Capital expenditures, Corporate Hedging and Firm Value

Abstract

Despite the well-documented mixed results of hedging on firm value, empirical evidence of why hedging reduces firm value is rare. Theory suggests that hedging can increase firm value by reducing bankruptcy cost and volatility, although it can also decrease firm value through a manager's utility maximization. This study explores the reduction of market dependence and the over-investment hypothesis that results in a reduction in firm value. By studying UK domiciled oil and gas companies, we found that capital expenditure accompanied by hedging reduces firm value, although capital expenditure itself increases firm value. This effect is pronounced when capital expenditure is made by firms with foreign operations, suggesting that hedging reduces the effect of the market's monitoring role and, therefore, capital expenditure with hedging tends to be perceived as over-investment. This paper is one of the first studies that empirically examine the reduction of market dependence and over-investment through hedging.

Keywords: hedging, market dependence, over-investment, firm value, oil and gas, UK

JEL codes: M40, M41, G30, G32,

1. Introduction

Two decades ago, Warren Buffett declared derivatives as “financial weapons of mass destruction” (Buffett, 2002). Although multinational corporations have reaped the benefits of internationalization by exploiting the use of derivatives to lower their systematic risk, idiosyncratic risk, and total risk (Trang, 2018), the legislators, policymakers, and regulators failed to identify and manage the systemic risk (Schwarcz, 2008) linked with the use of derivatives. After the financial crisis in 2008, US and European officials started to regulate the use of derivatives through collaterals and margin requirements. New Central Counterparty Clearing House and mark-to-market measures have been introduced since 2012 to enhance financial stability and reduce systemic risk. However, these measures have caused liquidity crunch risk in firms that used derivative instruments. Despite the claims from European Market Infrastructure Regulation that firms will operate in a safer financial system, many firms see these requirements (e.g., margin requirements) as a constraint on a firm’s ability to optimize the use of its resources to generate profit and maximize the firm’s value.

Although hedging is generally considered a value-enhancing activity by reducing financial distress cost (Mayers & Smith, 1982; Smith & Stulz, 1985), increasing debt capacity and tax shield (Leland, 1998), reducing under-investment problems (Froot et al., 1993), empirical evidence shows mixed results (see Bessler et al., 2019, for a meta-analysis). While several studies found a positive relation between hedging and firm value (Ahmed et al., 2014; Allayannis et al., 2012; Ayturk et al., 2016), their average effect is weak with only 0.02. On the other hand, other studies found a negative relation, especially in the oil and gas industry (Bae et al., 2016; Haushalter, 2001; Jin & Jorion, 2006).

Although a negative effect is possible due to the manager’s incentive to maximize their utility through corporate hedging (Stulz, 1984), only a few studies examined this theory, including Fauver and Naranjo (2010) who find the impact of agency cost and hedging on firm value. Our study contributes to this literature by empirically investigating an alternative hypothesis, the reduction of market dependence and over-investment, proposed by Tufano (1998) and Haushalter (2000).

Using UK domiciled oil and gas companies, we found that capital expenditure and hedging combined reduce the firm value, although capital expenditure itself tends to increase firm value. This negative effect is pronounced for companies operating overseas, suggesting that the market's monitoring mechanism is less effective for capital expenditures by overseas operating companies when they use hedging. Such capital expenditure is more likely to be considered as over-investment, reducing the firm's value. Our robustness test shows that this effect is not due to the firm size effect.

This study contributes to the literature on hedging and firm value by investigating the theory of manager's utility maximization. Despite the common findings of a negative effect of hedging on firm value, the explanation with empirical evidence is rare. Our study is one of the first to examine the reduction of market dependence and the over-investment hypothesis. Future studies can explore other possibilities, such as management incentive, corporate governance, and cash holdings. In addition, this study examines the non-dollar foreign exchange hedging by the UK oil and gas companies. This is different from the previous studies that examined the dollar-denominated foreign exchange hedging by US companies. Therefore, the findings of this study are important for companies outside the US. The study also makes a practical contribution to investors about different effects of capital expenditure on firm value based on its market dependence.

The rest of the paper is organized as follows: Section 2 presents a theoretical framework and hypothesis. Section 3 presents the methodology, followed by the sample in Section 4. Results of the main analysis and robustness tests are presented in Sections 5 and 6, respectively. The paper concludes in Section 7.

2. Theoretical framework and hypothesis

The mixed academic evidence of the impact of hedging on firm value is compounded by the mixed perception of hedging by policymakers. Over the past decades, corporate use of derivatives in risk management has grown rapidly, partly because of financial deregulation and the availability of a variety of over-the-counter and exchange-traded contracts. Derivatives create an opportunity for the market participants to bet on changes in underlying commodities, assets, or events (Hull, 2003). In the derivative market, a participant can enter into a contract with only a fraction of the full value of the underlying assets using a margin account. This fractional margin requirement allows companies to save their precious working capital while benefiting from hedging. On one hand, this innovation and growth have benefited companies, traders, and governments by creating new jobs, economic activities, and tax revenues.

On the other hand, as derivative prices are more volatile than the underlying asset prices, firms are required to follow regulations regarding margin and collateral requirements. This requirement has become stricter since 2013 when the European Union increased margin requirement through European Market Infrastructure Regulation in the form of mandatory clearing through Central Counterparty Clearing House and the mark-to-market valuation of outstanding contracts on a daily basis. As a result, corporate resources are tied up in maintaining derivative contracts, reducing the company's ability to maximize its value.

Modigliani and Miller (1958) suggest that financial strategies should not affect firm value in a perfect capital market. However, market imperfection such as tax shield, transaction costs, agency costs, direct and indirect bankruptcy costs, and external financing costs can make financial strategies useful to maximize the firm value. Hedging can reduce volatility in future cash flows, thereby reducing a firm's distress cost (Mayers & Smith, 1982; Smith & Stulz, 1985). With more predictable future cash flows, companies can borrow more money and reduce tax payments through tax shields (Leland, 1998). When economic activities are slow, companies are under pressure to preserve cash holdings although they could benefit in the long-term from purchasing low-priced assets. Hedge provides an opportunity for companies to balance long-term and short-term benefits and costs, easing the under-investment problem in the economy (Froot et al., 1993).

Consistent with this value maximization theory, studies have found that hedging tends to increase firm value. Allayannis and Weston (2001) study a relationship between hedging and firm value of large US firms and find that foreign currency hedging increases firm value by 5%. In the UK, Belghitar et al. (2008) find that foreign exchange and interest rate hedging can increase firm value by 14%. A similar result is found in other countries, such as in Sweden (Jankensgard, 2015), France (Belghitar et al., 2013), and Malaysia (Zamzamir@Zamzamin et al., 2021). However, a meta-analysis of the academic results found that the value-maximizing effect is only marginal at 0.044 on average (Bessler et al., 2019).

Several studies, however, also found that hedging decreases the firm value. This can happen when hedging is done to maximize a manager's utility, rather than a firm's utility (Stulz, 1984). Unlike outside investors who can diversify risk through their portfolio, a manager faces more restriction in holding a diverse portfolio and hence holds a more concentrated risk in the firm's stocks. Therefore, a manager can reduce this risk by using a hedge, although this is not in the best interest of the stockholders. Fauver and Naranjo (2010) find that the negative value effect occurs when a company has high agency and monitoring costs. Jin and Jorion (2006) find that US oil and gas companies do not benefit from commodity hedging, and often suffer a negative value effect. In the UK, Panaretou (2014) finds that the value-enhancing effect is only observed when foreign exchange hedging is used, but not interest rate hedging. Nguyen and Faff (2010) find that Australian firms experienced a negative value effect of interest rate hedging.

Despite the common observations that firms often suffer a negative value effect of hedging, only a few studies have empirically investigated the cause, except for Fauver and Naranjo (2010). This paper, therefore, investigates another mechanism of a manager's utility maximization through the reduction of market dependence and over-investment. Manager's utility maximization behavior results in a sub-optimal investment or over-investment from the investors' perspective. This problem becomes more severe when investors cannot evaluate the investment effectively (Huynh et al., 2020). Although hedging reduces the volatility of future cash flows and reduces bankruptcy risk, it alters the payout structure of the investment and makes market monitoring more difficult. Such a reduction in market monitoring (i.e., market dependence) makes it easier for managers to make over-investment, thereby increasing their utility while decreasing firm value. Therefore, in this paper, we expect that investors will suffer more when capital expenditure is made with hedging.

Hypothesis: Capital expenditure with hedging will decrease firm value.

3. Methodology

To test the hypothesis, we examine the relationship between firm value, capital expenditure, and hedging. Specifically, we use the following model:

$$TOBINQ_{i,t} = \beta_0 + \beta_1 CAPEX_{i,t} + \beta_2 FXHEDGE_{i,t} + \beta_3 CAPEX_{i,t} \times FXHEDGE_{i,t} + \beta_4 IRHEDGE_{i,t} + \beta_5 CAPEX_{i,t} \times IRHEDGE_{i,t} + \beta_6 LNSIZE_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LEV_{i,t} + \beta_9 DIV_{i,t} + \sum_{j=10}^{j=13} \beta_j Year\ fixed_t + \varepsilon_{i,t} \quad (1)$$

where $TOBINQ_{i,t}$ is a Tobin's Q ratio of a firm *i* at time *t*; $CAPEX_{i,t}$ is capital expenditure; $FXHEDGE_{i,t}$ is a foreign exchange hedge dummy, equals 1 if foreign exchange hedge is used, and 0 otherwise; $IRHEDGE_{i,t}$ is an interest rate hedge dummy, equals 1 if interest rate hedge is used, and 0 otherwise; $LNSIZE_{i,t}$ is firm size, measured as the natural logarithm of total assets; $ROA_{i,t}$ is return-on-assets; $LEV_{i,t}$ is leverage, measured as a ratio of long-term debt to total assets; $DIV_{i,t}$ is a dividend payment dummy, equals 1 if a dividend is paid, and 0 otherwise.

3.1. Dependent variable

We use Tobin's Q ratio to measure firm value as it is the most widely used measure of firm value in the literature (Bessler et al., 2019). Tobin's Q ratio compares the market's valuation of the firm with the replacement cost of the firm's assets. We did not use ROA or ROE as the dependent variable because they measure a firm's profitability rather than firm value. ROA is used as a control variable for profitability in this study.

3.2. Independent variables

We use capital expenditure and hedging variables to measure the impact of investment with hedging. We measured both foreign exchange (FXHEDGE) and interest rate (IRHEDGE) hedging. Due to the information limitation on the hedging amount in annual reports, we measured both hedging variables as binary variables, which equal 1 if a company uses the relevant hedging, and 0 otherwise.

3.3. Control variables

This paper uses firm size, profitability, leverage, and dividend payment as control variables. These variables are commonly used as control variables in the literature of hedging and firm value (Allayannis & Weston, 2001; Jin & Jorion, 2006; Nguyen & Faff, 2010). Firm size (LNSIZE) is measured as the natural logarithm of total assets. Empirical evidence is inconclusive of the impact of firm size on firm value. On one hand, larger firms can have higher valuations due to their market size and stability. On the other hand, smaller firms may have higher valuations due to their growth potential. Profitability is measured using return-on-asset (ROA). Profitable firms tend to have a higher valuation. Leverage is measured as long-term debt divided by total assets. Leveraged firms can increase their profitability and, thus, firm value when they make positive returns, although they can also experience increased negative profitability when they make losses. Dividend payment (DIV) is measured as a binary variable, equals 1 if a dividend is paid and 0 otherwise. Dividend payment can provide a signal that the firm will continue making profits and paying dividends in the future (Rees, 1997).

We include year-fixed dummies in the model to control for the time-varying effect of firm value. All continuous variables are winsorized at 5% and 95% levels to reduce the impact of outliers. The model uses robust standard errors to control for potential heteroskedasticity. The definitions of the variables are summarized in Table 1.

<Table 1 here>

4. Sample

The sample consists of UK domiciled companies in the oil and gas industry based on Global Industry Classification Standard from 2013 to 2017. Financial data were collected from a Bloomberg terminal, and the hedging information was manually collected from the companies' annual reports. The annual reports contain information about foreign exchange and interest rate hedges. However, the information of hedging amount is sporadic and cannot be used for analysis. Therefore, we measure the hedging information as binary variables. The sample collection initially started with 99 companies from 2013 to 2017, consisting of 495 observations. We require non-missing values across the variables used, resulting in a final sample of 238 observations covering 63 companies.

We chose the oil and gas industry because the literature showed that the negative effect of hedging on firm value is often observed in the oil and gas industry (Haushalter, 2000; Jin & Jorion, 2006), providing an ideal environment to investigate the negative value effect of hedging. Following Guay and Kothari (2003), we chose one industry rather than multiple industries to reduce an endogeneity problem caused by omitted variables. Despite being a single industry, oil and gas companies have geographically diverse operations with the need for heavy capital expenditure. Therefore, they widely make capital expenditures with foreign exchange and interest rate hedges.

Our data show that the sample companies operate in Africa, Asia, Europe, America, and Australia. Some companies operate in more than one region and continent. Figure 1 presents the geographical distribution of our sample companies' operations.

<Figure 1 here>

Table 2 presents the descriptive statistics of the variables. Companies on average have a Tobin's Q ratio of 1.053, with a standard deviation (SD) of 0.753. About 90% of the companies have made capital expenditures (shown in Table 4 below) with an average value of $74 million. 37% have used foreign exchange hedges, while 25% have used interest rate hedges. The uses of foreign exchange and interest rate hedges are not mutually exclusive. 40.3% of sample firms have used at least one form of hedges (not tabulated). The mean ROA is -14.8%, mainly because the sample period covers a period of historically low oil prices, which are the major source of the companies' income (see Figure 2 below for the historical trend of Brent crude oil prices). Companies on average have 11% of leverage, and 22.3% have paid dividends.

<Table 2 here>

<Figure 2 here>

Table 3 presents the correlations between the variables. Tobin's Q ratio is negatively related to all independent and control variables. As commonly observed in the literature, large firms tend to use more hedges and have larger capital expenditures. Companies that make capital expenditures also tend to use foreign exchange and interest rate hedges.

<Table 3 here>

5. Results

A bivariate analysis of Tobin's Q ratios based on capital expenditure and hedges is presented in Table 4. Panel A (B) shows the impact of foreign exchange (interest rate) hedge and capital expenditure decision on Tobin's Q ratio. Capital expenditure decision (CAPEX>0), as well as FXHEDGE and IRHEDGE, tends to have a negative effect on Tobin's Q ratio. The result shows that Tobin's Q ratios tend to be the lowest when capital expenditure and hedges occur at the same time.

<Table 4 here>

This preliminary result is further investigated using a multivariate regression model to isolate the impact of hedge and capital expenditure from those of control variables. Table 5 presents the results of multivariate regression models. In contrast to the bivariate analysis results in Table 4, CAPEX has a positive impact on Tobin's Q ratios when other variables are controlled. Models 2 and 3 include the hedging variable individually and interact it with CAPEX. The results show that CAPEX with hedging has a negative impact on firm value, supporting our hypothesis. Including both hedging variables in Model 4 produces a consistent result.

<Table 5 here>

6. Robustness Tests

If the hypothesis of the reduction of market dependence and over-investment is valid, we would expect that the negative impact would be stronger for companies with overseas operations. This is because capital expenditure made by overseas operators would be more difficult to evaluate and monitor, leading to a greater reduction in market dependence. In Table 6, we divide our sample into two groups: companies without foreign operations (Model 1) and companies with foreign operations (Model 2). For domestic companies, we do not observe the CAPEX and the interaction effects with hedging variables. Only companies that have overseas operations show a negative interaction effect between CAPEX and IRHEDGE, further supporting the hypothesis of the reduction of market dependence. The consistent result is observed in Model 3 when we use the full sample instead with an interaction term between IRHEDGE, FORSALE (a binary foreign operations variable), and CAPEX.

<Table 6 here>

One of the most common findings in the literature is that firm size plays a dominant role in hedging decisions. Indeed, the results in Table 5 show that firm size has a significant negative impact (at the 1% significance level) on firm value. Therefore, we tested whether our results are driven by the firm size effect, rather than by the effects of the reduction of market dependence and over-investment. In Model 1 of Table 7, we include a binary size variable (MIDSIZE) that equals 1 if the firm size is above the median, and 0 otherwise, and interact with CAPEX and hedging variables. The results show that the coefficients on FXHEDGE × MIDSIZE × CAPEX and IRHEDGE × MIDSIZE × CAPEX are not significant, indicating that our results are not driven by the firm size effect. In Model 2, we use a continuous size variable, LNSIZE, and interact it with CAPEX and hedging variables. Although the coefficient on IRHEDGE × CAPEX × LNSIZE is not significant, the coefficient on FXHEDGE × CAPEX × LNSIZE is positively significant. The positive sign is inconsistent with the negative impact we observed of CAPEX with hedging, indicating that our results are not driven by the firm size effect. In fact, the positive sign indicates that our hypothesis is strong enough to overcome the positive impact of the size effect.

<Table 7 here>

7. Conclusion

Despite the importance of the research question, whether the use of hedging increases firm value, academic studies found mixed results. A general conclusion from a meta-analysis by Bessler et al. (2019) indicates that hedging increases firm value but only by a marginal degree. Although studies often found a negative impact, only a few empirically examined the cause of the negative impact. This study fills this gap in the literature by examining the hypothesis of the reduction of market dependence and over-investment.

The results based on UK domiciled oil and gas companies indicate that capital expenditure with hedging reduces the firm value, supporting the hypothesis. This effect is pronounced for companies with overseas operations, where the market's monitoring of capital expenditure is weaker. A robustness test shows that our results are not driven by the firm size effect.

This study is one of the first studies that examine the manager's utility maximization theory in the literature. Different from Fauver and Naranjo (2010), who investigate the agency cost hypothesis on the negative value effect of hedging, this study investigates the reduction of market dependence and over-investment hypothesis. In addition, by studying non-dollar foreign exchange hedging by non-US oil and gas companies, our findings have relevance to non-US companies that use foreign exchange hedging for their operations. The study also has a practical contribution to investors who will benefit from understanding the different impacts of capital expenditure by oil and gas companies. Although capital expenditure itself increases firm value, our findings suggest that capital expenditure with hedging reduces the market's dependence and potentially leads to over-investment.

This study has caveats. Due to the sporadic nature of data of hedging amounts, we only used binary variables of foreign exchange and interest rate hedges. Future studies can utilize a fuller data set to examine the hypothesis of the reduction of market dependence and over-investment. In addition, we acknowledge that a manager's utility maximization can also be achieved through different channels, other than the reduction of market dependence and over-investment. Potential channels include a manager's incentives such as their compensation structure and shareholdings, corporate governance, and firms' cash holdings. We leave these other avenues to future research.

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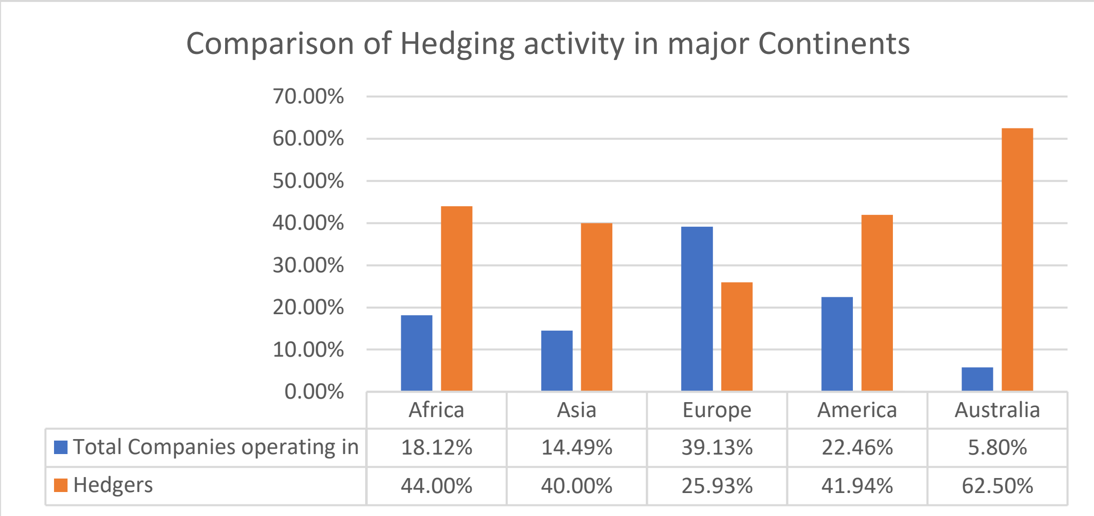
Table 1

Variable definitions.

Variable	Definition
TOBINQ	Tobin's Q ratio, measured as a ratio of the market value of firm to the replacement cost of firm assets
CAPEX	Capital expenditure in million USD
FXHEDGE	Foreign exchange hedge, measured as a binary variable equals 1 if a firm uses foreign exchange hedge, and 0 otherwise
IRHEDGE	Interest rate hedge, measured as a binary variable equals 1 if a firm uses interest rate hedge, and 0 otherwise
LNSIZE	The natural logarithm of total assets
ROA	Return-on-assets
LEV	Long-term debt divided by total assets
DIV	Dividend payment, measured as a binary variable equals 1 if a firm pays a dividend, and 0 otherwise

Figure 1

Geographical distribution of operations.



	Africa	Asia	Europe	America	Australia
Total Companies operating in	18.12%	14.49%	39.13%	22.46%	5.80%
Hedgers	44.00%	40.00%	25.93%	41.94%	62.50%

Table 2

Descriptive statistics.

	N	Mean	SD	Min	p25	Median	p75	Max
TOBINQ	238	1.053	0.753	0.210	0.539	0.830	1.311	3.202
CAPEX	238	74.540	196.705	0.000	0.419	5.680	25.570	806.960
FXHEDGE	238	0.370	0.484	0.000	0.000	0.000	1.000	1.000
IRHEDGE	238	0.248	0.433	0.000	0.000	0.000	0.000	1.000
LNSIZE	238	5.069	1.909	1.788	3.714	5.032	6.463	8.710
ROA	238	-0.148	0.247	-0.860	-0.216	-0.058	0.014	0.102
LEV	238	0.110	0.159	0.000	0.000	0.008	0.175	0.508
DIV	238	0.223	0.417	0.000	0.000	0.000	0.000	1.000

Figure 2

Brent crude oil prices.

Table 3

Correlations.

	TOBINQ	CAPEX	FXHEDGE	IRHEDGE	LNSIZE	ROA	LEV
TOBINQ							
CAPEX	-0.103						
FXHEDGE	-0.185	0.400					
IRHEDGE	-0.169	0.531	0.588				
LNSIZE	-0.286	0.603	0.456	0.639			
ROA	-0.074	0.156	0.161	0.244	0.494		
LEV	-0.042	0.355	0.463	0.565	0.563	0.209	
DIV	-0.105	0.130	0.155	0.324	0.364	0.328	0.274

Table 4

Mean Tobin's Q and frequency.

Panel A: Foreign exchange hedge			
	CAPEX=0	CAPEX>0	Total
FXHEDGE=0	mean = 1.368	1.137	1.159
	n = 14	136	150
FXHEDGE=1	1.503	0.825	0.871
	6	82	88
Total	1.409	1.020	1.053
	20	218	238

Panel B: Interest rate hedge			
	CAPEX=0	CAPEX>0	Total
IRHEDGE=0	mean = 1.444	1.092	1.125
	n = 17	162	179
IRHEDGE=1	1.211	0.811	0.831
	3	56	59
Total	1.409	1.020	1.053
	20	218	238

Table 5

The effect of capital expenditure and hedging.

	(1) TOBINQ	(2) TOBINQ	(3) TOBINQ	(4) TOBINQ
CAPEX	0.000***	0.007***	0.004**	0.009***
	(2.639)	(2.683)	(2.233)	(3.496)
FXHEDGE		-0.097		-0.154
		(-0.874)		(-1.207)
FXHEDGE × CAPEX		-0.006**		-0.005**
		(-2.465)		(-2.190)
IRHEDGE			-0.016	0.086
			(-0.159)	(0.720)
IRHEDGE × CAPEX			-0.003*	-0.003**
			(-1.959)	(-2.308)
LNSIZE	-0.207***	-0.258***	-0.232***	-0.277***
	(-5.442)	(-5.548)	(-5.481)	(-5.866)
ROA	0.323	0.399*	0.332	0.399*
	(1.345)	(1.680)	(1.396)	(1.681)
LEV	1.026***	1.305***	1.205***	1.419***
	(3.913)	(4.820)	(4.220)	(4.807)
DIV	-0.059	-0.018	-0.021	-0.002
	(-0.656)	(-0.196)	(-0.241)	(-0.025)
Intercept	2.275***	2.469***	2.341***	2.527***
	(10.345)	(10.325)	(10.270)	(10.467)
Year fixed	Yes	Yes	Yes	Yes
N	238	238	238	238
adj. R^2	0.134	0.167	0.142	0.170

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6

Capital expenditure, foreign operation, and hedging.

	(1) FORSALE = 0 TOBINQ	(2) FORSALE = 1 TOBINQ	(3) All sample TOBINQ
CAPEX	0.014	0.013***	0.012*
	(1.506)	(3.219)	(1.910)
FORSALE			0.030
			(0.174)
FXHEDGE	0.545	-0.249*	0.295
	(1.662)	(-1.762)	(1.299)
FORSALE × CAPEX			0.001
			(0.147)
FXHEDGE × CAPEX	-0.014	-0.002	-0.012*
	(-1.507)	(-0.872)	(-1.766)
FXHEDGE × FORSALE			-0.529**
			(-1.991)
FXHEDGE × FORSALE × CAPEX			0.010
			(1.518)
IRHEDGE	-0.578*	0.327*	-0.400**
	(-1.908)	(1.967)	(-2.109)
IRHEDGE × CAPEX	0.001	-0.011***	0.000
	(1.129)	(-2.726)	(0.121)
IRHEDGE × FORSALE			0.751***
			(3.050)
IRHEDGE × FORSALE × CAPEX			-0.011***
			(-2.735)
LNSIZE	-0.325**	-0.294***	-0.297***
	(-2.615)	(-5.102)	(-5.795)
ROA	0.160	0.432	0.384
	(0.200)	(1.596)	(1.506)
LEV	0.552	1.371***	1.175***
	(0.773)	(3.967)	(3.720)
DIV	0.252	-0.031	0.022
	(0.895)	(-0.280)	(0.219)
Intercept	2.333***	2.688***	2.563***
	(4.461)	(8.801)	(10.455)
Year fixed	Yes	Yes	Yes
N	64	174	238
adj. R^2	0.003	0.217	0.169

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7

The effect of size and hedging on firm value.

	(1) Using size dummy TOBINQ	(2) Using continuous size TOBINQ
CAPEX	0.072***	0.071**
	(2.798)	(2.484)
MIDSIZE	0.358*	
	(1.719)	
FXHEDGE	-0.290	-0.947
	(-1.044)	(-1.328)
MIDSIZE × CAPEX	-0.063**	
	(-2.456)	
FXHEDGE × CAPEX	-0.044	-0.058***
	(-1.315)	(-2.976)
FXHEDGE × MIDSIZE	0.369	
	(1.234)	
FXHEDGE × MIDSIZE × CAPEX	0.037	
	(1.121)	
IRHEDGE	0.483	-0.182
	(1.525)	(-0.253)
IRHEDGE × CAPEX	-0.033	-0.021
	(-1.244)	(-0.782)
IRHEDGE × MIDSIZE	-0.459	
	(-1.331)	
IRHEDGE × MIDSIZE × CAPEX	0.031	
	(1.170)	
CAPEX × LNSIZE		-0.008**
		(-2.028)
FXHEDGE × LNSIZE		0.203
		(1.553)
FXHEDGE × CAPEX × LNSIZE		0.006***
		(2.626)
IRHEDGE × LNSIZE		0.046
		(0.358)
IRHEDGE × CAPEX × LNSIZE		0.003
		(0.686)
LNSIZE	-0.368***	-0.344***
	(-4.922)	(-6.129)
ROA	0.400*	0.397
	(1.683)	(1.597)
LEV	1.463***	1.001***
	(5.103)	(3.278)
DIV	-0.045	-0.061
	(-0.449)	(-0.628)
Intercept	2.730***	2.726***
	(9.065)	(10.272)
Year fixed	Yes	Yes
N	238	238
adj. R^2	0.211	0.220

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$