), (1998) have found that since the 1980s, non-financial firms have increasingly hedged their market risk exposure in relation to commodities, equities, foreign exchange, and interest rates by utilizing various financial derivative instruments. Merton (1993) classifies risk management strategies according to three different types of risk reduction: hedging, insurance and diversification.

A hedge is a risk management strategy used to reduce any substantial losses suffered by an individual or an organization. A hedge can be constructed from many types of financial instruments, including stocks, insurance, forward contracts, swaps, options, many types of over-the-counter and derivative products, and futures contracts. The act of *hedging* is the practice of taking a position in one market or investment to offset and balance against the risk adopted by assuming a position in a contrary or opposing market or investment.

Many hedges do not involve the usage of financial instruments. A natural hedge is an investment that reduces the undesired risk of adverse market conditions by matching cash flows. For example, an automobile exporter to Canada faces a risk of changes in the value of the Canadian dollar and chooses to open a production facility in Ontario so its costs will be denominated in the same currency as the firm's sales revenue.

Another example is a company that opens a subsidiary in a different country and borrows in the foreign currency to finance its operations, even though the foreign interest rate may be higher than in its home country. By matching the debt payments to expected revenues in the foreign currency, the parent company has reduced its foreign currency exposure. Similarly, an oil producer may expect to receive its revenues in U.S. dollars, but faces costs in a different currency; the entity would be applying a natural hedge if it agreed to, for example, pay bonuses to employees in U.S. dollars.

Insurance refers to strategies that eliminate the potential for downside risk while keeping the upside potential. Hedging, therefore, refers to financial contracts with a linear payoff function while insurance denotes contracts with non-linear payoff. *Diversification* is the strategy to engage in a wider range of activities and thereby reducing the dependence on any single activity.

There has been ongoing debates whether hedging, often in the form of financial derivatives usage, is an appropriate strategy or more speculative. Stulz (1996) observes that companies engage in some speculation because they allow their outlook on the future to impact how they manage market risks. The size of this effect is, however, uncertain and there is evidence that supports the view that the effect is insignificant on average. Géczy et al. (1997) noticed that companies with currency risk exposures appear to engage in rational currency contracts usage, thus supporting the opinion that entities are hedging instead of speculating. We will therefore assume that firms are hedging rationally and that speculation has an insignificant impact on the results.

Kim et al. (2006) report that there are two types of hedging strategies, financial and operational hedging. Financial hedging is an investment strategy whose purpose is to offset probable losses that may be incurred by some risk factors, such as price risks, liquidity risks, credit risks or even natural disaster risks, through using many types of financial instruments. Conversely, operational hedging is the strategy that hedges a firm's risk exposure by means of non-financial instruments, particularly through operational activities.

Multinational corporations (MNCs) or multinational enterprises (MNEs) will engage in operational hedging only when both exchange rate and demand uncertainty are present (Chowdhry and Howe, 1999). Operational hedging is less important for managing short-term exposures since demand uncertainty is lower in the interim. Operational hedging is also less significant for commodity-based firms that face price, but not quantity, uncertainty.

Smith and Stulz (1985) mention that the motive behind the usage of financial derivative instruments is that hedging can reduce the transaction cost of financial distress and decrease the level of tax obligation. Their research goes on to highlight that managerial risk aversion can also be one of the objectives for hedging. They determine that market imperfections make market hedging a value enhancement strategy. Froot et al. (1993) suggest that hedging can also offset the underinvestment issue and it can also affect the marketplace's perception about the capability

of managerial executives based on hedging and firm performance. Conversely, Modigliani and Miller (1958) comment that financial policies cannot change a firm's value in the lack of market failures which indicates that there would virtually be no incentive for firms to adopt hedging policies including those that utilize derivatives strategies.

It can be observed that exploring the relation between hedging and a MNC's value has increasingly become a matter of interest to many academics and practitioners. The existing literature regarding the relationship between firm value and financial hedging show some inconsistent results. Allayannis and Weston (2001) report that companies that establish a financial hedging policy experience a rise in firm value above their competitors that decide to stay unhedged or those who choose to abandon their hedging mandates. Moreover, Carter et al. (2006) claim that airlines using jet fuel whose prices are volatile benefit from the hedging premium. Jin and Jorion (2006), in contrast, report that there is usually no change in firm value between MNCs that hedge and those that do not. Fauver and Naranjo (2010) observed that in the presence of agency costs and monitoring problems the usage of financial derivatives has an adverse effect on firm value.

Our research focuses on analyzing whether or not hedging using financial derivatives enhances the value of firms and the possible reasons for our observations.

We applied four limitations to our study. First, we did not distinguish between different types of risk reduction. Second, we ignored how much or by which means hedging should be performed. Third, we did not discuss what exposures should be hedged. Finally, we assumed that hedging was undertaken rationally and that speculation was of marginal importance.

The structure of this thesis is as follows: (i) Section II examines a number of relevant literature research and earlier empirical evidence on the factors of corporate hedging and key findings on hedging and firm value; (ii) Sections III and IV present the applied methodology, data analysis and empirical results; and (iii) Section V reports our findings and conclusions.

2.0 Literature Review

According to traditional finance theory, in the absence of market imperfections, financial hedging does not impact a firm's value (Modigliani and Miller, 1958). We proceed by examining empirical studies that investigate why firms hedge by starting from the assumptions underlying the Modigliani-Miller (MM) propositions. We will relax them, one-by-one, and investigate their corresponding effect(s) on hedging incentives. Theory and empirical evidence reviewed in this thesis suggest that corporate entities hedge because some of the MM assumptions do not hold. Specifically, to have an increased debt capacity and thereby enabling a larger interest tax shield and the fact that external financing is costly appear to be important motives why they hedge.

Modern finance theory puts risk in the center. It identifies a few market imperfections that can make volatility costly. They are summarized as follows:

i. **Taxes** (Smith and Stulz, 1985; Stulz, 1996; Leland, 1998): If firms' effective marginal tax rates are an increasing function of their pre-tax value then the after-tax value of the entity is a convex function of its pre-tax value. Thus, if hedging decreases the variability of pre-tax firm values then the projected corporate tax liability is decreased and the anticipated post-tax value of the entity is increased providing the price of the financial hedge is not overly large. The greater the convexity of the corporate tax liability the greater the effectiveness of the hedge is so long as the hedging charges do not surpass the benefits of the hedge.

ii. **Financial distress costs** (Myers, 1977; Smith and Stulz, 1985): Hedging can decrease the probability that the company encounters financial distress through the reduction of the variance of its firm value, and thus decreases the expected costs of financial distress. The size of the entity also affects its motivation to hedge. For instance, financial distress can lead to bankruptcy and reorganization or liquidation which results in direct legal costs. Warner (1977) found that a firm's legal costs of financial distress are less than proportional to its size which suggests that small companies are more likely to hedge. Conversely, the costs of bankruptcy are a small fraction of a large firm's total assets. This implies that they can hedge by affording weighty information and transaction cost scale economies.

iii. **Managerial risk aversion costs** (Stulz, 1984; Smith and Stulz, 1985): If a large fraction of an MNE is owned by management, one can expect it to hedge more frequently as the executives' wealth is increasingly a linear function of its value. Moreover, researchers suggest that risk-averse executives whose compensation packages hinges on the firm's accounting earning and economic value are more likely to implement an active hedging policy since shareholders design management's compensation packages as a concave function of the firm's value.

iv. **Costly external financing** (Froot et al., 1993): Risk management theories that highlight costly external financing emphasize on the cash flow volatility as the risk measure to be hedged. For instance, Froot et al. mention that if external financing is costlier than internal financing, hedging can be a value-increasing tactic if it more closely matches fund inflows with outflows, thus decreasing the possibility that an MNC needs to access the capital markets.

These papers offer an insight into some of the motives for hedging market risk. The mentioned incentives are viewed as the fundamental factors related to firm value.

Froot et al. also observed that the more correlated a firm's cash flows are with future investment opportunities, the greater the likelihood it will hedge. They determined that hedging can explain the underinvestment problem by decreasing cash flow unpredictability so as to finance the project which possesses a positive net present value. Froot et al. go on to mention that nonlinear financial derivatives instruments (i.e.: options) will normally permit companies to synchronize financing and investment plans with greater precision than with linear financial instruments (i.e.: forwards and futures). A MNC's hedging strategies are dependent on a number of factors such as the currency risk exposure of both investment disbursements and incomes. They also note that the optimum hedging strategy for a firm will hinge on both the nature of product market competition and on the hedging policies adopted by its corporate rivals.

Froot, Scharfstein and Stein's (1993) research not only examines and explains a company's incentives behind financial hedging but it also offers responses to questions such as "What types of risks should be mitigated?", "Should such risks be partially or fully hedged?", and "What kind of financial instruments will achieve the hedging objectives?" The conclusion presented by Froot et al. compliments and adds to the findings of Smith and Stulz (1982).

Other incentives exist as to why a company hedges. Nance et al. (1993) suggest that investing in less risky, more liquid and/or imposing dividend restrictions are all alternatives for hedging. Higher asset liquidity and/or the lower its dividend yield can ensure that an MNC is able to repay its debt to creditors, thus decreasing the likelihood of financial distress. Kalay (1982) also finds that implementing dividend restrictions can ease the insufficient amount of investment problem. Nance et al. (1993) also show that entities can lower the possibility of financial distress by issuing preferred shares ("preferreds") rather than debt, as preferreds cannot cause insolvency. They also remark that the size of the company impacts whether or not it hedges. The explanations offered by Nance et al. are similar to those expressed by Smith and Stulz (1985). Nance et al. also mention that smaller companies are more likely to have taxable income in the progressive region of the tax schedule, which implies that these entities are more inclined to hedge than their larger counterparts.

Tufano (1996) mentions that researchers have assigned two categories to classify the motives behind hedging. The first one is the stockholder maximization hypothesis. This theory states that by decreasing the cost of financial distress, lowering tax liability and avoiding suboptimal investment policies, hedging can increase the expected value of a company. The second one is the managerial utility maximization hypothesis, which includes signaling of managerial skill, managerial risk aversion and alternatives to hedging as controls, such as preserving liquid assets and reducing leverage. Tufano also presents a theory regarding hedging strategies and their relation to firm value. It states that using financial derivatives can diminish firm value when agency costs between shareholders and managers exist.

The following passages examine some of the research undertaken on the predictability of hedging principles on determinants and incentives.

Nance et al. (1993) observed that firms that possess tax schedules with greater convexity hedge more. Those that utilize financial instruments possess more tax credits and a greater amount of their income is in the progressive section of the tax schedule. Their observations are consistent with the tax convexity models presented by Smith and Stulz (1985). Nance et al. also mention that their results are consistent with the opinion that hedging and other financial risk management related policies are substitutes. They found that MNCs that utilize hedging

instruments possess fewer liquid assets and higher dividends, and these observations are consistent with the findings of Nance et al. (1993).

Graham and Rogers (2002), in contrast, found no evidence that companies that hedge to decrease their projected tax liability when their tax functions are convex; this finding goes against the observations of Nance et al. (1993). Graham and Rogers' analysis suggests that an MNC hedges to increase debt capacity which, in turn, increases tax benefits.

Gay and Nam (1998) examined the incentives behind financial derivatives usage by closely analyzing the underinvestment premise proposed by Froot et al. (1993). They observed that there exists a positive relation between a firm's usage of these instruments and its growth opportunities. For firms with more investment opportunities, their use is greater when they also possess fairly low cash reserves. Gay and Nam's observations support the shareholder maximization and underinvestment hypothesis.

Dadalt et al. (2002) findings confirm that the use of financial instruments and the level of their usage are linked with lower asymmetric information. They comment that analysts' earnings forecasts possess greater accuracy and lower dispersion. These findings support DeMarzo and Duffie's (1995) argument that hedging decreases the statistical noise associated with exogenous factors and reduces the level of asymmetric information concerning a firm's earnings.

By examining gold producers, Tufano (1996) observed that the theories of managerial risk aversion appeared more explanatory than those principles behind shareholder value maximization. They noticed that mining executives who possessed more stock options managed less risk than those who owned more company shares. Also, MNCs with lower cash reserves managed more price risk. These findings are consistent with the managerial utility hypothesis.

Supanvanij and Strauss (2010) noticed that increases in executive compensation is positively correlated with rises in derivatives usage by firms while compensation in the form of salary, stock options and bonus(es) is adversely related to financial hedging. Management remuneration in the form of stock aligns the interests of management with the ongoing welfare of the MNC and increases hedging activity. Payment in the form of stock options rewards risk and reduces hedging activity. Their conclusions are comparable to the findings of Tufano (1996).

The central theme of the cited research findings is that an active hedging policy increases a firm's value when market imperfections such as underinvestment problems, convex tax schedules, and/or bankruptcy costs are prevalent. These studies also provided conflicting results regarding whether or not financial hedging achieves satisfactory economic objectives. The following passage outlines various empirical tests that have been undertaken on the relation between hedging utilizing financial derivatives and firm value.

Allayannis and Weston (2001) studied the usage of currency derivatives and analyzed their impact from hedging on a firm's value by utilizing the Tobin's Q ratio. They found substantial evidence that the use of these financial instruments is positively linked with a firm's market value and that companies that face exchange risk and who utilize such derivatives have nearly five percent higher value than those that do not use them. Their findings also suggest that MNCs that possess an active hedging policy experience an increase in value greater than those entities that decide to remain unhedged. Furthermore, those firms that choose to terminate their hedging policies experience a decline in value relative to those that decide to continue observing their hedging policy. These observations are consistent with empirical studies that propose active hedging increases firm value. Results from univariate and multivariate tests between derivatives users and non-users point out that companies who possess high growth prospects but low accessibility to financing are more likely to utilize derivatives for hedging purposes. Their findings are consistent with those of Froot et al. (1993).

Berrospide et al. (2010) also studied the effect of currency derivatives hedging on corporate performance and value. They noticed that hedging allows companies to increase their capital expenditures and to also smooth their investment policies. Their findings show that a firm's foreign debt capacity increases when it utilizes financial derivatives and it also adds to its firm value from tax shield. They concluded that currency hedging is positively correlated with firm value, and their findings are supported by Allayannis and Weston's (2001) research.

Carter et al. (2006) examined the U.S. airline industry to observe the relation between hedging and firm value. They determined that jet fuel hedging is positively correlated to an airline's firm value and that most of the hedging premium is attributed to the interaction between hedging and investment. Carter et al. emphasize that the main benefit of fuel hedging by carriers comes from a decrease in underinvestment costs.

Adam and Fernando (2006) examined a group of gold mining companies and they found that those that hedge generate positive cash flows that are economically and statistically significant. This suggests that derivatives usage for such mitigating purposes boosts shareholder value. Their findings also show that the majority of the cash flow increase seems to stem from positive realized risk premium.

Jin and Jorion (2006), having analyzed a sample of U.S. oil and gas producers, found that hedging did not seem to affect an energy firm's market value; however, they confirm that hedging does reduce a firm's price sensitivity to oil and gas prices which is opposite to Allayannis and Weston's (2001) findings.

Fauver and Naranjo (2010) also investigated the usage of financial derivatives by over 1700 companies whose headquarters were situated in the U.S. and they observed that those with greater agency and monitoring issues display a negative correlation between derivatives usage and Tobin's Q. This indicates that the use of derivatives for hedging purposes has a negative impact on firm value for entities that display greater agency and monitoring issues. Their findings are consistent with those of Tufano (1998) but conflict with the observations of DeMarzo and Duffie (1995).

According to the Modigliani-Miller theorem, hedging is a purely financial decision. Their hypothesis states that financial policy can not affect firm value in the absence of market imperfection which suggests that there is no incentive for hedging. In contrast, a number of researchers point out observations that can be considered as factors or incentives inherent in financial hedging decision-making policies; their collective empirical testing demonstrate that there is indeed a relation between financial hedging and firm market value.

Allayannis and Weston (2001), Graham and Rogers (2002), Hagelin et al. (2004), Carter et al. (2006), Adam and Fernando (2006) and Berrospide et al. (2008) found a positive relation between hedging with derivatives and firm value. Mello and Parsons (2000), Lookman (2004), Dan et al. (2005), Jin and Jorion (2006), and Fauver and Naranjo (2010), conversely, found either zero, conditional or adverse relation between hedging and firm market value. Such conflicting conclusions indicate that researchers possess mixed views. It also suggests that further research is necessary to understand this association (or lack of).

3.0 Data and Methodology

3.1 Data

We obtained quarterly financial data of oil, gas and mining companies that are listed on the Toronto Stock Exchange (TSX) with a market capitalization of over $500 million CAD as of 9/30/2013. Our analysis is based on a sample of 47 publicly-traded resource companies (18 mining companies and 29 oil & gas producers), or 1199 quarterly end-of-period observations over the period 12/30/2005 to 9/30/2013.

We only analyze companies that meet the following criteria: financial statements/reports are available from SEDAR (System for Electronic Document Analysis and Retrieval); Market Value of Equity is available on a quarterly-end basis; and there is sufficient company data needed to conduct the necessary analysis.

Following the Allayannis and Weston (2001) model, the dependent variable is firm value, proxied by the Tobin's Q (*TQ*) ratio. We calculate it as Book Value of Total Assets plus Market Value of Common Shares less Book Value of Common Shares scaled by Book Value of Total Assets. Market Value of Common Shares was calculated by multiplying the Share Price by the number of Shares Outstanding. Companies with high Tobin's Qs or with Qs greater than one have been found to be better investment opportunities (Lang et al., 1989), possess higher growth potential (Tobin and Brainard, 1968; Tobin, 1969) and indicate management has performed well with the assets under their command (Lang et al., 1989). The ability to apply Tobin's Q, as either an ancillary or indicator of firm success, is of value in a real-world setting.

Firms-quarters with negative Qs or with Qs in excess of ten are excluded to reduce measurement error. Abel and Eberly (2002) uses a similar selection criterion, excluding Qs less than zero or greater than five.

The five independent variables as factors of firm value are firm size (*FSze*), profitability (*ROA*), leverage (*LEV*), growth options (*GroOp*), and financial constraints (*FinCon*), which were discussed in length by Allayannis and Weston (2001) and Allayannis et al. (2012).

It is still uncertain if *firm size* impacts firm value. According to Nance et al. (1993), larger companies are more likely to utilize financial derivatives to hedge; however, Cabral's (1995) findings suggest that Tobin's Q is negatively related to size when MNCs are in the initial stages of growth and they spend a great deal as sunk costs.

MNCs tend to face many market exposures and are therefore more likely to utilize financial derivatives. Prior studies provide evidence as to whether firm size can indeed increase accounting profitability for firms. Nance et al. (1993) point out that corporate financial risk management could be positively correlated to firm size because economies of scale may apply to operational and transaction costs of hedging. Larger firms are more likely to use financial derivatives to mitigate their market price exposures than smaller companies since larger entities can afford the large fixed start-up costs of hedging. Consequently, it is necessary to control for size. The log of Total Assets will be used as the proxy for firm size. The purpose of taking the log of Total Assets is that the assets amount of some large firms are much greater than those of small companies which can skew the results of the analysis.

Profitability is considered a significant determinant of firm value. Profitable publicly-traded corporations are more likely to trade at a premium than lesser ones, and thus increasing a firm's market value. Breeden and Viswanathan (1998) observe that profitable MNCs may want to "lock in" the effects of their rising profitability through hedging; therefore, the greater the profitability of a hedger the higher their respective Tobin's Qs should be. The relation between Return on Assets (ROA) and the Tobin's Q ratio is expected to be positive. We use ROA, calculated as Net Income divided by Total Assets, as a proxy for profitability.

Leverage is used for firm's capital structure, which could also be related to firm value. Increasing a firm's debt can be considered a double-edge sword since a rising leverage ratio can be beneficial, yet harmful at the same time. We calculate leverage as the ratio of Total Debt to Shareholders' Equity (D/E). When calculating it, we prefer to use the market value of debt and equity rather than the book value since book value often understates current value. A high D/E ratio implies that the firm has been aggressively financing its activities through debt and therefore must pay interest on this financing. If the company's assets generate a greater return than the interest payments, then the company can generate greater earnings than it would without

the debt. If not, however, and the company's debt outweighs the return from its assets, then the debt cost may outweigh the Return on Assets. Over the long-term, this could lead to bankruptcy.

Myers (1977) and Smith and Watts (1992) have found that future investment prospects affect firm value. According to Myers, the value of the MNC is dependent on future investment growth. The consequence of hedging can ease the issue of cash shortfall when taking on future investment projects. Specifically, hedging can resolve underinvestment issues through the use of financial derivatives hedging as outlined by Froot et al. (1993). Hedgers are therefore more likely to have adequate cash reserves and take advantage of larger investment opportunities which in turn implies they could possess higher Tobin's Q ratios. We use Net Capital Spending scaled by Sales as a proxy for *growth options*. Net Capital Spending was calculated by deducting Net Fixed Assets (Beginning) from Net Fixed Assets (Ending) and adding Depreciation (Ending).

Lang and Stulz (1994) argue that firms without access to capital markets will have a higher Tobin's Q since they will only take on projects with positive net present value. In addition, Fazzari et al. (1988) mentioned that the greater the dividend yield, the lower is the probability that the company is financially constrained. In order to control for a firm's *financial constraints* we include a dummy variable to signify whether or not it pays dividends during a particular year. It is set to 1 if it paid dividends and 0 otherwise. We expect on average a negative correlation between dividends and a firm's Tobin's Q value.

Hedging information for each company in the sample can be obtained from their respective annual financial reports. To make the distribution of hedging variable more symmetric, we use the log of the fair value of derivative financial assets (*FHdg*) as a proxy for a firm's hedging variable. To control this variable, we set the hedge dummy (*HdgDum*) to 1 for firms that hedge and 0 for those that do not.

We excluded the following independent variables that appeared in past research studies:

- *Industrial Effects* since the sample size consists of firms operating in similar sectors;
- *Credit Rating* since reliable and sufficient firm ratings data cannot be found either in annual reports or in accessible databases; and
- *Tax Convexity* given that if effective marginal tax rates on corporate entities are an increasing function of their pre-tax value then the after-tax value of the firm is

a convex function of its pre-tax value (Smith and Stulz, 1985). They further observed that if hedging decreases the variability of pre-tax corporate values, the expected corporate tax liability is subsequently reduced and the expected post-tax value of the firm is increased so long as the cost of the hedge is not excessive.

3.2 Methodology

According to Allayannis and Weston (2001), companies that hedge possess a larger Tobin's Q value. To test this claim, the main hypothesis can be expressed as:

H_0: Hedging increases firm value.

H_a: Hedging does not increase (no impact on) firm value.

We estimated the hedging premium by regressing firm market value on hedging practice, controlling for the independent factors that are considered to be correlated to firm value. A number of multivariate regressions were carried out on the sample data set.

The empirical model is expressed as follows:

$$TQ = \beta_0 + \beta_1(HdgDum) + \beta_2(FHdg) + \beta_X(X) + \varepsilon$$

where *TQ* refers to an entity's firm value in a given quarter, *HdgDum* is the hedge dummy, *FHdg* represents a firm's hedge variable, X is the set of control variables (firm size (*FSze*); profitability (*ROA*); leverage (*LEV*); growth options (*GroOp*); and financial constraints (*FinCon*)), and ε is the error term.

4.0 Empirical Analysis

Table One - Descriptive Statistics

The values are separated by firms that used hedging and those that do not in a given quarter. The data from the consolidated balance sheets discussed above were then used to create the dependent variable Firm Value (TQ). Five independent variables as determinants of firm value were also calculated: Firm Size (FSze), Profitability (ROA), Leverage (LEV), Growth Options (GroOp), and Financial Constraints (FinCon). A dummy variable for Hedging was also used (HdgDum); 1 was used for hedging companies and 0 for non-hedging companies. To make the distribution of hedging variable more symmetric, we also used the log of fair value of derivative financial assets (FHdg) recognized in financial statement as a proxy for a firm's hedging variables.

Panel A **Full Sample: Mining / Oil & Gas**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.664	0.518	0.624	3.390	6.233	0.784	6.331	0.622
Standard Deviation	2.525	0.500	0.922	0.727	10.125	0.444	149.945	0.485
Number of Observations:	1199							

Panel B **Full Sample: Mining**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.568	0.537	0.796	3.466	5.953	0.598	15.504	0.545
Standard Deviation	2.377	0.499	1.040	0.662	11.686	0.392	244.472	0.498
Number of Observations:	451							

Panel C **Full Sample: Oil & Gas**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.722	0.507	0.519	3.345	6.402	0.896	0.800	0.668
Standard Deviation	2.612	0.500	0.827	0.761	9.067	0.436	1.594	0.471
Number of Observations:	748							

Panel D **Sample: Mining (HEDGED)**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.966	1.000	1.484	3.677	7.508	0.620	0.782	0.669
Standard Deviation	2.356	0.000	0.998	0.626	12.664	0.321	2.585	0.471
Number of Observations:	242							

Panel E **Sample: Mining (UNHEDGED)**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.107	0.000	0.000	3.222	4.151	0.573	32.549	0.402
Standard Deviation	2.323	0.000	0.000	0.618	10.175	0.460	358.819	0.491
Number of Observations:	209							

Panel F **Sample: Oil & Gas (HEDGED)**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.518	1.000	1.025	3.248	5.912	0.884	0.871	0.681
Standard Deviation	2.716	0.000	0.912	0.621	9.001	0.385	1.531	0.467

Number of Observations: 379

Panel G **Sample: Oil & Gas (UNHEDGED)**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.931	0.000	0.000	3.444	6.905	0.908	0.727	0.656
Standard Deviation	2.488	0.000	0.000	0.872	9.120	0.484	1.655	0.476

Number of Observations: 369

Panel H **Sample: Mining / Oil & Gas (HEDGED)**

	TQ	HdgDum	FHdg	FSze	ROA	LEV	GroOp	FinCon
Mean	4.693	1.000	1.204	3.415	6.534	0.781	0.837	0.676
Standard Deviation	2.589	0.000	0.972	0.657	10.599	0.383	2.007	0.468

Number of Observations: 621

Panel I	Sample: Mining / Oil & Gas (UNHEDGED)							
	TQ	**HdgDum**	**FHdg**	**FSze**	**ROA**	**LEV**	**GroOp**	**FinCon**
Mean	4.633	0.000	0.000	3.363	5.909	0.787	12.233	0.564
Standard Deviation	2.460	0.000	0.000	0.796	9.598	0.502	215.983	0.496
Number of Observations:	578							

Table One presents the descriptive statistics for the full sample (Panels A) and for the sub-samples of resource firms with and without hedging (Panels B - I). The variables and their sources are defined in Table One.

The mean estimates are: of firm value, 4.664; of size (in log), 3.390; of profitability, 6.233%; of leverage, 0.784; of growth options, 6.331%; of financial constraints, 0.622; and nearly 52% of the time companies are hedging. Interestingly, comparing both the mining and oil & gas sectors, companies that hedge do not necessarily possess a higher leverage than their non-hedging counterparts (Panels H and I), while hedging entities show a slightly higher firm value and greater financial constraint than their non-hedging equivalents.

Table Two - Hedge Usage and Firm Value* *indicating the significance at the 5% level*

Panel A reports the results from the multivariate regressions without the independent Hedge variables (HdgDum and FHdg) while Panel B displays the results from the regressions with the Hedge variables.

Panel A

Without Hedge Dummy

Sectors: Mining and Oil & Gas

Variable Name	β Coefficient	t Stat
Intercept	-0.82289	-2.57187
Firm Size (Fsze)	1.21808	11.57311
Profitability (ROA)	0.05306	8.93063
Leverage (LEV)	0.37353	2.68919
Growth Options (GroOp)	0.00020	0.51368
Financial Constraints (FinCon)	1.17767	6.87717
No. of Obs.	1199	
F stat*	157.57234	
Adjusted R Square	0.39521	

Without Hedge Dummy

Sector: Mining

Variable Name	β Coefficient	t Stat
Intercept	-0.47631	-0.70248
Firm Size (Fsze)	1.16063	5.22567
Profitability (ROA)	0.04300	5.36695
Leverage (LEV)	0.43188	1.70245
Growth Options (GroOp)	0.00009	0.24044
Financial Constraints (FinCon)	0.92841	3.01395
No. of Obs.	451	
F stat*	46.61655	
Adjusted R Square	0.33636	

Without Hedge Dummy

Sector: Oil & Gas

Variable Name	β Coefficient	t Stat
Intercept	-1.24428	-3.29646
Firm Size (Fsze)	1.28537	10.25476
Profitability (ROA)	0.06391	7.18331
Leverage (LEV)	0.32024	1.79336
Growth Options (GroOp)	0.10028	2.15552
Financial Constraints (FinCon)	1.33271	5.98097
No. of Obs.	748	
F stat*	113.55731	
Adjusted R Square	0.42968	

Panel B

With Hedge Dummy

Sectors: Mining and Oil & Gas

Variable Name	β Coefficient	t Stat
Intercept	-0.61629	-1.77806
Hedge Dummy (HdgDum)	-0.26329	-1.67687
Hedge Variable (FHdg)	0.08256	0.88967
Firm Size (Fsze)	1.18229	10.79179
Profitability (ROA)	0.05306	8.93248
Leverage (LEV)	0.36654	2.63346
Growth Options (GroOp)	0.00016	0.42798
Financial Constraints (FinCon)	1.18621	6.77905
No. of Obs.	1199	
F stat*	113.05887	
Adjusted R Square	0.39569	

With Hedge Dummy

Sector: Mining

Variable Name	β Coefficient	t Stat
Intercept	-0.09930	-0.13657
Hedge Dummy (HdgDum)	-0.37390	-1.41696
Hedge Variable (FHdg)	0.23358	1.60544
Firm Size (Fsze)	1.06744	4.46648
Profitability (ROA)	0.04253	5.26211
Leverage (LEV)	0.39554	1.55444
Growth Options (GroOp)	0.00005	0.12197
Financial Constraints (FinCon)	0.90245	2.92828
No. of Obs.	451	
F stat*	33.75522	
Adjusted R Square	0.33754	

With Hedge Dummy

Sector: Oil & Gas

Variable Name	β Coefficient	t Stat
Intercept	-1.10559	-2.63639
Hedge Dummy (HdgDum)	-0.14442	-0.72856
Hedge Variable (FHdg)	-0.00116	-0.00907
Firm Size (Fsze)	1.26027	9.70430
Profitability (ROA)	0.06295	6.96394
Leverage (LEV)	0.31720	1.77483
Growth Options (GroOp)	0.10192	2.17782
Financial Constraints (FinCon)	1.37252	5.81475
No. of Obs.	748	
F stat*	81.13767	
Adjusted R Square	0.42888	

Table Two reports the regression results of resource firms with and without hedging with regards to a set of firm-specific variables that have been shown to be important determinants in prior studies. The adjusted R-squared values (*for the mining and oil & gas combined sectors*) show that approximately 39.57% of the variance of a firm's value can be explained by these independent variables along with the hedge variables.

Based on the multivariate regression results, a model to predict the changes in firm value in the next fiscal quarter can be expressed as:

$$\text{Firm Value} = \beta_0 + \beta_1(\text{Hedge Dummy}) + \beta_2(\text{Hedge Variable}) + \beta_3(\text{Firm Size}) + \beta_4(\text{Profitability}) + \beta_5(\text{Leverage}) + \beta_6(\text{Growth Options}) + \beta_7(\text{Financial Constraints})$$

Based on the above data in Table Two the hedging equation (*for the mining and oil & gas combined sectors*) can be written as:

$$\text{Firm Value} = (-0.61629) - 0.26329*(\text{Hedge Dummy}) + 0.08256*(\text{Hedge Variable}) + 1.18229*(\text{Firm Size}) + 0.05306*(\text{Profitability}) + 0.36654*(\text{Leverage}) + 0.00016*(\text{Growth Options}) + 1.18621*(\text{Financial Constraints})$$

Contrary to the proposed observation that hedging increases firm value, we do not find a positive relation between them, as measured by the Tobin's Q ratio. In fact, the relationship appears negative. Specifically, the negative regression coefficient, β_1, implies a negative correlation, holding all other variables constant, between firm value and a proactive hedging policy in the resource sectors. Our study is in line with the findings of Jin and Jorion (2006), who find no association between derivatives hedging and firm value for a sample of oil and gas producers. Jin and Jorion (2007) also found no positive relationship between hedging activity and firm value as measured by Tobin's Q when analyzing the gold mining industry.

The regression coefficient $\beta_3 = 1.18229$ is positive, so for every unit increase in Firm Size an increase of 1.18229 in Firm Value is predicted, holding all other variables constant. Similarly, Profitability and Leverage are positive. Consequently, for every unit increase in these two variables an increase of 0.05306 and 0.36654 in Firm Value is predicted, respectively. It is important to mention that profitability is statistically significant at the five percent level, meaning the higher the profit, the higher the value of the firm. This is consistent with corporate valuation theory. Finally, Growth Options and Financial Constraints are also positive.

Similar observations can be made when analyzing the hedging linear multivariate equations for just the mining companies and also the sub-sample of energy producers.

Table Three - Pairwise Correlation Matrix of Selected Variables

Industries: Mining and Oil & Gas

	TQ	*HdgDum*	*FHdg*	*FSze*	*ROA*	*LEV*	*GroOp*	*FinCon*
TQ	1							
HdgDum	0.0118	1						
FHdg	0.2314	0.6525	1					
FSze	0.5362	0.0356	0.3723	1				
ROA	0.3248	0.0309	0.0738	0.1007	1			
LEV	0.2712	-0.0068	0.0861	0.2347	0.1697	1		
GroOp	-0.0435	-0.0380	-0.0254	-0.0732	-0.0759	-0.0334	1	
FinCon	0.5455	0.1158	0.3845	0.6616	0.2943	0.3870	-0.0490	1

Industry: Mining

	TQ	*HdgDum*	*FHdg*	*FSze*	*ROA*	*LEV*	*GroOp*	*FinCon*
TQ	1							
HdgDum	0.1805	1						
FHdg	0.3549	0.7122	1					
FSze	0.5135	0.3432	0.5705	1				
ROA	0.2876	0.1434	0.1719	0.1028	1			
LEV	0.2612	0.0599	0.1938	0.2631	0.1427	1		
GroOp	-0.0720	-0.0649	-0.0470	-0.1361	-0.1049	-0.0320	1	
FinCon	0.5093	0.2679	0.4799	0.7771	0.1737	0.3857	-0.0665	1

Industry: Oil & Gas

	TQ	*HdgDum*	*FHdg*	*FSze*	*ROA*	*LEV*	*GroOp*	*FinCon*
TQ	1							
HdgDum	-0.0791	1						
FHdg	0.1630	0.6202	1					
FSze	0.5536	-0.1285	0.2405	1				
ROA	0.3586	-0.0548	-0.0141	0.1060	1			
LEV	0.2844	-0.0280	0.1109	0.2834	0.1972	1		
GroOp	-0.0907	0.0454	0.0205	-0.1734	-0.1389	-0.0987	1	
FinCon	0.5700	0.0265	0.3563	0.6291	0.3954	0.3625	-0.2116	1

Table Three presents a correlation matrix of the main variables for each sample and sub-sample analysis. The independent variables are noticeably correlated to one another and more so to firm value.

5.0 Findings and Conclusions

In this paper we examined the impact of financial hedging on firm value for a sample of publicly-traded mining, oil and gas companies that are listed on the Toronto Stock Exchange.

Among the five control variables, Firm Size, Profitability and Financial Constraints enhanced the value of the firm both statistically and significantly at the five percent level. Predictably, firm's profitability and investment growth are positively related to the Tobin's Q ratio, indicating that firms with higher profitability and higher growth potentials are rewarded with higher Q ratios. In addition, Q ratios seem to be positively related to firm size among the sampled firms. We also observed that financial constraints are positively related to the Q ratio.

Contrary to the argument that an active financial risk management policy increases firm value, we do not find a positive relation between them. In fact, the relationship appears negative. This finding is inconsistent with theories denoting that hedging increases firm value. In these sectors, commodity price exposures are transparent and easy to hedge by investors; hence, there is no reason to expect that resource firms hedging their commodity (production) price risk should have higher market values.

Our observations are in line with the conclusions of Jin and Jorion (2006), who found no relation between financial hedging and firm value for a sample of energy producers. Within the analyzed oil and gas sectors, these results support the assumptions of Tufano (1996) who also found little empirical support for theories claiming that hedging stems from firm value maximization motives. Instead, Tufano shows that hedging appears to be driven mainly by managerial risk aversion.

Stulz (1984) argues that corporate risk management is an outgrowth of the risk aversion of managers. While outside shareholders' ability to diversify will effectively make them unconcerned to the amount of hedging activity undertaken, the same cannot be said for executives, whose human capital and wealth are poorly diversified. Such lack of diversification can result from managers having firm specific human capital that results in a relatively large portion of the firm's stock held by them. Thus, risk management initiated by managerial incentives may not be beneficial to shareholders and may decrease firm value.

Smith and Stulz (1985) claim that shareholders hire executives because they have specialized resources that increase the value of the firm. Managers cannot use their expertise unless they have some discretion in the choice of their actions. Yet, unless faced with proper incentives, they will not maximize shareholder wealth. Their compensation contract must be designed so that when they increase the value of the firm, their expected utility also rises.

If Stulz (1984), Smith and Stulz (1985), Tufano (1996), Jin and Jorion (2006), and Jin and Jorion (2007) are correct, there should be no association between hedging and firm value, which is confirmed by our empirical analysis.

As in the energy sector, the commodity price risk of mining companies is easy to identify and hedge. Hedging at the firm level does not confer special advantages. Even if there was a risk premium in forward contracts, such premium can easily be captured by investors (Jin and Jorion, 2006). The firm environment is closer to that described by the Modigliani-Miller irrelevance conditions proposition. Under such conditions, it is hard to understand how hedging price risk can increase firm value.

6.0 References

Abel, A.B. and J.C. Eberly. 2002. "Investment and q with Fixed Costs: An Empirical Analysis." Working paper, The Wharton School, University of Pennsylvania, Northwestern University and N.B.E.R. (National Bureau of Economic Research).

Adam, T.R. and C.S. Fernando. 2006. "Hedging, Speculation and Shareholder Value." *Journal of Financial Economics*, 81: 283-309.

Adam, T.R., D. Dasgupta and S. Titman. 2007. "Financial Constraints, Competition, and Hedging in Industry Equilibrium." *Journal of Finance*, 62: 2445-2473.

Allayannis, G. and J.P. Weston. 2001. "The Use of Foreign Currency Derivatives and Firm Market Value." *The Review of Financial Studies*, 14: 243-276.

Allayannis, G., Lel, U. and D.P. Miller. 2012. "The Use of Foreign Currency Derivatives, Corporate Governance, and Firm Value around the World." *Journal of International Economics*, 87: 65-79.

Berkman, H. and M.E. Bradbury. 1996. "Empirical Evidence on the Corporate Use of Derivatives." *Financial Management*, 25: 5-13.

Berrospide, J.M., Purnanandam, A. and U. Rajan. 2010. "Corporate Hedging, Investment and Value." Working paper, Federal Reserve Board.

Bodnar, G.M., Hayt, G.S. and R.C. Marston. 1996. "1995 Survey of Financial Risk Management by U.S. Non-Financial Firms." *Financial Management*, 25: 113-133.

Bodnar, G.M., Hayt, G.S. and R.C. Marston. 1998. "1998 Survey of Financial Risk Management by U.S. Non-Financial Firms." Financial Management, 27: 70-91.

Brainard, W.C. and J. Tobin. 1968. "Pitfalls in Financial Model-Building." Discussion paper, Yale University.

Breeden, D. and S. Viswanathan. 1998. "Why Do Firms Hedge? An Asymmetric Information Model." Working paper, Duke University.

Cabral, L., 1995. "Sunk Costs, Firm Size and Firm Growth." *Journal of Industrial Economics*, 43: 161-172.

Callahan, M., 2002. “To Hedge or Not to Hedge...That Is the Question: Empirical Evidence from the North American Gold Mining Industry 1996-2000.” *Financial Markets, Institutions & Instruments*, 11: 271-88.

Carter, D.A., Rogers, D.A. and B.J. Simkins. 2006. “Does Hedging Affect Firm Value? Evidence from the US Airline Industry.” *Financial Management*, 35: 53-86.

Chowdhry, B. and J.T.B. Howe. 1999. “Corporate Risk Management for Multinational Corporations: Financial and Operational Hedging Policies.” *European Finance Review*, 2: 229-246.

DaDalt, P.J., Donaldson, J.R. and J.L. Garner. 2003. “Will Any Q Do? Firm Characteristics and Divergences in Estimates of Tobin’s Q.” *Journal of Financial Research*, 26: 535-551.

Dan, C., Gu, H. and K. Xu. 2005. “The Impact of Hedging on Stock Return and Firm Value: New Evidence from Canadian Oil and Gas Companies.” Working paper, Dalhousie University.

DeMarzo, P.M. and D. Duffie. 1995. “Corporate Incentives for Hedging and Hedge Accounting.” *Review of Financial Studies*, 8: 743-771.

Fauver, L. and A. Naranjo. 2010. “Derivative Usage and Firm Value: The Influence of Agency Costs and Monitoring Problems.” *Journal of Corporate Finance*, 16: 719-735.

Fazzari, S., Hubbard, R. and B. Petersen. 1988. “Financing Constraints and Corporate Investment.” *Brookings Papers on Economic Activity*, 1: 141-195.

Froot, K.A., Scharfstein, D.S. and J.C. Stein. 1993. “Risk Management: Coordinating Corporate Investment and Financing Policies.” *Journal of Finance*, 48: 1629-1658.

Gay, G.D. and J. Nam. 1998. “The Underinvestment Problem and Corporate Derivatives Use.” *Financial Management*, 27: 53-69.

Géczy C., Minton B. and C. Schrand. 1997. “Why Firms Use Currency Derivatives.” *The Journal of Finance*, 52: 1323-1354.

Graham, J.R. and D.A. Rogers. 2002. “Do Firms Hedge in Response to Tax Incentives?” *Journal of Finance*, 57: 815-840.

Hagelin, N., 2004. "Hedging Foreign Exchange Exposure: Risk Reduction from Transaction and Translation Hedging." *Journal of International Financial Management and Accounting*, 15: 1-20.

Jin, Y.B. and P. Jorion. 2006. "Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers." *Journal of Finance*, 61: 893-919.

Jin, Y.B. and P. Jorion. 2007. "Does Hedging Increase Firm Value? Evidence from the Gold Mining Industry." Working paper, University of California and California State University.

Kalay, A., 1982. "Stockholder-Bondholder Conflict and Dividend Constraint." *Journal of Financial Economics*, 10: 211-233.

Kim, Y.S., Mathur, I. and J. Nam. 2006. "Is Operational Hedging a Substitute for or a Complement to Financial Hedging?" *Journal of Corporate Finance*, 12: 834-853.

Lang, L. and R. Stulz. 1994. "Tobin's Q, Corporate Diversification and Firm Performance." *Journal of Political Economy*, 102: 1248-1280.

Lang, L.H.P., Stulz, R.M. and R.A. Walkling. 1989. "Managerial Performance, Tobin's Q, and the Gains from Successful Tender Offers." *Journal of Financial Economics*, 24: 137-154.

Leland, H., 1998. "Agency Costs, Risk Management, and Capital Structure." *Journal of Finance*, 53: 1213-1243.

Lookman, A.A., 2004. "Does Hedging Increase Firm Value? Evidence from Oil and Gas Producing Firms." Working paper, Carnegie Mellon University.

Mello A.S. and J.E. Parsons. 2000. "Hedging and Liquidity." *The Review of Financial Studies*, 13: 127-153.

Merton, R.C., 1993. "Operation and Regulation in Financial Intermediation: A Functional Perspective." *Operation and Regulation of Financial Markets*, Stockholm: The Economic Council.

Miller, M.H., 1986. "Financial Innovation: The Last Twenty Years and the Next." *Journal of Financial and Quantitative Analysis*, 21: 459-471.

Modigliani, F. and M.H. Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment." *American Economic Review*, 48: 261-297.

Myers, S., 1977. "The Determinants of Corporate Borrowing." *Journal of Financial Economics*, 5: 147-175.

Nance, D.R., Smith, C.W. and C.W. Smithson. 1993. "On the Determinants of Corporate Hedging." *Journal of Finance*, 48: 267-284.

Richard, P., Devinney, T., Yip, G. and G. Johnson. 2009. "Measuring Organizational Performance: Towards Methodological Best Practice." *Journal of Management*, 35: 718-804.

Smith, C.W. Jr. and R.M. Stulz. 1985. "The Determinants of Firms' Hedging Policies." *The Journal of Financial and Quantitative Analysis*, 20: 391-405.

Smith, C.W. Jr. and R.L. Watts. 1992. "The Investment Opportunity Set and Corporate Financing, Dividend and Compensation Policies." *Journal of Financial Economics*, 32: 263-292.

Stulz, R.M., 1984. "Optimal Hedging Policies." *Journal of Financial and Quantitative Analysis*, 6: 127-140.

Stulz, R.M., 1996. "Rethinking Risk Management." *Journal of Applied Corporate Finance*, 9: 8-24.

Supanvanij, J. and J. Strauss. 2010. "Corporate Derivative Use and the Composition of CEO Compensation." *Global Finance Journal*, 21: 170-185.

Tobin, J., 1969. "A General Equilibrium Approach to Monetary Theory." *Journal of Money, Credit and Banking*, 1: 15-29.

Tufano, P., 1996. "Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry." *Journal of Finance*, 51: 1097-1137.

Tufano, P., 2003. "Financial Innovation." in George M. Constantinides and Milton Harris & Rene M. Stulz (eds.), *Handbook of the Economics of Finance*, ed. 1: 307-335.

Warner, J., 1977. "Bankruptcy Costs: Some Evidence." *Journal of Finance*, 32: 337-348.