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RESEARCH PAPER

Capital Expenditure, Corporate Hedging and Firms' Value: Evidence from the Oil and Gas Sector of Pakistan

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ABSTRACT

The purpose of this study was to determine the effect of capital expenditure and corporate hedging on the firm's value. According to theory, hedging can raise business value by lowering costs and volatility, but it can also lower firm value by optimizing manager's utility. The study employed secondary data and population was collected from seventeen oil and gas companies that were listed on the PSX from 2011 to 2022. Panel data have been examined for fixed effect models (categories of panel model). Software called Eviews was used for analysis. On the dataset, the Levin li chu, Hauseman and Durban Watson were run. The results revealed that the Capex, Profitability, Cash holding and interest rate hedge capex have significant but Forex hedge; forex hedge capex, interst rate capex and leverage have insignificant impact with firm's value. The results of this study suggest that Pakistan's economy urgently needs to review as may protect existing as well as foreign investors.

KEYWORDS Capex Interest Rate, Foreign Exchange Rate, Oil and Gas, Pakistan Stock Exchange

Introduction

Due to its location in South Asia, Pakistan is an area with a wealth of natural resources. Energy demand is rising as a result of Pakistan's economy's 2.7% annual growth. To address the energy needs of the expanding economy, three major energy sources—oil, gas, and hydel—are now being used (Saleh, 2015).

As the largest economic sector in the world, the oil and gas industry plays a crucial role in every economy, but particularly in emerging economies like Pakistan and other nations. In Pakistan, the transportation sector consumes the most petroleum products (approximately 48%), followed by the production of power (36%), the industrial sector (12%), and the residential sector (12%) (Dr. A.R. Memon, 2018).

Despite the empirical evidence that demonstrates why hedging lowers firm value and the well-documented effects of hedging on business value. Hedging may increase a firm's worth by reducing the risks of insolvency and market volatility, but it may also decrease a firm's value, according to an analysis of the study (Omar, 2019). The utility maximization of a management creates value. The goal of this research will have to find out the way to reduce the amount of pollution in the environment. Market reliance and the over-investment hypothesis, which leads to a decrease in firm worth and we will discover that funding is scarce in Pakistan based oil and gas sector. Investment combined with hedging diminishes the value of a company, despite the fact that capital expenditure increases it. This, in turn, raises the firm's value.

The notion of manager's utility maximization is investigating in this work, which added the literature on effecting the hedging and business worth. Other potential include

management incentives, company control and cash holding by firm. In this connection, the analysis work is also providing to investors useful information on the various properties of capital expenditure and its impact on firms' value based on the market reliance. Because of this cyclical nature of oil and gas business, oil price volatility is always a source of anxiety. Hedging oil prices is one way to deal with this unpredictability (Tailor, 2020). However, many oil and gas businesses have yet to appreciate the advantages of energy risk management. By better managing cash flows and hedging of oil price, interest rate risk and exchange rate risk and oil and gas business will have additional elasticity (Jones, 2016).

Mostly firms operating in Pakistan are exposed to a variety of hazards; including frequent fluctuations observe red in interest rates, foreign exchange rates and product price. Due to their complexity, the prevailing perception is that these are solely speculative instruments that are highly leveraged and to look into the relationship between derivative use and a company's value. (Butt et al., 2021). Corporate governance mechanisms change among frequency distribution on the basis of natures of firm business as well as between different market-based company performance and accounting proxies (Akbar et al., 2020).

Most of the analyses have been carried out developed countries, hence, it was recognized that minute devotion that this study will be carried out in oil and gas sector of the Pakistan and particularly in recent years due to increasing the investment trend and product level in oil and gas industry of the Pakistan. Any firm involved oil and gas sector risk and financial management strategy must include hedging. A firm can achieve its hedging goals in a variety of ways. The risks and advantages of the hedging that are frequently employed in the oil and gas sector in Pakistan to reduce the financial risk and market risk and these factors are well considerable by the firms in oil and gas sector for maintaining and developing the capital structure. Mostly studies have been completed to know significant impression in between sub sectors of oil and gas sector performance and sector evaluation(Subhan et al., 2021). The problem statement of research study work is to track out the characteristics of capital expenditure and hedging for reducing the financial and market risk through foreign exchange rate and interest rate hedging and its impacts on firms' value in Oil and Gas Sector. A case of Pakistan, period started from 2011 to 2022.

Literature Review

Time Preference Theory

The time-preference theory of interest is often called as agio theory for interest or the Austrian theory of interest which explains the interest rates in terms of preference of people to spend now rather than later (Trostel& Taylor, 2001). In "The Theory of Interest is determined by Impatience to Spend Income and Opportunity to Invest It," economist Irving Fisher formulated this theory of Interest and defined as "an indication of the community's preference for a dollar of present revenue over a dollar of future income" and "the price of time". According to Irving Fisher's neoclassical interpretation of the time-preference theory of interest, an individual's utility function, or the degree to which one measures the worth or value of goods, and how that individual weighs the utility trade-off between present consumption and future consumption, are related to time preference.

Balance of Payments Theory

The modern approach is known as the balance of payments theory. Balance of payment theory is the most satisfactory hypothesis for determining the exchange rate. The demand and supply of currency rates are the main determinants of theory. According to this idea, the foreign currency market's rate of exchange is governed by the balance of payments in terms of foreign exchange demand and supply (Johnson, 2018).

The Utility Maximization Theory of Williamson

In contrast to profit maximization, Williamson in 1985 created managerial-utility-maximization theory. The managerial discretion theory is another name for it. Shareholders and managers are two distinct groups in huge modern corporations. Shareholders desire the most possible return on their investment, as well as the highest possible profit margins. Managers, on the other hand, have utility functions that include factors other than profit maximization.

Fuxiu and jicheng (2011) examined the firms' value enhancement by using hedging with derivatives, Analysis was completed on the basis of statistical Meta-Analysis and the data was obtained from 47 research papers. During the sample sizing of data used derivatives, hedging and firms' profitability as independent variables and found its impact of value of firm. Result showed a signifying impact among the variables and hypothesis testing set as "Hedging with derivatives is associated with an increase in firm value by using (Tobin's Q)". The empirical evidence of on another study **(**YoussoufHadji (2020)**)** identified by using the Auto-Regressive distributed Lag (ARDL) bounds testing model, the analysis re-examines the effect in changing the exchange rates, oil prices, and interest rates on inflation in the euro area from 1999(Q1) to 2019(Q4)

Gayer (2021) investigated whether hedging and vertical integration might minimize risk exposure and affect company value by generating hedge ratios, vertical integration indexes, industry updated Q statistics, and models. Vertical integration was discovered that a company can minimize the risk exposure and the efficiency of hedging against oil and gas price risk. Hedging cannot reduce risk for integrated firms, but it can for independent businesses. The finding also learned that neither vertical integration nor hedging adds value to the company.

In reviewing of another study suggested that oil price uncertainty has a considerable and nonlinear impact over the corporate cash holdings by a firms, based on the precautionary motivation of cash and the trade-off hypothesis (Alomran&Alsubaiei, 2022). First, it was discovered that corporate cash holdings are strongly correlated with oil price volatility. However, we discover evidence that the relationship between oil volatility and cash holdings is U-shaped. Finally, it was shown that the positive association between oil price uncertainty and corporate cash holdings is stronger among companies that operate in oil-exporting countries and in industries that were exposed to oil. The empirical findings, on the whole, back up our expectations and pass several robustness tests (Habib, 2022).

Subhan et al., 2021conducted their study in UK based on listed oil and gas companies in UK and data from financial reports was collected for period from 2013 to 2017. The main objective of this study work to find out the overall impact of capital expenditure and corporate hedging like foreign exchange rate and interest rate hedging on firm value. In this research work was set the hypothesis testing on capital expenditure with hedging will decrease firm value in order to find out firms market dependency and over investment. The data analysis was calculated on the basis of Tobin's Q ratio and result identified that Tobin's Q will be lower when the capital expenditures and hedging occurs on same time. Furthermore, analysis of multivariate regression model was also conducted by using impact of control variables on firm value. The overall analysis shows that capital expenditure along with hedging has create the negative impact on firms' value, supporting with the hypothesis and suggest that an approach for manager utility maximization will help out the firm value.

JochenGüntner& Peter Öhlinger (2021) concluded their study considering determining the oil supplies, oil exporting economies. The most of the Persian Gulf countries have recently made significant investments in domestic travel and tourism industry. This study focused on conditional co-movement of airlines stock returns with the real time oil prices in supporting to structural oil supply and demand shocks using the Bayesian SVAR

Model of the global oil market. This study determined that participating in the data stream World Airline Indexing provide hedge benefits conditional on supply of oil, demand consumption and inventory demand shocks,. Whereas, there is no such evidence of systematic positive and negative co-movement shocks to economic global activity and value of airline stock returns. Equity, long-term debt, short-term debt, and growth to firm value all have short-run bidirectional panel causation, according to this study. The results showed that the predicted coefficients of the lagged error correction term in variable equations are statistically significant for long-run causal linkages, hinting that these variables could play an essential role in regulating processes. The conclusions of this study are critical for decision-makers who want to improve the capital structure of their companies in order to boost their worth(Mills &Mwasambili, 2022).

Laing et al. (2020) investigated in their study in topic of the impact of working and financial hedging over the commodity price risk at oil and gas in USA. It had a lot of underlying commodity movement exposure and also analyzed the impact of hedging methods using a combination of hand-collected and publically available data. This research found no evidence that operational hedging, which referred to as multinational effective in this case. Financial hedging, on the other hand, it believes was much important and impactful. When commodity price volatility is high, the efficiency of financial hedging is reduced according to sub-period studies.

SubhanUllah (2021) conducted his study to the based on listed oil and gas companies in UK and data from financial reports was collected for period from 2013 to 2017 and identified that analysis of multivariate regression model was also conducted by using impact of control variables on firm value. The overall analysis showed that capital expenditure with hedging has always create negative impact on firms' value, with supporting the hypothesis and suggest that an approach for manager utility maximization will help out the firm value. The results revealed that there is a substitution link between management incentive and debt, in which compensation is defined by monetary salary and perks based on data from Chinese listed companies from 2002 to 2008. Furthermore, it was also discovered that this link varies depending on the nature of the organization and the extent of mercerization. This research not only adds to the capital structure and agency theories, but also drives company decisions (Fuxiu&Jicheng, 2011). Another study by Nasrin (2022) based on European firms and according to the findings, CEO pay has a considerable negative impact on company stability as evaluated by the Z Score.

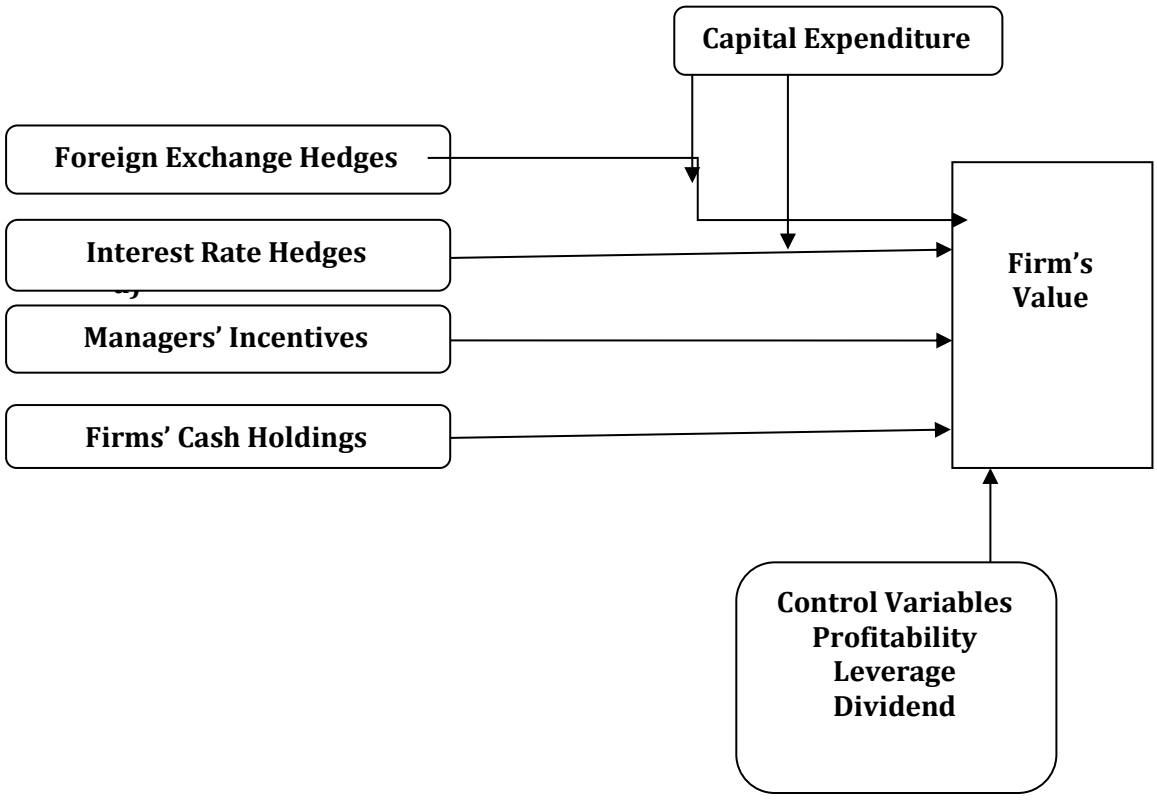
If CEO remuneration and shareholder interests in publicly traded corporations in Australia are aligned. The topic is examined over three distinct stages of an economic cycle, with the performance-remuneration models estimated using the panel fixed effects method. According to the study, CEOs and executive directors would be highly motivated by the long-term components of their remuneration plan(Wijeweera et al., 2022). The fixed compensation component, on the other hand, does not incentivize them to maximize shareholder profit..Another study conducted by Ozerturk (2006) to find out the impact of the manager's hedging abilities on his optimal compensation scheme, incentives, and firm value was examined in this study. By trading the market portfolio, it was assist the manager to lower his systematic risk exposure. It was also discovered that the manager's best hedging was determined by market liquidity. The manager's ideal hedging is incomplete due to insufficient liquidity. The market's liquidity raises the equilibrium pay-performance sensitivity, and thus the manager's equilibrium incentives and company value.

Akbar et al., 2020 and the main objective of this study was to look into the link between corporate governance and company performance. Through dynamic penal estimation, it was investigated the impact of CEO duality on board traits and their relationship to business performance. The findings of this study were based on a sample of 230 publicly traded non-financial companies from 2004 to 2014. This study was showed that corporate governance is a critical factor in influencing the financial performance of

Pakistani businesses. The outcomes of this study demonstrate some statistical variances among the sampled firms, which is consistent with previous studies (large and small size). The findings of this study was also indicated the non-linear relationship between managerial ownership and performance.

This study was conducted on the basis of trade-off theory by Kariyawasam, Rathnayake&Lasantha (2021) and the evidence of study argues that a firm's cash holdings should be at a certain level; nevertheless, empirical data are equivocal and lacking in the context of developing countries. The goal of this research is to empirically examine the existence of an optimal cash level, or the point at which a firm's value is maximized, in the setting of Sri Lanka, a developing country. This study was conducted using a quantitative research approach, with secondary data acquired from annual reports of firms listed on the Colombo Stock Exchange over a period of eight years, from 2012 to 2019. A panel data regression analysis was used to examine the impact of corporate cash holdings on company value. The findings reveal that the link between corporate cash holdings and firm value is concave. Another study conducted by Luo &Hachiya (2005) to find out the cash holdings impact on firms' value for Japanese enterprises listed on the Tokyo Stock Exchange, as well as the role of corporate governance aspects on cash holdings. Insiders also tend to hold more cash in order to contribute to their positive relationships with steady stockholders. Businesses with a higher percentage of financial institution ownership have less cash on hand, yet some of them are over borrowing due to the monopoly strength of major banks.

Conceptual Framework



The aforementioned conceptual framework in a clear research process which indicate that capital expenditure moderate relationship between FOREX and INTR hedging and firms' value, the firms' value is used as deponent variable. As far as other independent variables are concerned, managers' incentives and firms' cash holding are used. To check the direct impact of some key financial factors over the firms' value, the impact of control variables is also used, i.e. profitability, leverage and dividend.

Material and Methods

Research Composition

The decision-making process of this research approach is a crucial element of the study. Additionally, the results may be verified anytime the right techniques are applied, which will produce accurate results. This research study is based over secondary data; the applicable data is retrieved from different realistic source, websites like organizations official websites, PSO, OGRA, Forex, PSX, and SBP, firm's official websites of registered companies in oil and gas sector of Pakistan. This research work is quantitative in a nature and used deductive the approach based on penal data acquired from the analysis of suitable different statistical model through Eviews 10 software.

Sample Design

Secondary data is used to compare the findings of published research papers, set the variables and data sampling design, find out the key aspects of variables from annual reports for companies in the relevant sector, and access periodical and journal data frequently issued by various corporate and governmental entities. The goal of this study is to gather data from annual reports of companies that are registered in Pakistan's oil and gas industry.

Data Collection

The data set for this study was compiled through annual reports, published journals, the websites of the State Bank of Pakistan and the Pakistan Stock Exchange, and published periodicals of the firms. Over a sixteen-year period, from January 2011 to December 2022, secondary data for a given variable was gathered. Data obtained from official yearly reports and journals published by various departments and entities have enabled the Pakistani oil and gas industry to check and certify all data. The Pakistan Stock Exchange indicates that 17 companies are registered in Pakistan's oil and gas industry, which is divided into three subsectors: exploratory, marketing, and refinery. The data of 14 firms from each of the three subsectors have been included in this research project, but the data of the remaining three firms—all of which were registered in Pakistan in 2017–18—has not been included due to a lack of information or a lack of organizational.

Econometric Model

To determine the effects of the independent variables on firms' value (DV), an econometric model is being used.

$$FVALUEit = \beta_0 + \beta_1 FXHGit + \beta_2 FXHGit \times CAPEXit + \beta_3 ITRHGit + \beta_4 ITRHGit \times CAPEXit + \beta_5 MICit + \beta_6 CAPEXit + \beta_7 CSHDit + \beta_8 LEVit + \beta_9 PFTit + \beta_{10} DIVit + \varepsilon it$$

FVALUE = Firm Value

FXHG = Foreign Exchange Rate Hedging

CAPEX = Capital Expenditure

ITRHG = Interest Rate Hedging

MIC = Manager Remuneration

CSHD = Cash Holdings

PFT = Profitability

LEV = Leverage

DIV = Dividend

Hypotheses

H1: Foreign exchange hedging has considerable and positive impact on firms' value.

H2: Interest rate hedging has considerable and positive impact on firms' value.

H3: Capital Expenditure Moderates the FOREX and INTR Hedging and Firm Value

H4: Capital expenditure is linked directly on firm value and significant impact on firm value.

H5: Managers' Incentives can be played an important and significant role in developing on firm value.

H6: Firms' Cash Holding imposed impact on significant impact on firm value

Results and Discussion

Table 1
Panel unit root test

Test of data stationery	**Levin, lin and Chu test**	
Variables	**t-statistics**	**Probability**
F-VALUE	-4.23456	0.0124
FOREX_HEDGING	-3.78965	0.0075
FOREX_HEDGING*CAPEX	-2.9865	0.0006
INTREST_RATE__HEDGING	-8.87432	0.0017
INTREST_RATE__HEDGING*CAPEX	-4.78954	0.0048
CASH_HOLDING	-6.76543	0.0035
MANAGER__REMUNERATIONS	-5.67895	0.0005
LEVERAGE	-2.67895	0.0045
PROFITABILITY	-3.86547	0.0014
DIVIDEND	-6.89675	0.0000
CAPEX	-2.54897	0.0345

Unit root test especially in panel model, Levin, lin, and Chu technique is utilized to make sure that the data is stationery or not prior to doing panel regression which are analyzed in Table1. In step with the guideline of rule of thumb in panel unit root check said that variable is good sized at stationery and probability suggests its value less than five in keeping with cent. So, despite all the data analysis many factors are considerable inside the stage of level.

Tabel2
Hauseman Test

Analysis	**Decision Making**	**Result**	**Decision**
Hausman Test	If (Prob.) for Cross-section F. > 0.05, CE is chosen If (Prob.) for Cross-section F. < 0.05, FE is chosen	(Prob.) for Cross-section F. = 0,0000 < a (0.05)	FE is chosen
	If (Prob.) for Cross-section	(Prob.) for Cross-	RE is chosen

Table 3
Correlated Random Effect –Hauseman Test

Test summary	**Chi Square Statistics**	**Chi Square d.f.**	**Probability**

Cross Section Random	93.987	8	0.0001

The result of Hauseman Test is described through Table: 3 that is less than 0.05 so according to table: 2 which are guidance and nature of panel data are shown that the fixed effected model is best fitted for this research work.

Table 4
Model Results and Hypotheses Testing

Variable	Coefficient	Std. Error	t-statistics	Probability
FOREX_HEDG	-0.053516	0.113846	-0.470073	0.6391
FOREX_HEDG*CAPEX	1.50E-10	3.57E-10	0.418863	0.6760
INTREST_RATE__HEDG	-0.441627	0.331144	-1.333641	0.1847
INTREST_RATE__HEDG*CAPEX	-3.92E-09	2.02E-09	-1.943237	0.0542
CASH_HOLDING	0.117538	0.032556	3.610383	0.0004
MANAGER__REMUNERATIONS	-5.99E-09	1.47E-08	-0.407519	0.6843
LEVERAGE	-0.001077	0.003013	-0.357260	0.7215
PROFITABILITY	-0.546584	0.132574	-4.122850	0.0001
DIVIDEND	-0.001432	0.004915	-0.291422	0.7712
CAPEX	3.63E-09	1.99E-09	1.821209	0.0709

Effect Specification
F statistics = 17.91 R-squared = 0.76
Prob> F = 0.0000 Adjusted R-squared = 0.71
Durbin Watson state = 2.1

Table:4 describes that adjusted R square is 0.71 that means dependent variable (F-Value) is explained more than seventy percent from explanatory variables (Capex, Profitability, Cash holding, interest rate hedge capex, forex hedge, forex hedge capex, interst rate capex and leverage) which shows clearly fitness of good model. Capex, Profitability, Cash holding and interest rate hedge capex is significant with firm value of oil and gas sector. These results were also similar with study of (Karim, 2017, Nelson, 2021). Forex hedge, forex hedge capex, interst rate capex and leverage have insignificant impact with firm's value of oil and sector. These results were also similar with study of (jenny, 2019; lofiez, 2020). The value of Durbon Watson shows that there is no any autocorrelation is existed.

Conclusion

The tool of hedging is a very important derivatives market in order to ensure the financial risks and market risk for developing capital structure. In this context risk management has also increased the importance in emerging markets like Pakistan Oil and Gas Sector especially during the last decade of time from 2011 to 2021. Levin, lin, chu unit root test were employed for confirmation of data stationery that was found significant on level stage. It was clear indication for usage of regression.

After testing the basic analysis, Fix Effect Model employed, the overall fitness of model found significant, the results of model for prob. value of dependent variable (firm value) Tobin's' Q is <5% which represented significant with Capex, Profitability, Cash holding, interest rate hedge capex, forex hedge, forex hedge capex, interst rate capex and leverage and Tobin's' Q is >5% which represented insignificant with Forex hedge, forex hedge capex, interst rate capex and leverage. The evidence of this study was reviewed through trade-off theory, and this study has also given the evidence that cash holding is affecting the firm's performance in Pakistan. The results of this study are important for stakeholders including investors, portfolio managers, and government agencies. The findings of this study recommend that it is much needed by Pakistan's economy to review

the existing position of a main pioneer sector and government should take initiatives in order to reforms in Oil and Gas Sector of Pakistan, which will not protect the existing market in Pakistan but it will also encourage the foreign investors. By this changing's, firms can enhance the performance, protect the investment from market risk, foreign exchange risk, and interest rate risk and increase the profitability level.

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